User Manual
NoiseTEK Software

ver. 02.2.03



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1 Introduction

1.1 Purpose of the Manual

This manual is intended for users of NoiseTEK software and provides guidance on installing, activating and using the program's functions.

It describes the procedures for importing, displaying and processing measurements, managing applied acoustics projects, and exporting data and results.

Its aim is to guide the user through the practical use of the software and provide a reference for professional work in acoustics.

1.2 System Requirements

The following requirements apply to ensure that NoiseTEK software operates correctly:

Minimum requirements:

- Operating system: Windows 10 or later (64-bit versions)
- Processor: Intel i5 or equivalent
- RAM: 8 GB
- Disk space: at least 500 MB available
- Screen resolution: 1280×720 or higher
- Microsoft .NET Framework 4.7.2 or a later compatible version.

Recommended requirements:

- Operating system: Windows 11
- Processor: Intel i7 or better
- RAM: 16 GB
- Full HD monitor or higher for clearer display of graphs and tables

The storage space required for measurements and projects depends on the number and duration of acquisitions, particularly when audio recordings are included.

Microsoft Excel does not need to be installed to generate Excel files; a compatible program is required to open them.

1.3 Software Overview

NoiseTEK is modular software for importing, analysing and processing sound level and vibration measurements and managing applied acoustics projects.

It offers an intuitive interface and advanced tools for:

- Automatically reading data from various brands of sound level meter in the supported formats
- Displaying and analysing the time history and frequency content of measurements
- Organising and managing measurements within applied acoustics projects

The available features depend on the enabled modules and on the data actually contained in the imported files.

The modular architecture provides considerable scalability and flexibility, making the software suitable for professional practices, qualified acousticians, environmental consultants and industrial operators.

2 Software Installation

2.1 Installation Procedure

To install NoiseTEK, run the setup file supplied with the software.

The installer guides the user through the different steps in the procedure.

During installation, you can:

- Accept the proposed destination folder or select a different path.
- Choose whether to create a NoiseTEK shortcut on the desktop.

When installation is complete:

- NoiseTEK is available from the Windows Start menu.
- If selected during setup, a program shortcut is created on the desktop.
- A desktop shortcut is created to the templates folder containing the Excel templates

  used by the program.

On the final installation screen, you may also choose to launch NoiseTEK immediately.

On first launch, the program checks for a valid licence and, if necessary, displays the activation procedure described in Chapter 3.

Before installing, make sure that:

- The computer meets the system requirements in Section 1.2.
- The user has administrator privileges on the computer.
- There is sufficient free disk space.
- Antivirus software does not block the installation file (add it to the exceptions if necessary).

- All other running programs that could interfere with installation are closed.

2.2 Updates and Maintenance

NoiseTEK updates are distributed as new installation packages, supplied through the channels indicated by the software provider.

To update the program, simply run the new setup file and follow the on-screen instructions.

The procedure updates the program files without directly changing projects or measurements stored in the user's working folders.

Updated versions of the original templates supplied with NoiseTEK are also installed during an update. Customised templates should therefore be saved under different names, as described in Chapter 7.

Before updating, it is advisable to back up projects, measurements and customised templates.

3 Licence Activation

3.1 First Launch of the Program

On first launch following installation, NoiseTEK automatically checks for a valid licence. If no active licence is found, the program displays the activation window.

NoiseTEK generates a request code associated with the device on which it runs. The code contains the information required to issue the licence and is automatically copied to the clipboard to simplify transmission to support.

The licence may be tied to the workstation or, where included in the purchased configuration, to a USB dongle. It uniquely identifies the user and workstation.

3.2 Submitting an Activation Request

To obtain activation, the request code must be sent to the software supplier. This can be done in two ways:

- Manual submission: paste the request code into an email and send it to support.
- “Send by email” button: NoiseTEK automatically prepares a message containing the necessary information and opens it in the email application.

Important: the message is not sent automatically. Before sending it, you may check its contents and add any further information. The user must confirm sending in the email program.

It is advisable to provide contact details for any subsequent communications.

3.3 Receiving and Entering the Activation Code

After receiving the request, the supplier prepares the Activation Code and sends it to the user.

To complete the procedure:

- Open NoiseTEK and go to the activation window.
- Enter the Activation Code received in the appropriate field.
- Click the “Activate” button.

If the code is correct, NoiseTEK confirms activation and enables access to the features covered by the licence.

Note: workstation-based licences are linked to the device for which the request was made. Replacing the computer or significantly changing its configuration may require a new activation.

3.4 Checking Licence Status

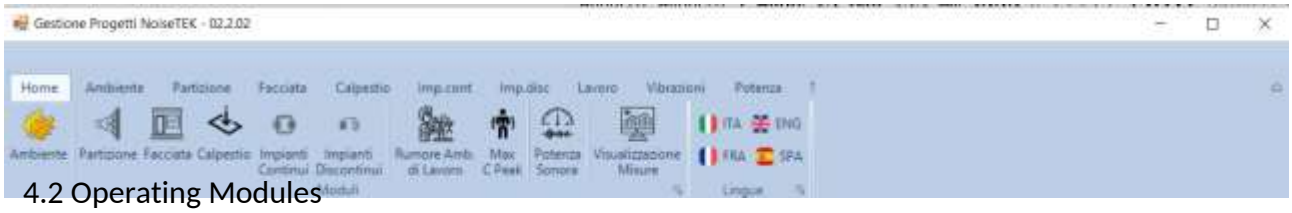
After activation, you can check the active licence status at any time using the menu: “?” → “Info”

4 User Interface

4.1 General Overview

The NoiseTEK user interface is based around a ribbon that organises commands and tools by topic. Its purpose is to provide convenient access to the available features according to the current operating context.

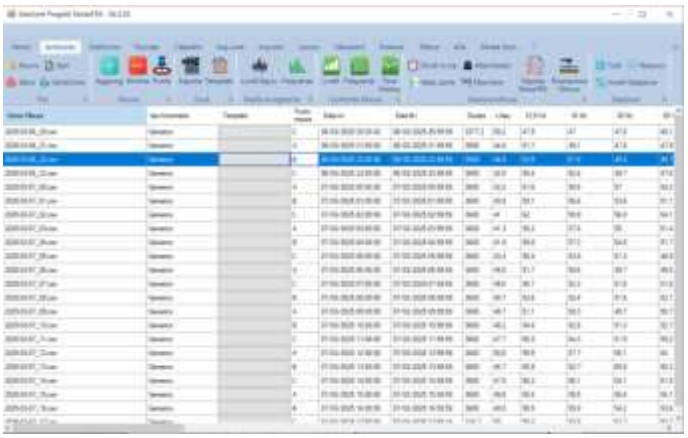
At startup, the main screen allows the user to select the required operating module: “Environment”, “Partition”, “Facade”, “Impact Sound”, “Continuous Systems”, “Intermittent Systems”, “Workplace”, “Vibrations” and “Sound Power”, as well as “Measurement Viewer”.



4.2 Operating Modules

Each selected module has a dedicated command ribbon comprising tabs, command groups and icons for interaction. The main modules are:

4.2.1 “Environment”



This module manages environmental sound level measurements and includes functions for:

- Adding and removing measurements
- Managing measurement points
- Exporting to Excel
- Analysing equivalent sound levels and frequency content
- Managing individual measurements: splitting, masking and resampling
- Exporting the complete measurement to CSV

4.2.2 “Partition”

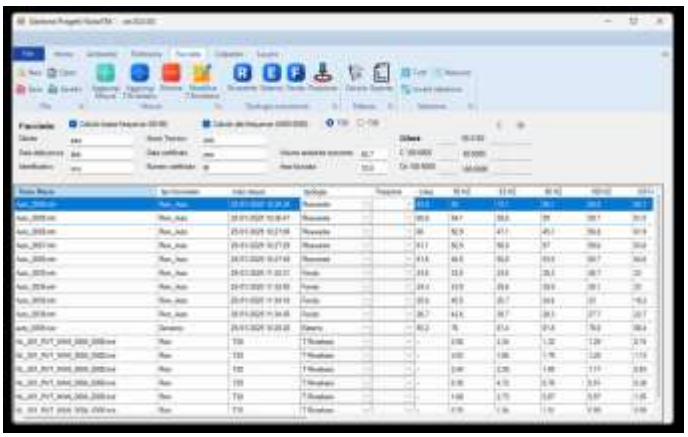
Used to analyse airborne sound insulation between rooms. Features include:



- Entering measurements for the source room, receiving room, background noise and reverberation time
- Calculating R’w and spectrum adaptation terms (C, Ctr)
- Basic settings: using T20/T30 and calculations at low and high frequencies
- Entering parameters required to calculate or print a certificate, such as partition area, volume, date, technician and client details
- Exporting the certificate

4.2.3 “Facade”

It manages the measurements for calculating the acoustic insulation of facades:



• Insertion of external measures, in the environment

receiver, background and reverberation time
• Calculation of D_2m,nT, C and Ctr curves
• Basic settings: use of T20/T30, calculation

at low frequencies and at high frequencies.
• Entering the parameters necessary for the

Calculate or print the certificate, such as facade area, volume, date, technician, customer, etc.
• Export certificate

4.2.4 “Trampling”

Dedicated to impact noise measurements:



• Insertion of measurements in receiving environment, background and reverberation time
• Calculation of L’n,w, verification of machine beats
• Basic settings: use of T20/T30, calculation

at low frequencies and at high frequencies.
• Entering the parameters necessary for the

Calculate or print the certificate, such as floor area, volume, date, technician, customer, etc.
• Export certificate

4.2.5 “Continuous cycle plants”

Dedicated to the assessment of noise produced by continuous-cycle technological systems. Includes:

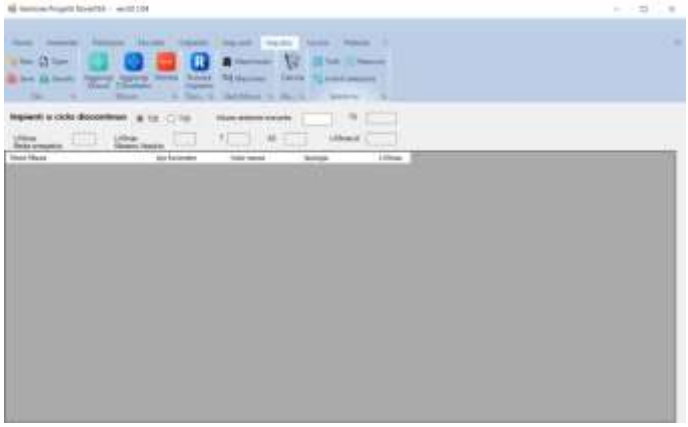


• Insertion of system noise measurements, residual noise and reverberation time
• Calculation of the A-weighted equivalent level

medium
• Application of the K1 and K2 corrections.
• Calculation of the noise level of the continuous cycle system

4.2.6 “Discontinuous cycle plants”

Dedicated to the assessment of noise produced by discontinuous-cycle technological systems. Includes:



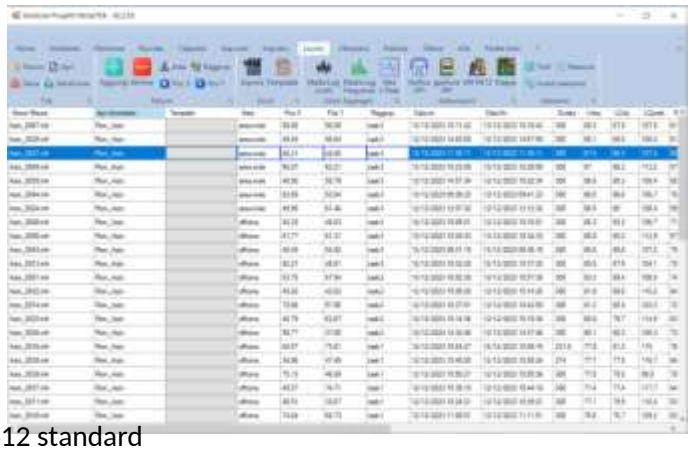
• Insertion of noise measurements

of the system and the reverberation time
• Calculation of the maximum A-weighted level

with slow constant
• Application of the K2 correction
• Calculation of the noise level of the discontinuous cycle system

4.2.7 “Work”

It allows the management of measurements performed in workplaces to support noise exposure assessments:



• Adding and removing measures
• Assigning measures to areas and

groupings
• Entering spatial coordinates

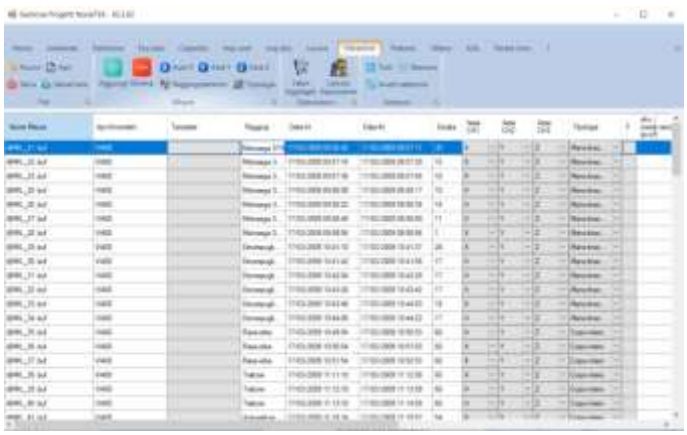
of measurements for contour maps
• Calculation of average levels and spectra

by area or grouping
• Verification of the effectiveness of the devices

Personal protection equipment (PPE)
• Management of the PPE archive
• Calculation of exposure according to the UNI 9612 standard

4.2.8 “Vibrations”

It allows the management of vibration measurements performed in workplace environments, to support exposure assessments of the hand-arm system and the whole body:



• Adding and removing measurements
• Assigning measurement channels to

X, Y and Z axes
• Classification of measures as

vibrations transmitted to the hand-arm system or to the whole body
• Assignment of measures to

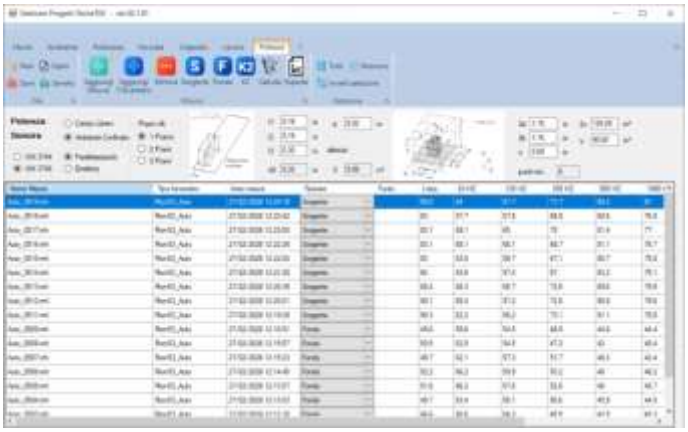
groupings
• Calculation of aggregate values for each

grouping
• Calculation of daily exposure to

vibrations

4.2.9 “Power”

It allows the calculation of sound power starting from sound pressure level measurements according to the UNI EN ISO 3744 or UNI EN ISO 3746 standards



• Adding and removing measures

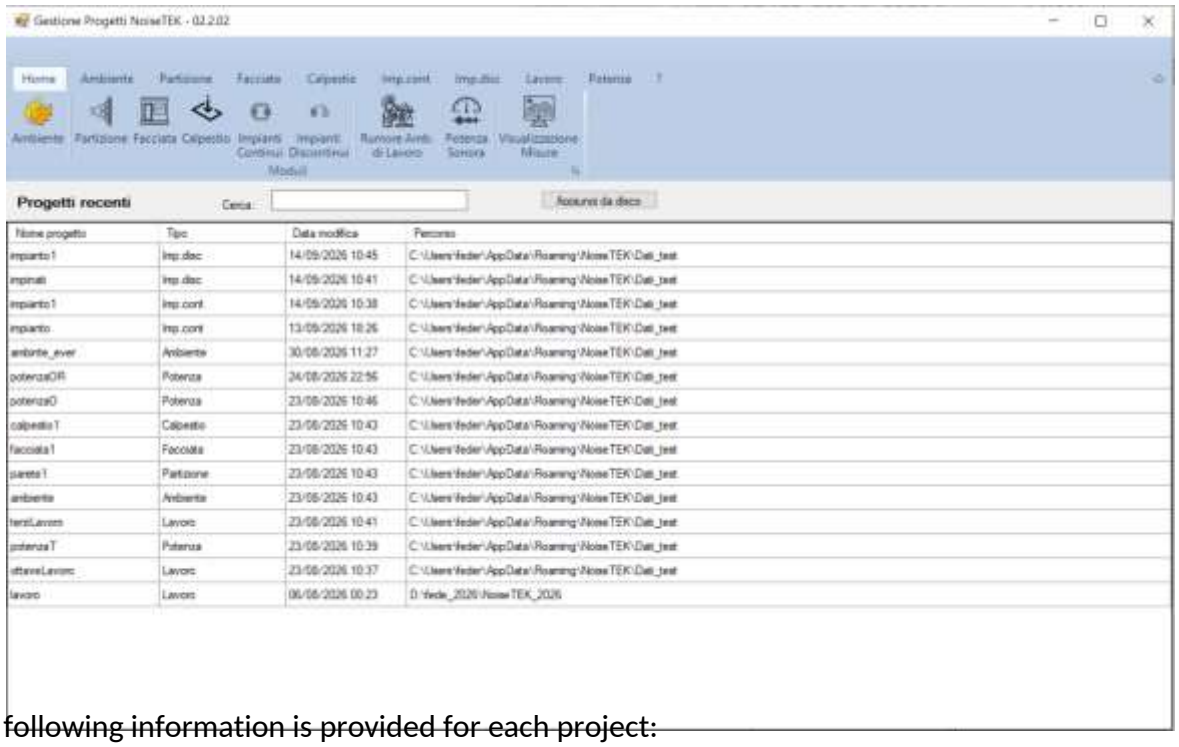
source noise and background noise to define K1
• Selection of the standard to be used,

of the type of surface, of the number of reflective planes
• If 'Confined environment' is selected

data is also required to define K2
• Excel export via template

4.3 Recent Projects

When a project isn't open, the workspace displays a list of recent projects. This feature allows you to quickly find and reopen used projects, without having to search through your computer's folders for the corresponding file each time.



The following information is provided for each project:

- Project file name, without extension.
- NoiseTEK module to which the project belongs.
- Modified Date: Date and time of the last modification recorded in the list.
- Path: Folder where the project file is located.

Projects are added or updated in the list when they are opened or saved.

Adding to the list records the reference to the files in their original location: it does not copy or move them.

View and search

The "Home" tab displays the module projects available in the installation. Selecting a single module tab limits the list to projects of that type.

The search box above the table allows you to further filter the list. As you type, only projects containing the search term in the name, type, or path remain visible. Deleting the text returns you to the full list for the selected tab.

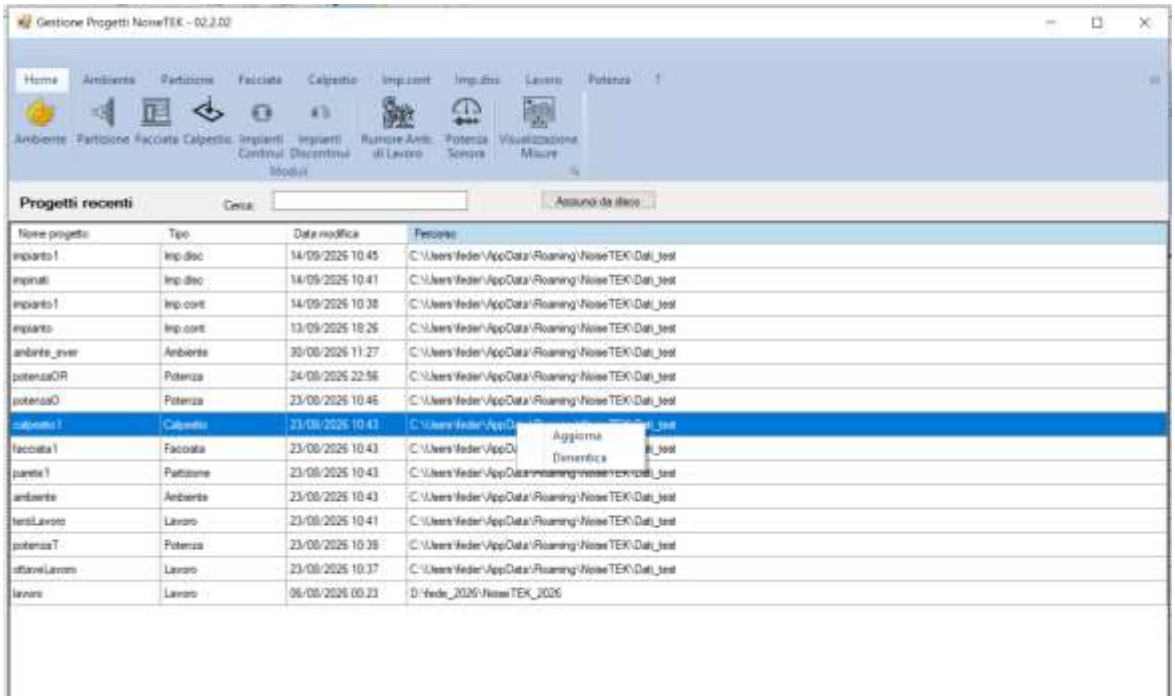
Opening a project

To open a project, simply left-click on its row, in any column. NoiseTEK automatically selects the corresponding module and loads the project.

If the file has been moved, renamed, or deleted, the project cannot be opened from the previously recorded path.

Updating and removing from the list

Right-clicking on a row opens a menu with two commands:



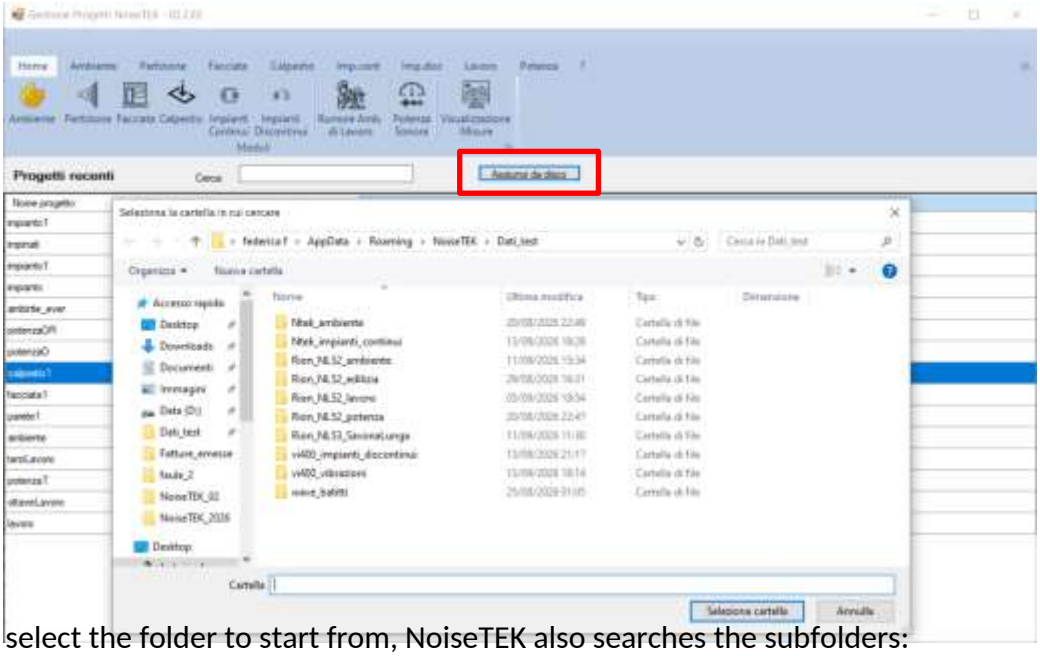
• “Update”: Updates the project information, including the modification date. This is useful, for example,

For example, if a shared project has been modified by another user.
• “Forget”: Removes the project from the recent list. The project file remains in its
folder and is not deleted.

The date displayed is the date stored when the file was last opened, saved, or updated. The list does not continuously check files on disks or network folders.

Adding projects from your computer

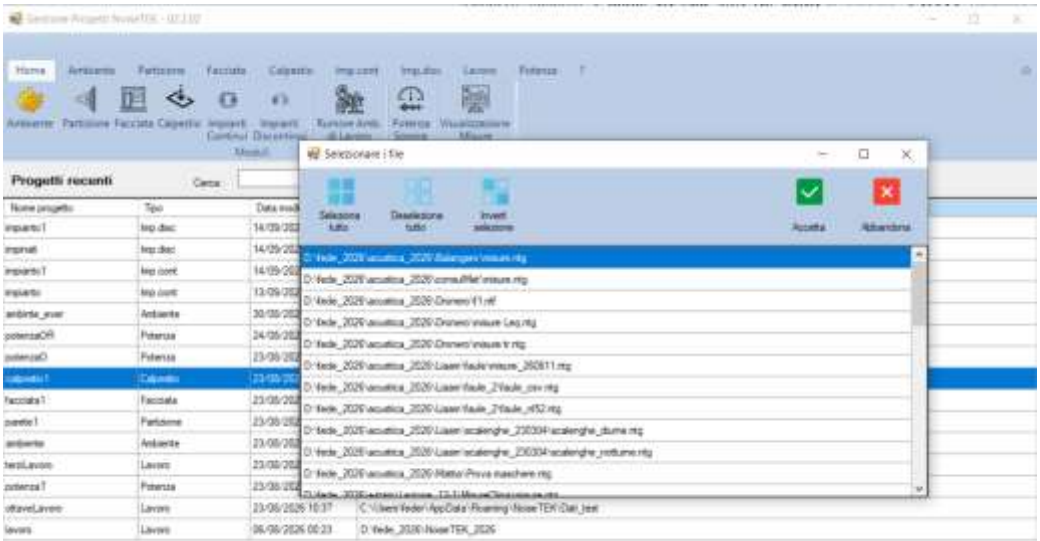
The “Add from disk” button allows you to search for projects not yet present in the list.



After you select the folder to start from, NoiseTEK also searches the subfolders:

- From the “Home” tab, search for all project types available in the installation;
- From a single module’s tab, search only for projects of that type.

Finally, a window appears with the newly found projects. You can select the desired rows or use the "Select All," "Deselect All," and "Invert Selection" commands.

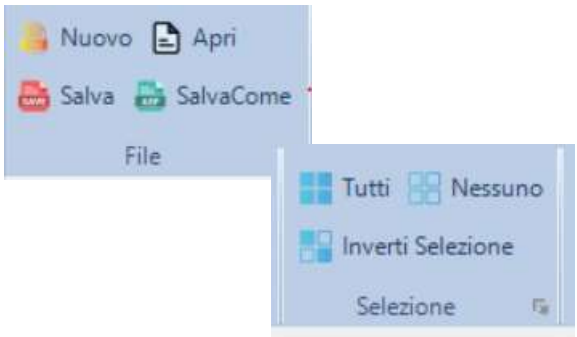


Pressing "Accept" adds the selected projects to the list; pressing "Abandon" cancels the operation. If no new projects are found, NoiseTEK displays a message and does not open the selection window.

4.4 Common features

In all modules there is a “File” tab with file management commands:

- “New”
- “Open”
- “Save”
- “Save As”



And there are selection tools available:

- “Select All”
- “Deselect All”
- “Invert Selection”

to facilitate multiple actions such as deleting, exporting or copying selected measurements.

Contextual help is also available in all modules: pressing the F1 key directly displays the manual chapter relating to the current context (see § 4.7.2).

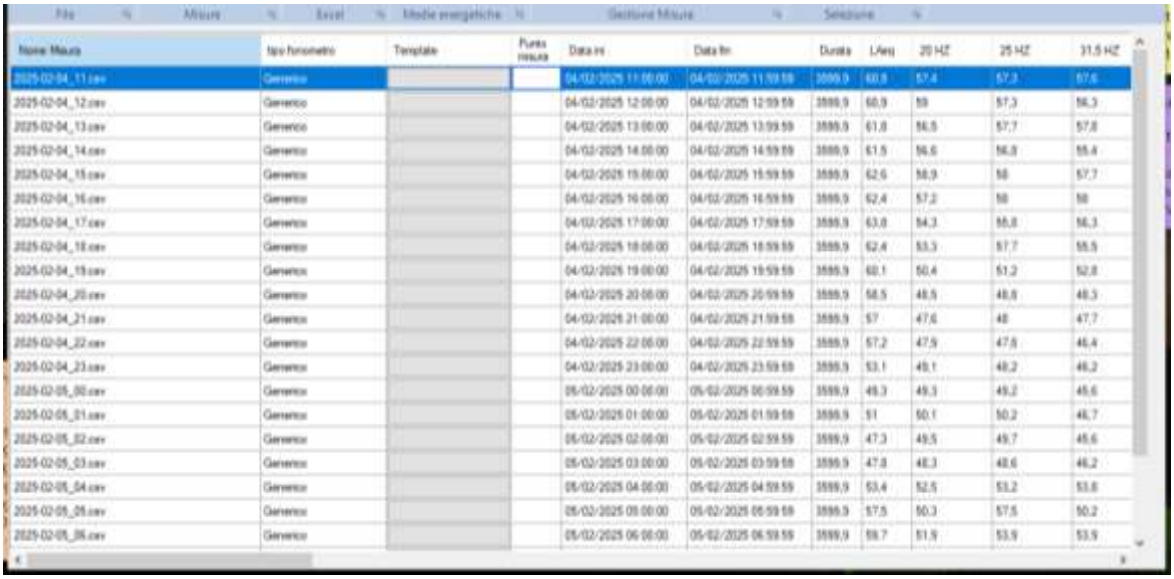
4.5 Work Area

Below the command bar is the data grid, which displays the measurements loaded for each project. The table includes:

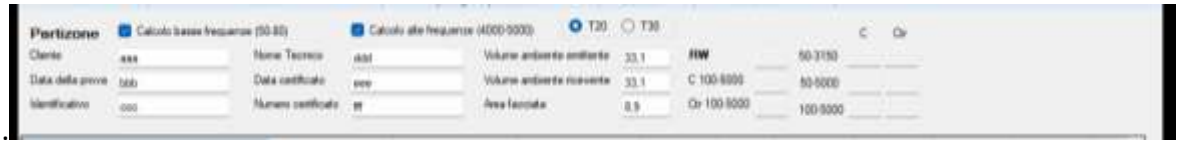
- Measurement name
- Sound level meter type
- Start/end date and time
- Duration
- Acoustic parameters (LAeq, frequency bands, etc.)
- Variable fields based on the module (e.g. position, typology, groupings)

Some fields are automatically preloaded and cannot be edited. If highlighted, they appear with a blue background.

Other fields (e.g. template, position, groupings) can be edited directly from the grid and must be managed by the user.



Some forms also have an additional section for entering data needed for calculating or presenting the results.



4.6 Template

The software allows the use of customized export templates for:

- Environmental measurements
- Calculation of passive acoustic requirements
- Noise in work environments
- Vibrations in work environments
- Sound power measurements

The templates for exporting the entire measure, available in the Environment and Work modules, can be associated with individual measures or assigned to multiple rows simultaneously. The measures can then be exported as a whole.

In the building acoustics modules, the program automatically associates the templates needed to generate certificates according to the format required by the applicable UNI standards.

Summary templates are also available for:

· verification of the effectiveness of hearing protection; · calculation of noise exposure in the workplace; · calculation of vibration exposure in the workplace; · calculation of sound power.

The templates are created in Excel format and can be customized by the user, as described in the dedicated chapter. They are contained in a folder accessible via the shortcut created on the desktop during program installation.

4.7 Help and Information Menu (Help/About) “?”

The NoiseTEK ribbon includes a tab identified by the “?” symbol, which collects useful functions for the user, independent of the type of measurement or project.

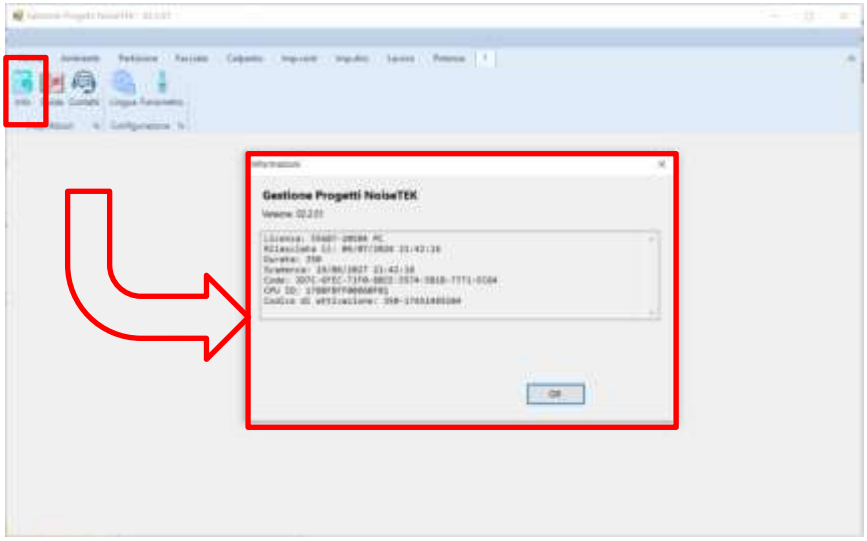


The available voices are:

4.7.1 “Info”

Opens a summary window with the following data:

- Software name
- Version in use
- License
- Creation date
- Duration
- Expiration date
- Machine code
- CPU
- Activation code



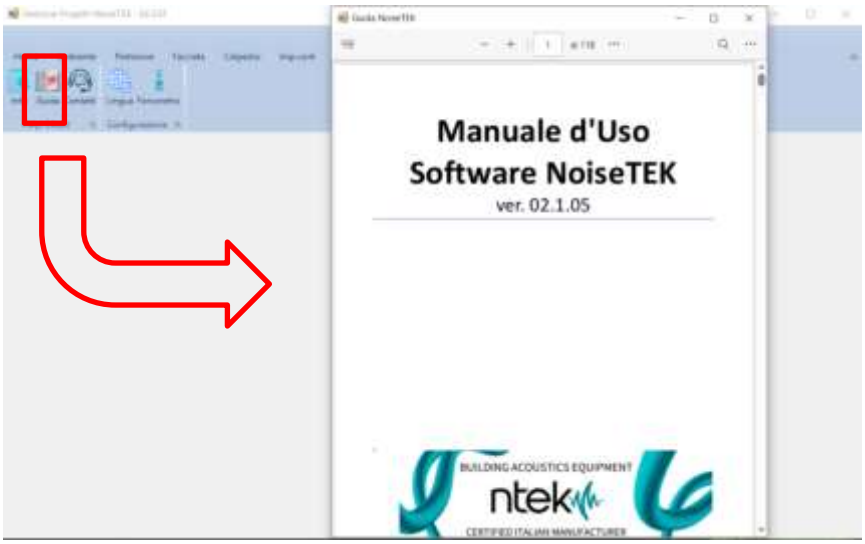
This information is automatically read from the installed license file and is useful for any checks or support requests.

4.7.2 “Guide”

By clicking the “Help” button, the user manual opens from the beginning in a separate NoiseTEK window.

The Help window can be moved and resized, and can remain open while you continue to use the program.

Contextual help is also available via the F1 key. Pressing F1 opens the manual directly to the chapter related to the module or function being displayed.



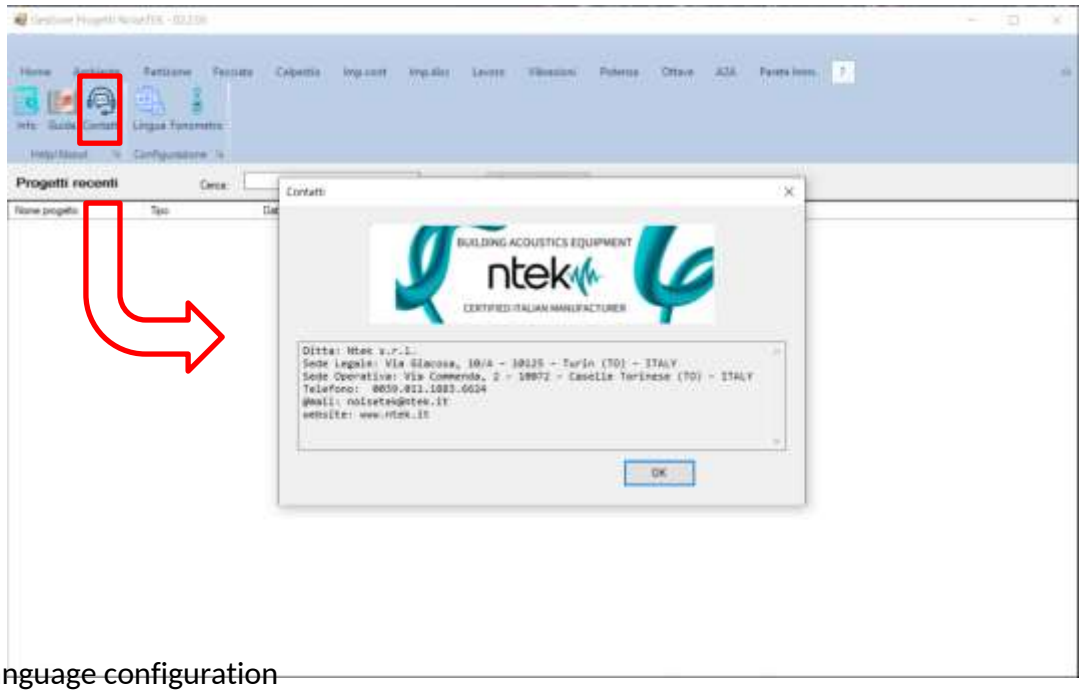
If the Help window is already open, pressing F1 again updates the contents and displays the chapter relevant to the current context.

The manual has been designed to be easily navigable: the index entries are interactive and allow you to directly reach the corresponding chapter;

4.7.3 “Contacts”

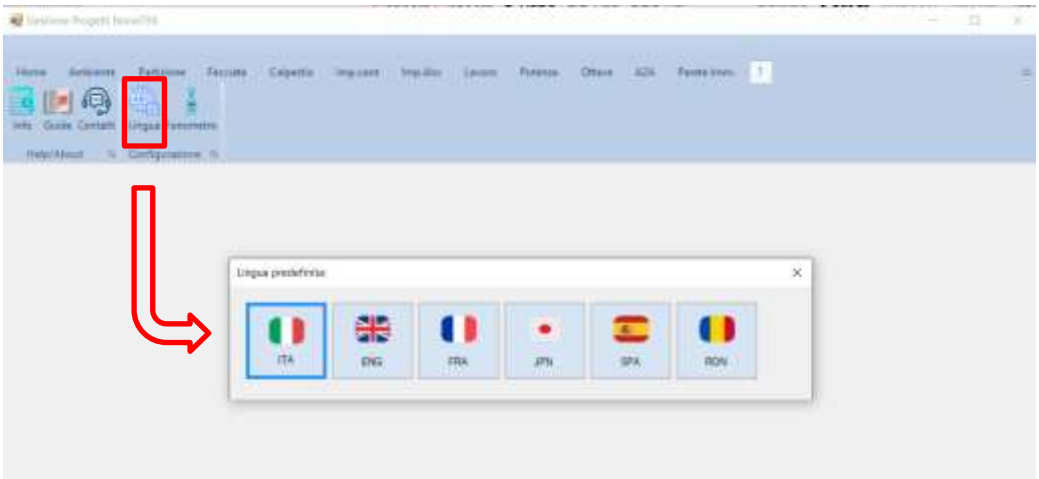
Display a window with technical support contacts:

- Name of the software and version in use
- Data of the company that created the procedure
- Email and telephone number to contact support



4.7.4 Language configuration

The “Language” button, located in the “Configuration” group of the “?” tab, allows you to choose the default language of the NoiseTEK interface.



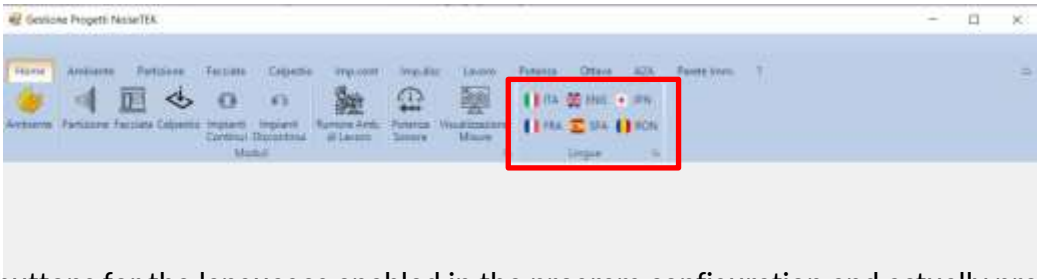
Pressing the button displays a list of languages enabled in the program configuration and available in the translation file. The language currently set as the default is highlighted.

The selected language is applied to the interface and stored as the default language for subsequent program starts.

The setting is saved in the path associated with the Windows User.

4.7.5 Temporary language management

In the “Languages” group on the “Home” tab, there are buttons that allow you to temporarily change the interface language.



Only the buttons for the languages enabled in the program configuration and actually present in the translation file are displayed. If only Italian is available, the entire Languages group is not displayed.

To temporarily change the language, simply press the corresponding button, identified by the flag and the language code,

The chosen language is applied to the interface and subsequently opened windows, but does not change the default language stored in the user configuration.

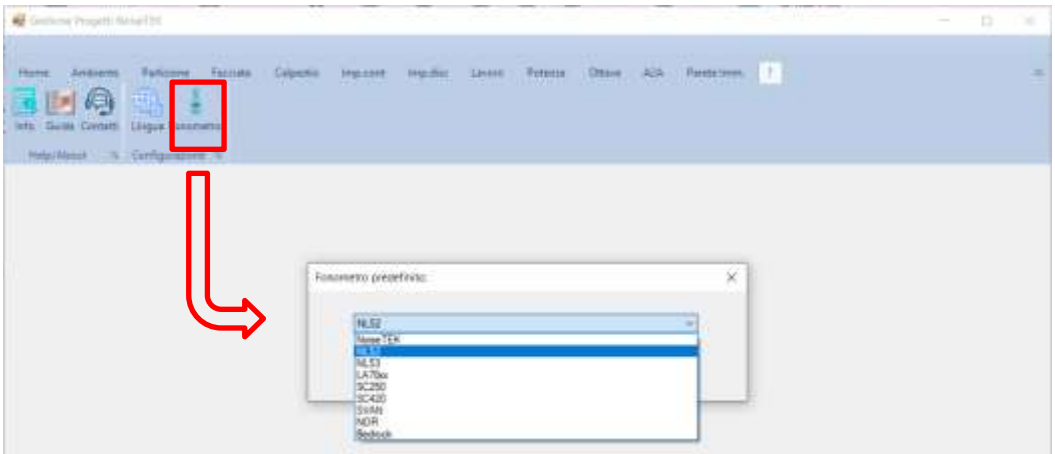
At the next startup, NoiseTEK will then restore the chosen language as default.

4.7.6 Configuring the equipment used

The “Sound Level Meter” button, located in the “Configuration” group of the “?” tab, allows you to define: the sound level meter, the reverberation time entry method and the accelerometer to be proposed as default values.

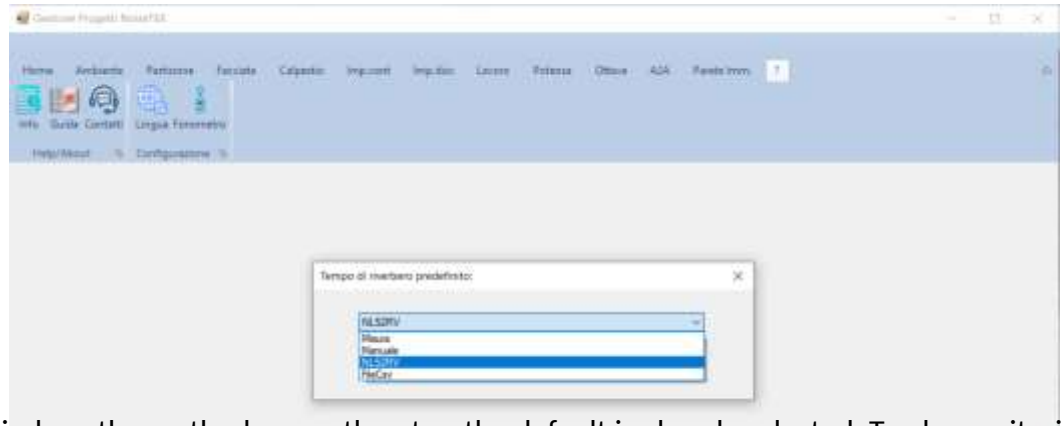
The setup takes place in three consecutive steps.

Pressing the button initially displays a list of available sound level meters. The sound level meter currently configured as the default is already selected in the list.



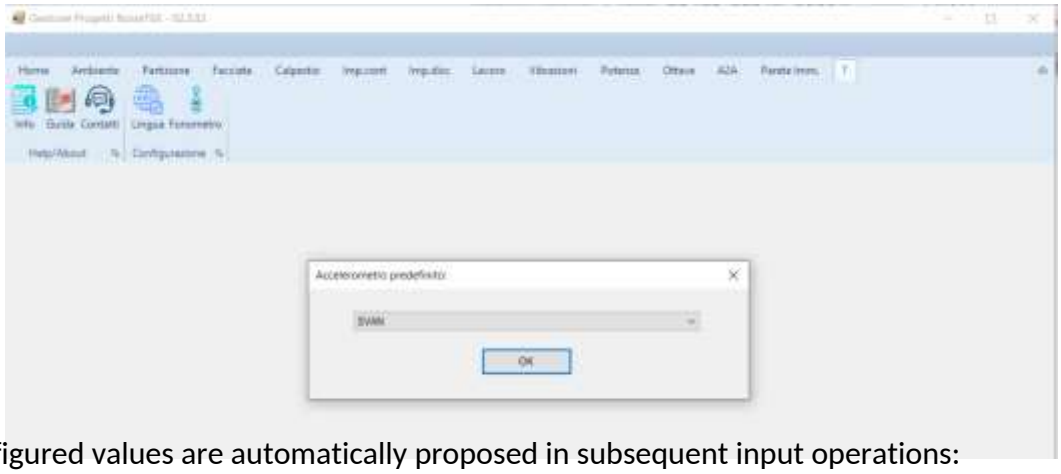
To change the default sound level meter, open the drop-down list, select the desired sound level meter and confirm your choice by pressing “OK”.

After confirming the sound level meter, a second window appears, asking you to select the default method for entering reverberation times.



In this window, the method currently set as the default is already selected. To change it, simply select the desired mode from the list and confirm by pressing "OK."

If accelerometers are present in the archive, a third window appears for selecting the default accelerometer. The currently configured accelerometer is already selected in the list. To change it, select the desired one and confirm by pressing "OK."



The configured values are automatically proposed in subsequent input operations:

- the default sound level meter when a new measurement is added;
- the default method when a new reverberation time measurement is added;
- the default accelerometer when a new vibration measurement is added.

The default values represent only the initially proposed choices. During entry, the user can select a different tool or method without changing the overall configuration.

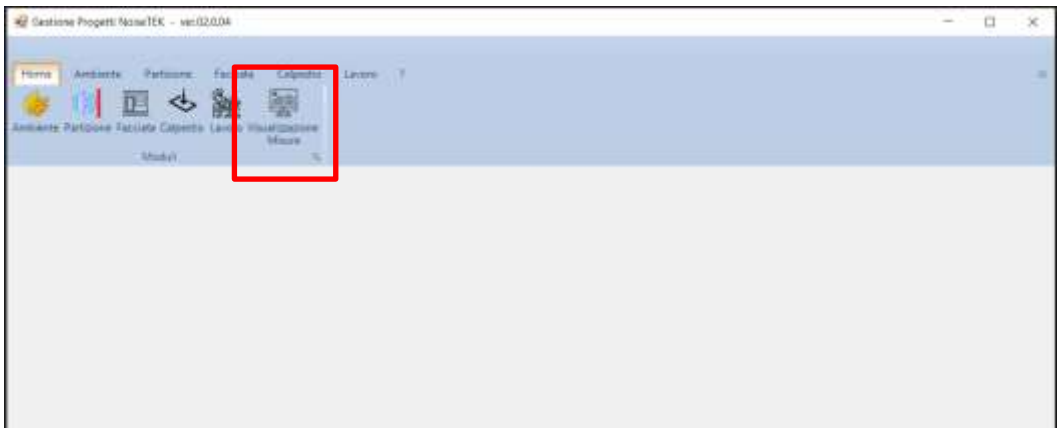
This configuration speeds up the entry of new measurements, avoiding having to select the most frequently used sound level meter, method and accelerometer each time.

The settings are saved in the path associated with the Windows User.

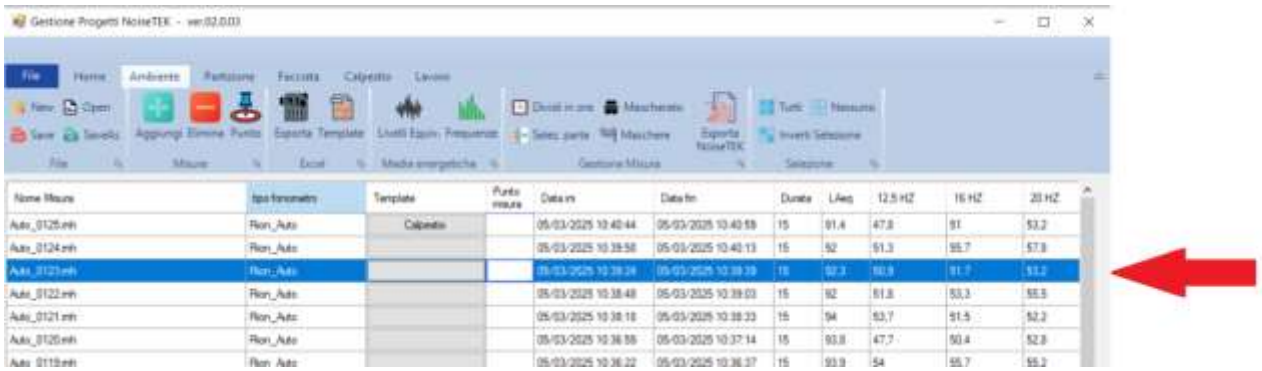
5 Management of Phonometric Measurements

The NoiseTEK software's central module allows for complete management of measurements taken using sound level meters. This module can be accessed in two ways:

• From the “Home” tab with the last module icon:



• From the grids of the various modules, by double-clicking on the row relating to a measure:

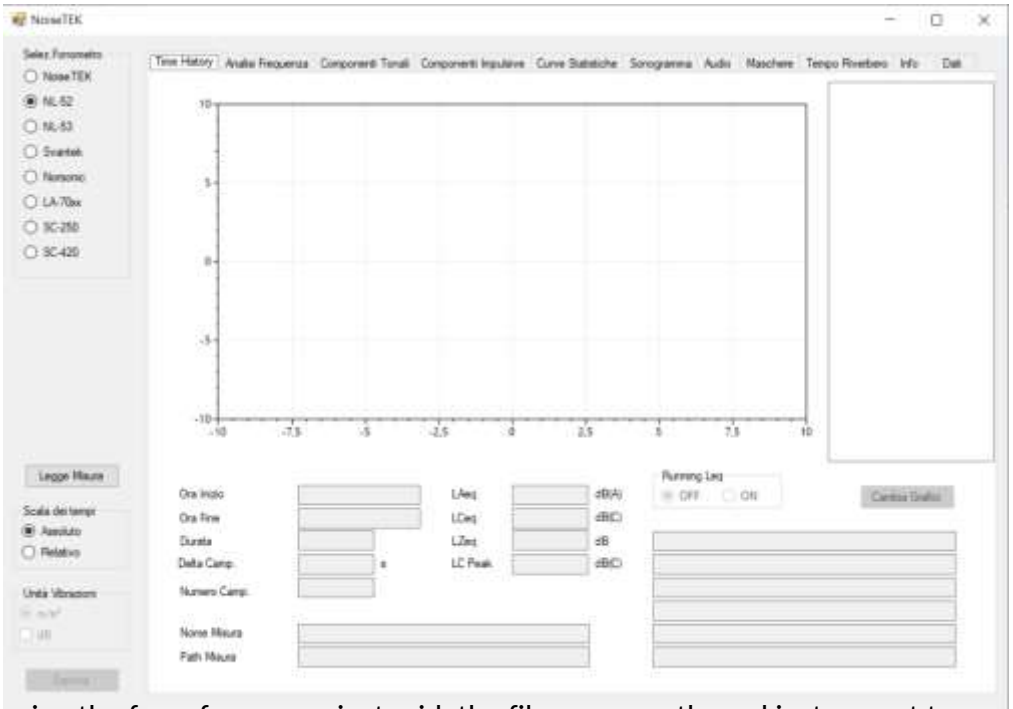


 Important note: when accessing from a grid, the program uses the full path to the measurement file saved in the corresponding line (even if it is not visible or editable by the user).

If the file has been deleted or moved in the meantime, the software will not be able to open the measurement, and an error message will be displayed: "Measurement file is missing".

This happens because only the summary data of the measurement required for management purposes is saved in the forms, not the complete contents of the files. Therefore, having the original file in its original location is essential for correct measurement display.

5.1 Sidebar commands and view tabs



When accessing the form from a project grid, the file name, path, and instrument type associated with the measurement are automatically transferred. If the form is opened directly, the user must select:

- The type of instrument used from the options presented.
- The measurement file via the “Read measurement” button.

After reading, the available data is organized into different tabs:

- Time History
- Frequency Analysis
- Tonal Components
- Impulsive Components
- Statistical Curves
- Sonogram
- Audio
- Masks
- Reverberation Time
- Info
- Data
- Vibration Time History
- Vibration Frequency Analysis
- Vibration Data

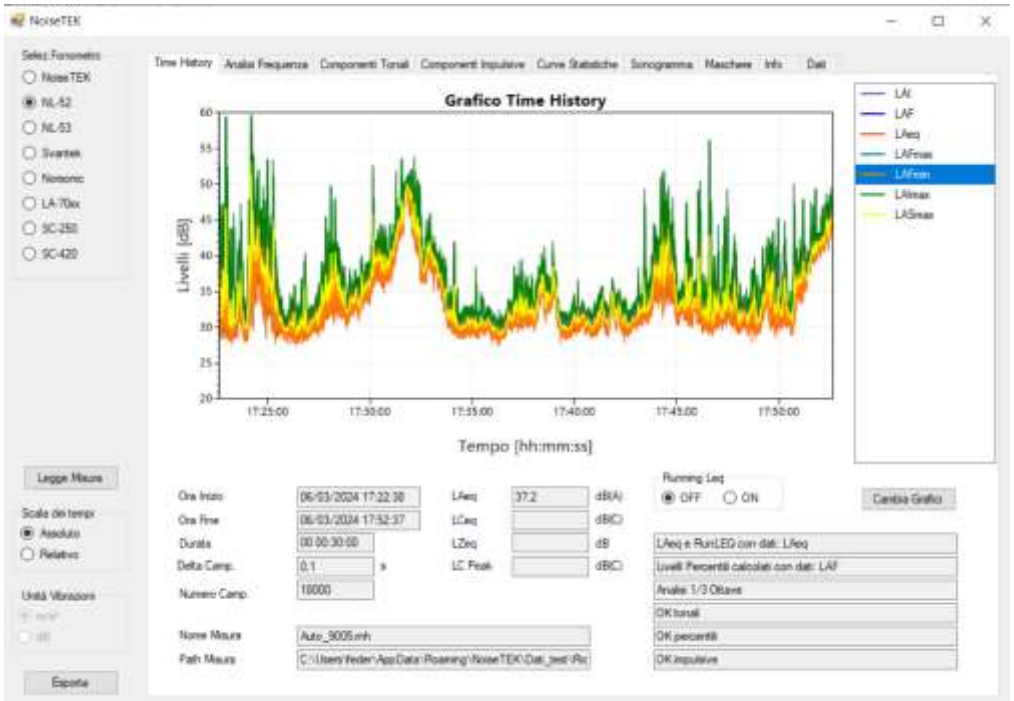
Cards are displayed only when they are relevant to the data contained in the measure; some of them may therefore not be available.

The right sidebar also includes some configuration boxes:

- “Time scale”: allows you to choose between the display of absolute time, with dates and the actual times of the measurement, and that of the relative time, which represents the time elapsed since the start of the measurement, in all the time-based graphs of the tabs
- “Vibration unit”: allows you to select the unit of measurement with which to display the values of the vibrations: physical unit m/s2 or in dB

Finally, the “Export” button is available, which allows you to export data using customizable Excel templates, as described in Chapter 7.

5.2 "Time History" Tab



The first tab displays time history graphs for some of the available parameters (except those in frequency bands) at the top of the video.

The legend to the right of the graph shows the parameters present in the graph.

In the lower part the main data of the measure:

- Start time of the measurement
- End time of the measurement
- Duration
- Sampling delta
- Number of samples
- Name of the measurement
- Directory where the measurement is located
- Total LAeq if the LAeq parameter is available in the measurement
- Total LCeq if the LCeq parameter is available in the measurement
- Total LZeq if the LZeq parameter is available in the measurement
- LCpeak,max if the LCpeak parameter is available in the measurement

Any additional data specific to individual sound level meters, such as measurement settings, are visible in the “Info” tab.

The last column on the right displays information relating to the processes available based on the parameters present in the file.

During the reading phase, the program checks for the presence of the parameters essential for managing subsequent presentations, in particular it checks for the presence of:

- LAeq: required for calculating the total LAeq and displaying the RunLeq. If absent, the

  The software requires an alternative parameter. Without it, it will not be possible to track the RunLeq or calculate the total.

• LAF: preferred for calculating percentiles.
• LASmax, LAFmax, and LAImax: required for identifying impulsive events. If one or more of these

missing, the “Impulsive Components” tab will not be populated.
• Frequency analysis: if the data divided into frequency bands is missing, the data will not be active.

“Frequency Analysis”, “Tonal Components”, and “Sonogram” tabs. If only the octave bands and not the third-octave bands are present, only the “Tonal Components” tab will be unavailable.

Interactive features available in the chart:

Navigation takes place directly with the mouse, in a differentiated way depending on the position of the pointer:

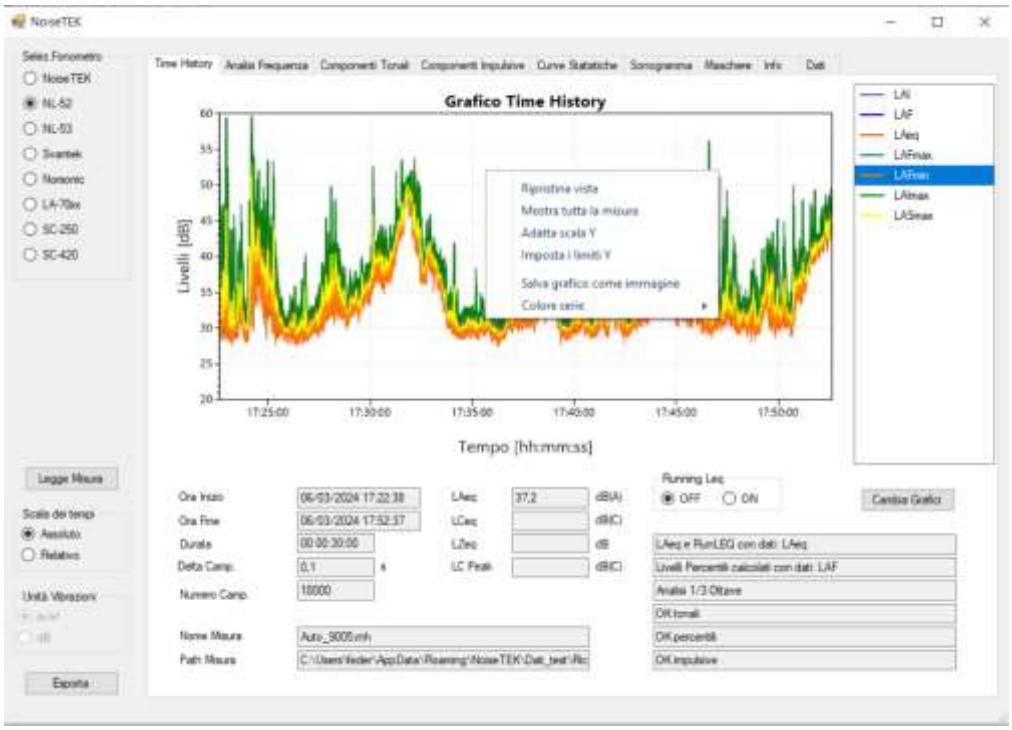
• Mouse wheel on the horizontal axis (X): changes the time scale only,

allowing you to enlarge or reduce the displayed range.
• Mouse wheel on the vertical axis (Y): changes only the scale of the levels, without

change the time interval.
• Dragging with the mouse: allows you to move the displayed portion of the graph, to

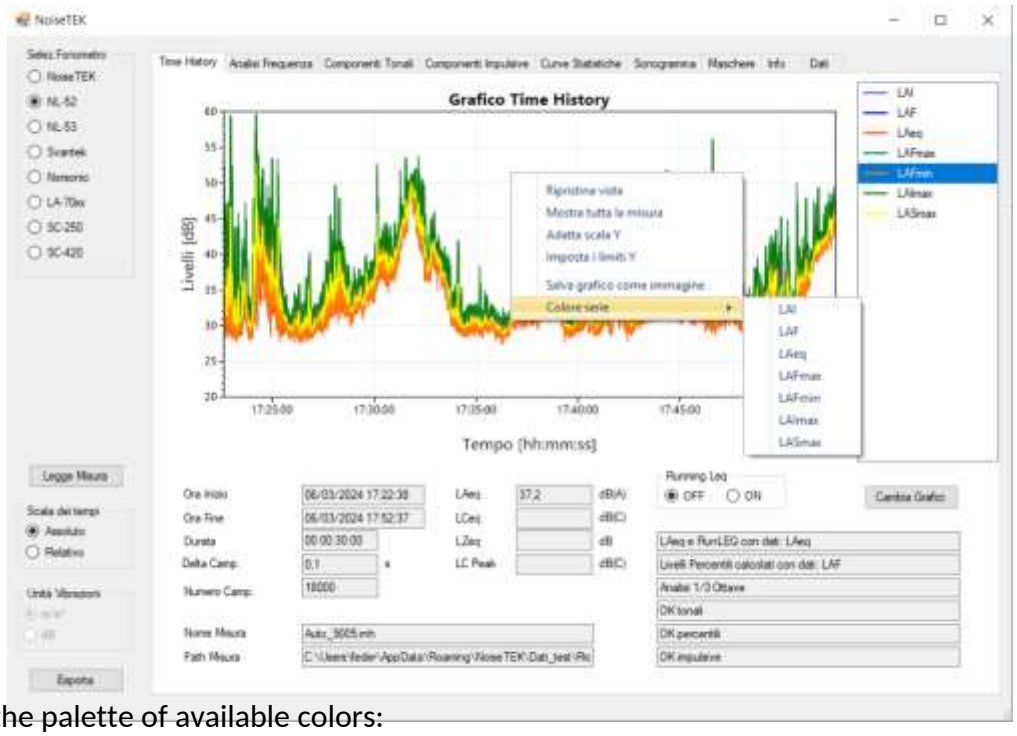
examine different ranges.

Right-clicking on the graph displays a menu containing the following commands:

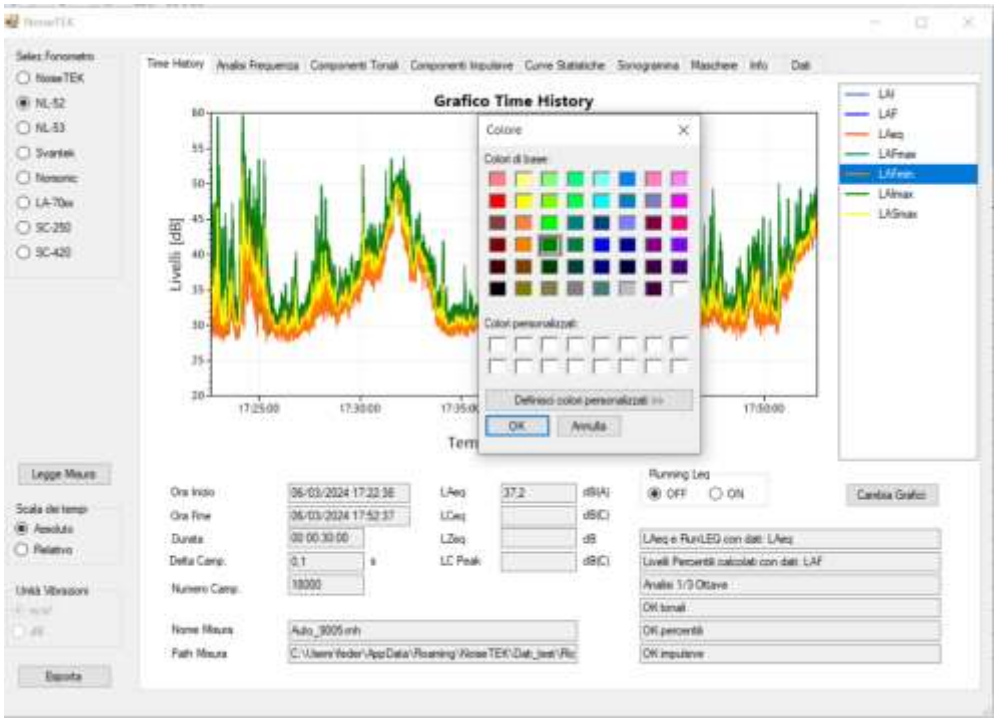


• “Reset view”: restores the original graph view.
• “Show entire measurement”: displays the entire duration of the measurement, canceling any time limitations introduced by zooming on the x-axis.
• “Adapt Y scale”: automatically adjusts the limits of the vertical axis based on the series levels, canceling the zoom on the y-axis.
• “Set Y limits”: allows you to manually enter the minimum and maximum values of the vertical axis, to define a specific range of levels.
• “Save graph as image”: exports the current representation as an image file, which can be used in technical documentation.

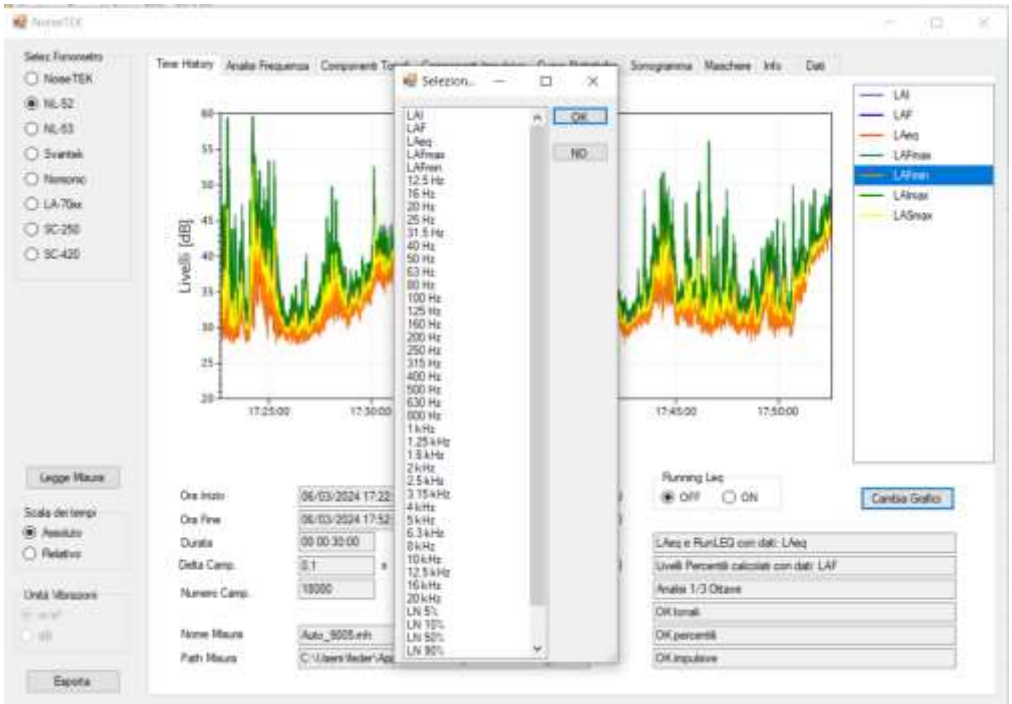
• “Series Color”: opens a submenu that allows you to select the series whose color you want to change:



and then the palette of available colors:



The “Change Charts” button allows you to change the configuration of the displayed series.



A list of all available parameters is displayed. You can select one or more graphs using standard Windows techniques (Ctrl, Shift).

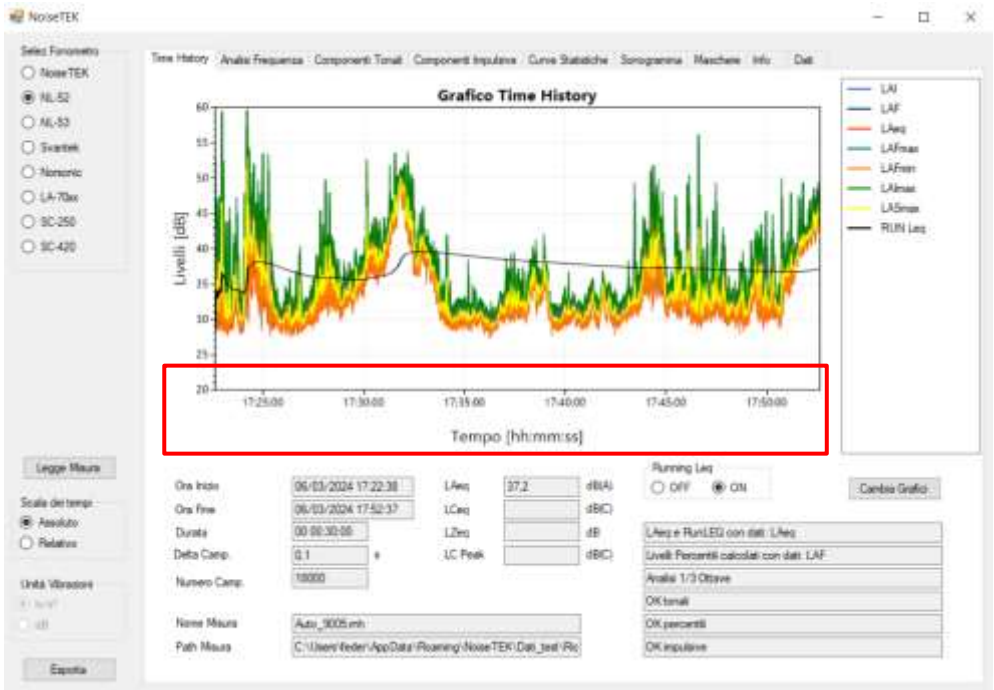
The “Running Leq” selection box allows you to activate or deactivate the series that represents the trend of the cumulative equivalent level, calculated using an energy average from the start of the measurement up to each instant.

It allows you to evaluate the influence of sound events on the overall level and verify its progressive stabilization. The final value coincides with the Leq of the entire measurement.

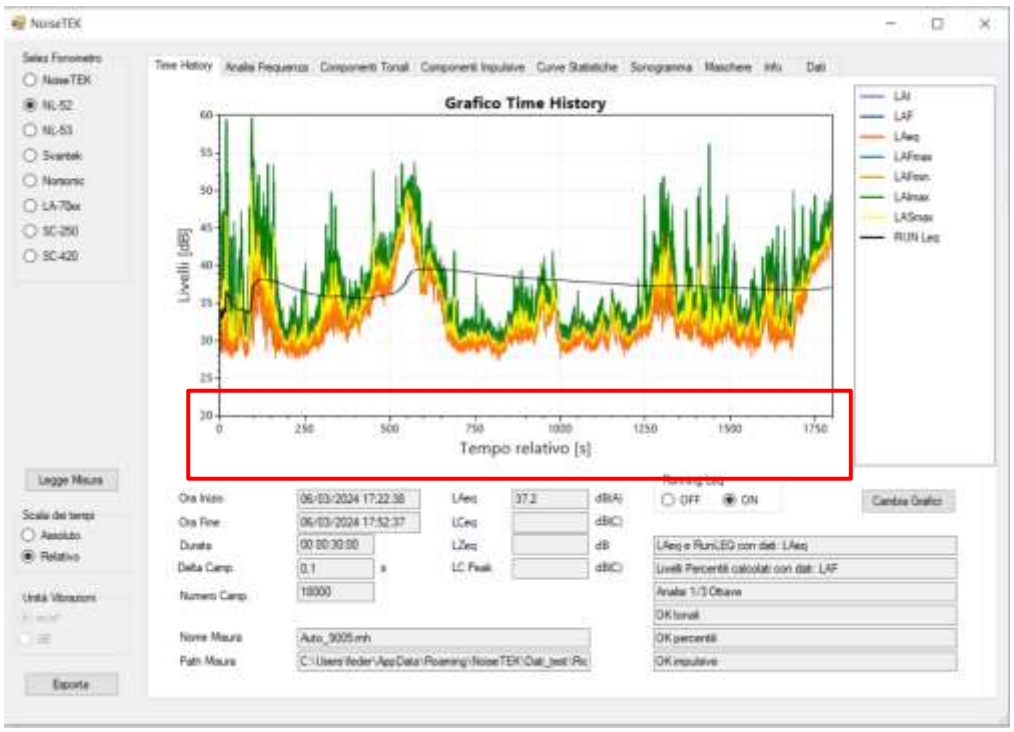


Using the “Time Scale” configuration box, you can change the representation of the graph’s time axis from absolute to relative or vice versa.

By default, the graph displays the absolute time of the samples acquired during the measurement (hh:mm:ss format).



By clicking on the dedicated button you can switch to the display of the relative time, expressed in seconds from the start of the measurement.



Detailed exploration of the measure:

By clicking the mouse on any point of the Time History graph, a detail window opens that allows you to analyze the selected instant in depth.

The window shows:

- Absolute date and time of the selected sample
- Relative time from the start of the measurement
- All parameters available at the selected point (e.g. LAeq, LAF, LAFmax,

  LAFmin, LCeq, LZeq, etc.)
- All frequency band levels available in the measurement (octaves or third octaves)

The numerical data are presented in a side table and simultaneously represented by a bar graph showing the frequency spectrum of the selected sample.



The window also features navigation tools that allow you to quickly move within the measurement without having to return to the main graph:

- Start
- Back 10 samples
- Back 1 sample
- Forward 1 sample
- Forward 10 samples
- End

As you navigate, both the value table and the frequency graph are updated based on the displayed sample.

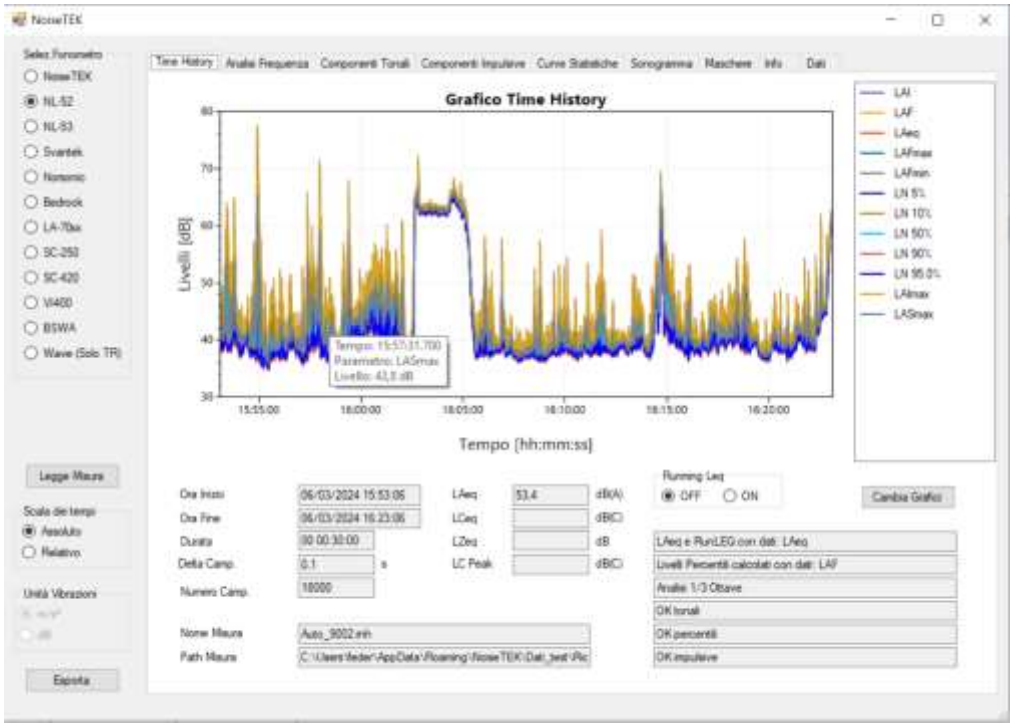
This function is particularly useful for analyzing specific events, verifying anomalies in the measurement, and examining the spectral trend in detail at a given time.

Interactive tooltip:

When you move the mouse pointer over a curve in the graph, a tooltip appears containing the following information:

- Time: in “absolute” time mode, the time of the point is displayed (hh:mm.fff);

  In “relative” time mode, the time elapsed since the start of the measurement is shown, expressed in seconds.
- Parameter: name of the acoustic parameter corresponding to the curve.
- Level: value of the parameter at the selected point, expressed in dB.



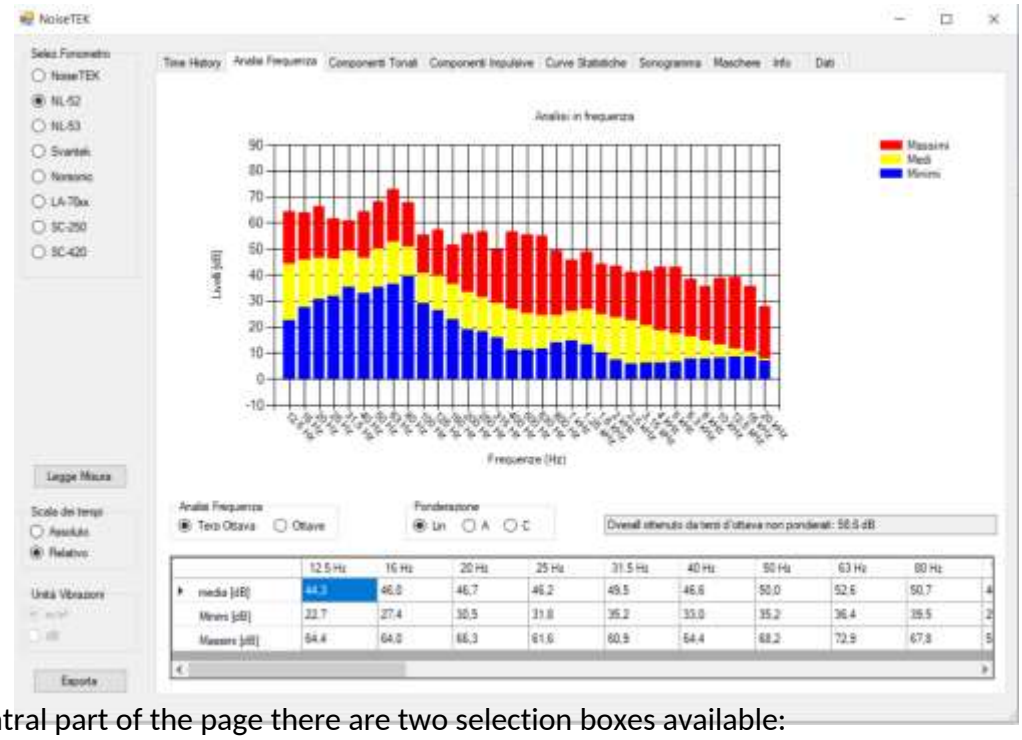
5.3 “Frequency Analysis” Tab

The “Frequency Analysis” tab shows the spectral content of the loaded measurement.

The screen is composed of two main sections, in the upper part: bar graph representing, for each frequency:

- in red: the maximum value detected
- in yellow: the average value (calculated as a logarithmic mean)
- in blue: the minimum value detected

At the bottom there is a table with the numerical values of averages, minimums and maximums for each frequency band.

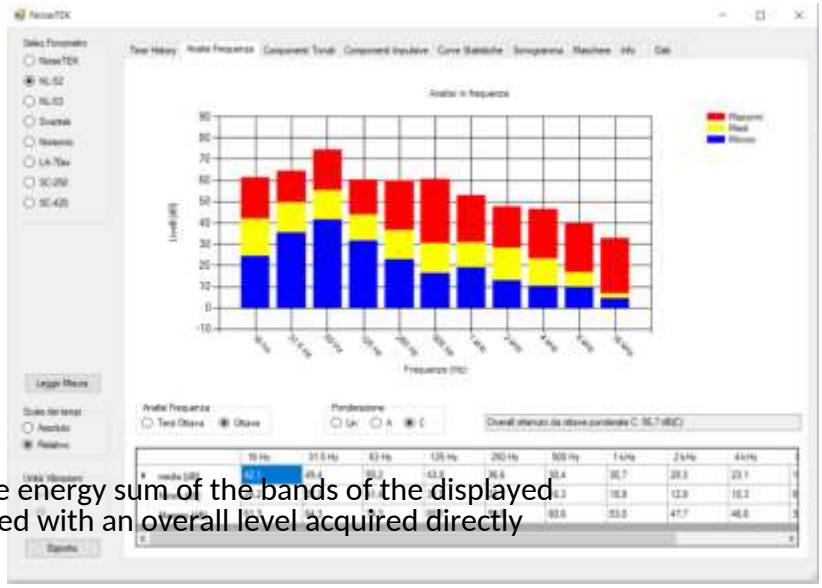


In the central part of the page there are two selection boxes available:

- “Frequency analysis”:

or thirds of octaves or octaves
- Weighting:

or A, or C, or linear (Z)



through which it is possible to modify the display of the energy contribution of the individual bands.

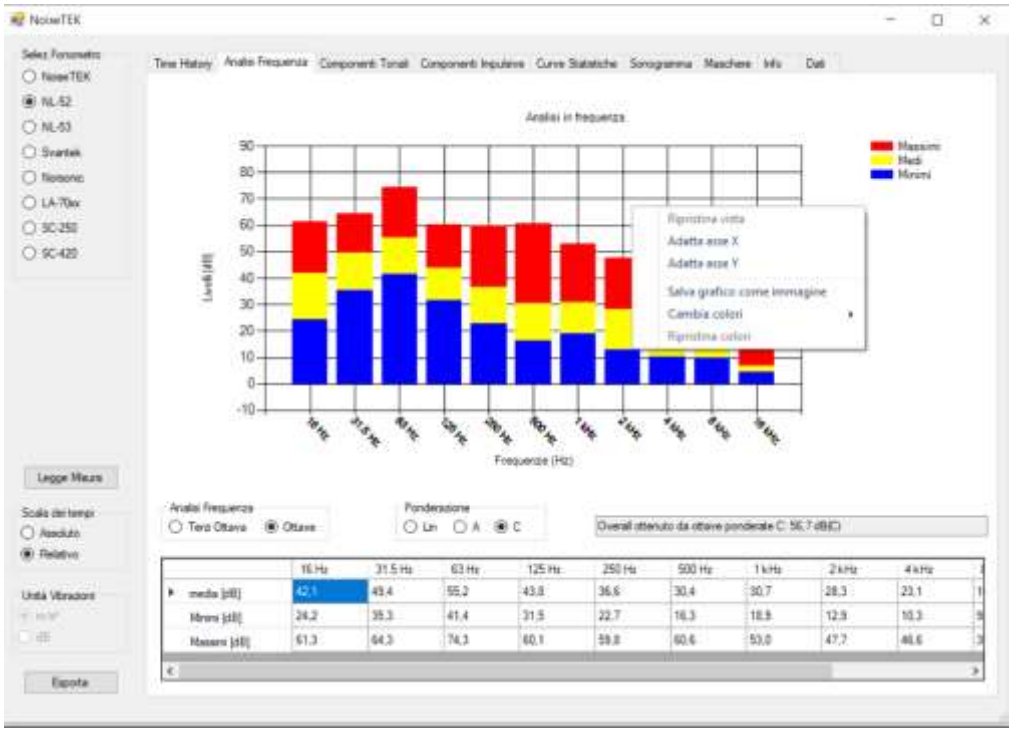
The “Overall” value represents the energy sum of the bands of the displayed spectrum; it should not be confused with an overall level acquired directly from the sound level meter.

Interactive features available in the chart:

Navigation takes place directly with the mouse, in a differentiated way depending on the position of the pointer:

• Mouse wheel on the horizontal axis (X): changes the time scale only,
allowing you to enlarge or reduce the displayed range.
• Mouse wheel on the vertical axis (Y): changes only the scale of the levels, without
change the time interval.
• Dragging with the mouse: allows you to move the displayed portion of the graph, to
examine different ranges.

Right-clicking on the graph displays a menu containing the following commands:



• “Reset View”: Restores the original view of the graph.
• “Fit x-scale”: Displays the entire frequency range, canceling any time limitations introduced by zooming on the x-axis.
• “Fit Y-scale”: Automatically adjusts the limits of the vertical axis based on the series levels, canceling the zoom on the y-axis.
• “Save graph as image”: Exports the current representation as an image file, which can be used in technical documentation.
• “Change Colors”: Opens a submenu that allows you to select the series whose color you want to change and then the available color palette.
• “Restore Original Colors”: The basic colors are restored.

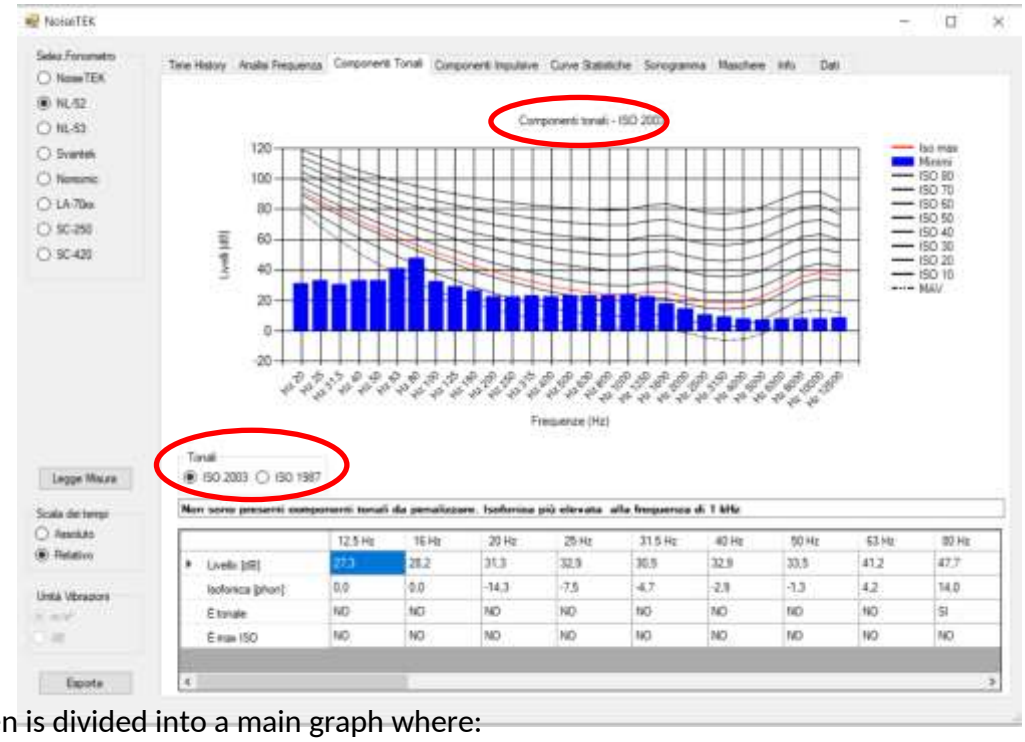
5.4 “Tonal Components” Tab

The “Tonal Components” tab allows you to identify and analyze the presence of pure tones within the measurement, using the isophonics proposed by the two versions of the ISO standard:

- ISO 1996-2:1987
- ISO 1996-2:2003

The selection of the desired standard is done via the specific "Isophonic" selection box

The choice of the standard modifies the layout of the isophonic lines and the criteria for highlighting the penalizable components.



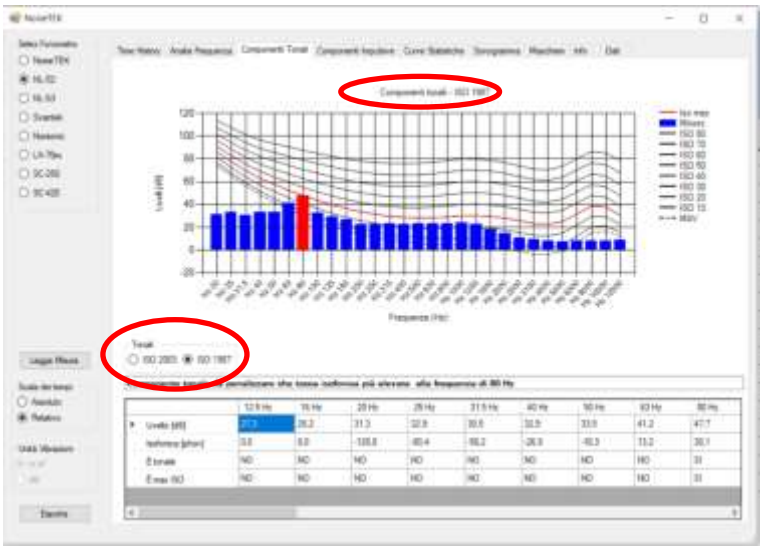
The screen is divided into a main graph where:

- The blue bars represent the minimum values for each frequency band.
- The black curves represent the reference isophonic lines based on the selected standard.

The situation is indicated below the graph: it is evaluated whether tonal components are present and whether they should be penalized or not.

In the section below there is a table which shows for all frequencies, the minimum level in dB and the corresponding isophonic (in phon).

If there is a tonal component to be penalized (the one that touches the major equal tone), it is highlighted in red.

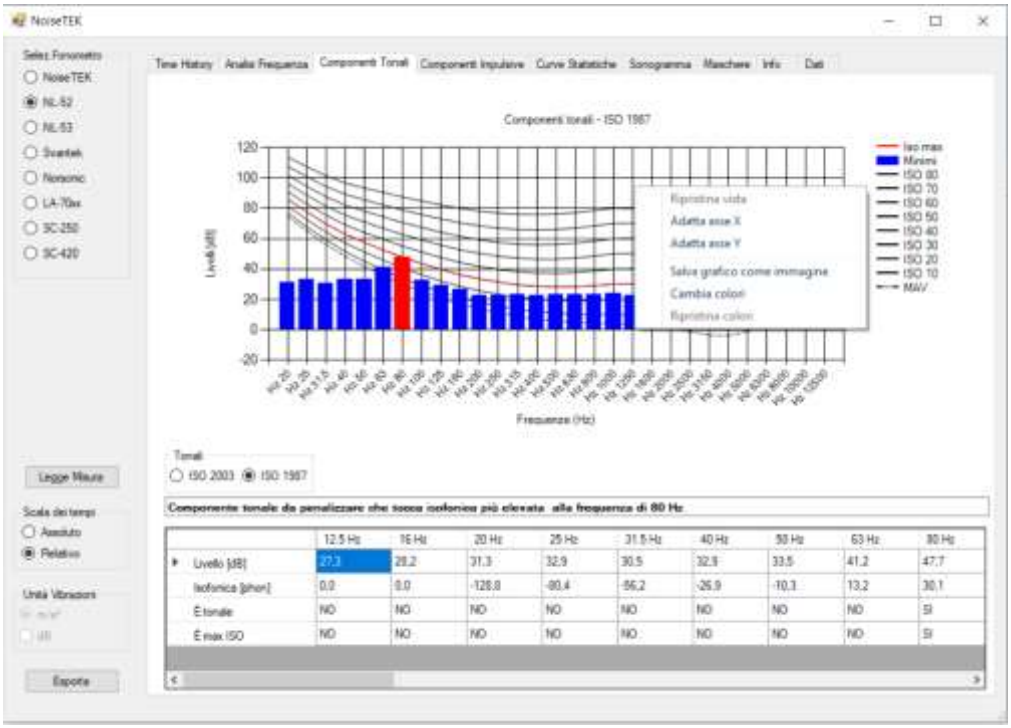


Interactive features available in the chart:

Navigation takes place directly with the mouse, in a differentiated way depending on the position of the pointer:

• Mouse wheel on the horizontal axis (X): changes the time scale only,
allowing you to enlarge or reduce the displayed range.
• Mouse wheel on the vertical axis (Y): changes only the scale of the levels, without
change the time interval.
• Dragging with the mouse: allows you to move the displayed portion of the graph, to
examine different ranges.

Right-clicking on the graph displays a menu containing the following commands:



• “Reset View”: Restores the original view of the graph.
• “Fit x-scale”: Displays the entire frequency range, canceling any time limitations introduced by zooming on the x-axis.
• “Fit Y-scale”: Automatically adjusts the limits of the vertical axis based on the series levels, canceling the zoom on the y-axis.
• “Save graph as image”: Exports the current representation as an image file, which can be used in technical documentation.
• “Change colors”: Opens a submenu that allows you to select the series whose color you want to change and then the available color palette.

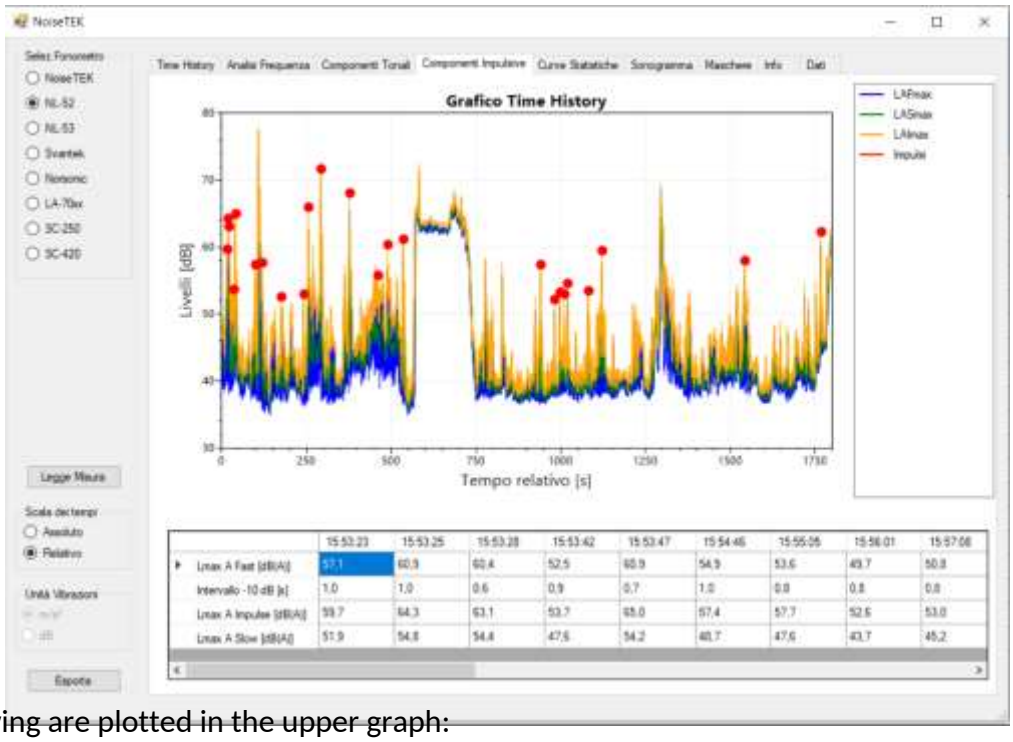
• “Restore original colors”: the basic colors are restored

5.5 “Impulsive Components” Tab

The "Impulsive Components" tab allows you to detect and display impulsive events present in the measurement. The analysis is only available if the file contains the following three parameters:

- LAFmax (maximum with fast time constant)
- LASmax (maximum with slow time constant)
- LAImax (maximum with impulse time constant)

When these parameters are available, the program automatically performs pulse detection and represents them graphically with red dots superimposed on the three time traces.



The following are plotted in the upper graph:

- LAFmax (blue line)
- LASmax (green line)
- LAImax (orange line)
- Impulsive events: highlighted by red dots positioned at the moment the impulse is

  detected

When pulses are detected, a detailed table appears at the bottom of the screen with the following information for each identified pulse:

- Time of event
- Peak values for LAFmax, LAImax, LASmax
- Pulse duration: calculated as the interval in which the signal remains within -10 dB of the

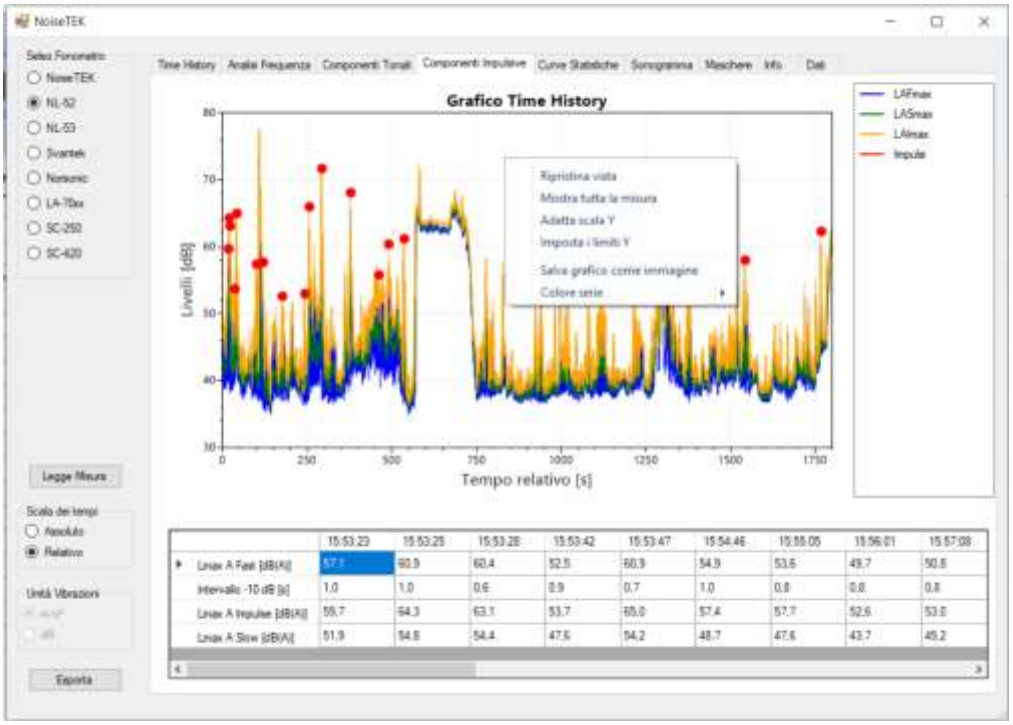
  LAFmax peak. (to be considered impulsive, the interval must be less than 1 second).

Interactive features available in the chart:

Navigation takes place directly with the mouse, in a differentiated way depending on the position of the pointer:

• Mouse wheel on the horizontal axis (X): changes the time scale only,
allowing you to enlarge or reduce the displayed range.
• Mouse wheel on the vertical axis (Y): changes only the scale of the levels, without
change the time interval.
• Dragging with the mouse: allows you to move the displayed portion of the graph, to
examine different ranges.

Right-clicking on the graph displays a menu containing the following commands:



• “Reset View”: Restores the original graph view.
• “Show Full Measurement”: Displays the entire measurement duration, canceling any time limitations introduced by zooming on the x-axis.
• “Adapt Y Scale”: Automatically adjusts the limits of the vertical axis based on the series levels, canceling the zoom on the y-axis.
• “Set Y Limits”: Allows you to manually enter the minimum and maximum values of the vertical axis, to define a specific range of levels.
• “Save Graph as Image”: Exports the current representation as an image file, which can be used in technical documentation.
• “Series Color”: Opens a submenu that allows you to select the series whose color you want to change and then the available color palette:

As in the “Time History” tab, the impulsive components graph also offers detailed exploration of the measurement, an interactive tooltip, and the ability to switch from absolute to relative time representation.

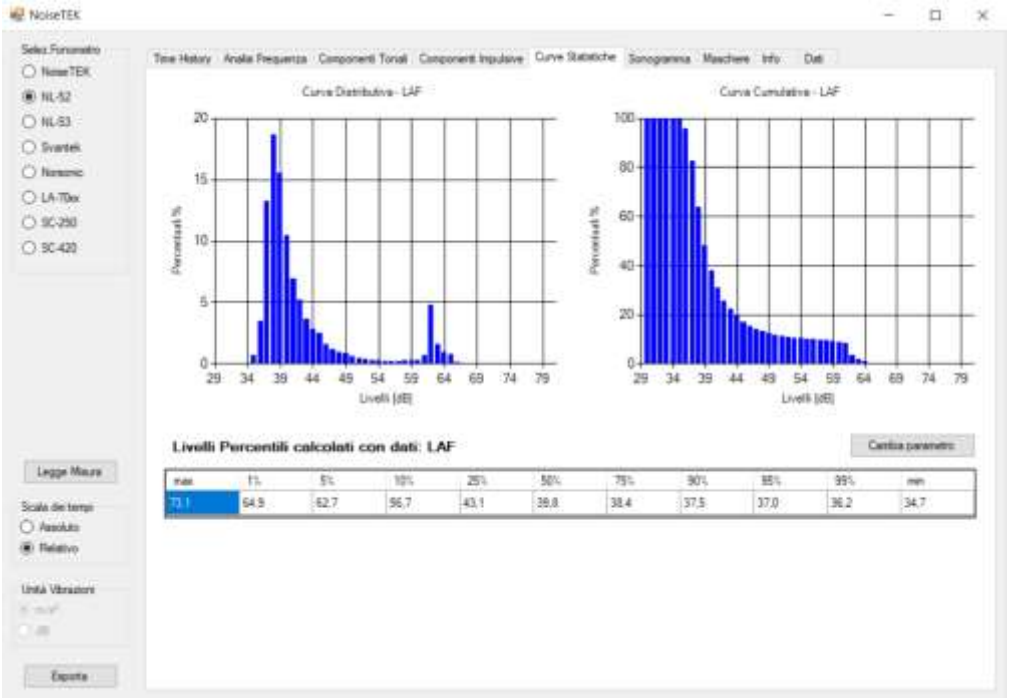
5.6 “Statistical Curves” Tab

The "Statistical Curves" tab provides a statistical representation of the sound levels recorded during the measurement. It consists of three main sections:

1. Distribution Curve
- Shows the frequency of occurrence of sound levels in dB.
- The data is expressed as a percentage (%) of the total samples. 2. Cumulative Curve

- Represents the cumulative percentage of measured levels.
- It is useful for evaluating the distribution of sound levels over time. 3. Percentile Table

- Report the main statistical values derived from the measurement:
    - Maximum value
    - Percentiles: 1%, 5%, 10%, 25%, 50%, 75%, 90%, 95%, 99%
    - Minimum value



Statistical curves and percentiles are calculated, possibly on the LAF parameter (A-weighted level, fast time constant).

If this parameter is not available in the measurement, the program asks the user to select an alternative at the time of reading. It is however possible to select a different parameter with the specific "Change parameter" button.

The two graphs feature the same interactive functions as those found on bar graphs already seen in the “Frequency Analysis” tab.

5.7 “Sonogram” Tab

The “Sonogram” tab allows you to analyze the evolution of the sound spectrum over time, identifying events, constant frequency components and level variations in the different frequency bands.

There are two representation modes available, selectable using the “Type” box:

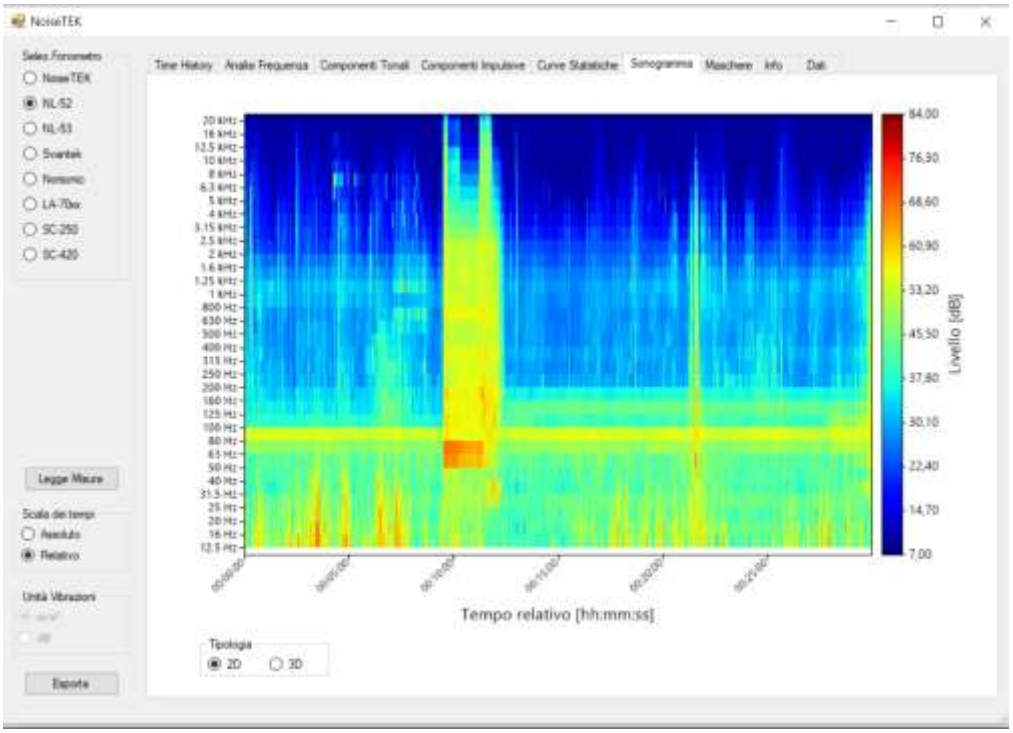
- 2D: Displays the sonogram as a color map, with time on the horizontal axis and the frequency on the vertical axis.
- 3D: represents the same data as a three-dimensional surface, in which the height and the color indicates the sound level.

In both modes, the color scale on the right associates colors with sound levels expressed in dB.

In “Absolute” time mode, the time of the point is displayed (hh:mm.fff); in “Relative” time mode, the time elapsed since the start of the measurement is shown, expressed in seconds.

5.7.1 2D sonogram

The two-dimensional representation allows you to quickly identify the frequencies affected by an event and its duration.



- Zoom: the mouse wheel allows you to enlarge or reduce the representation. By acting in

By matching the axes, it is possible to modify the time scale and the frequency scale separately.

- Pan: dragging with the mouse allows you to move within the sonogram without

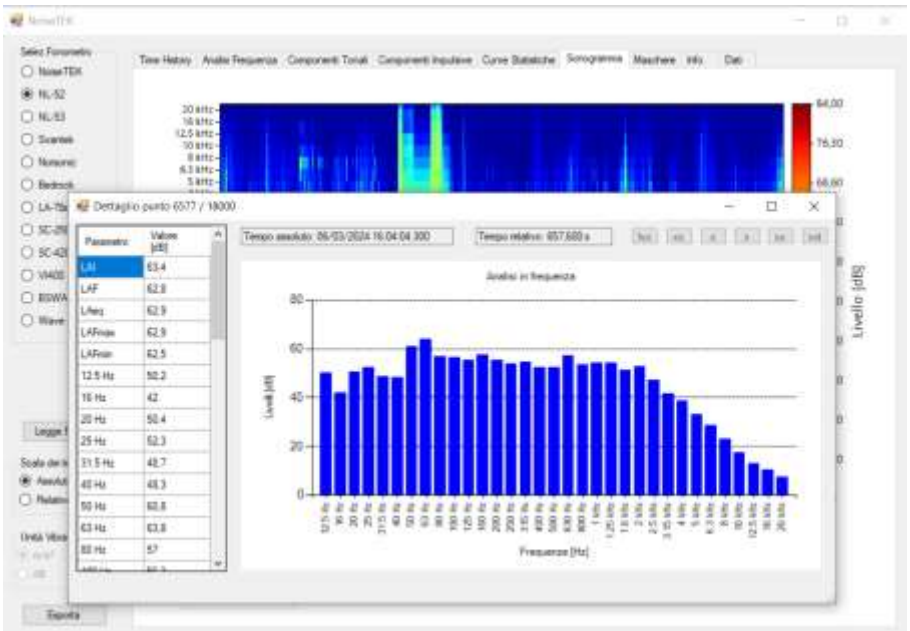
change the scale.

- Interactive tooltip: by placing the pointer on the map, the time, the frequency and sound level corresponding to the point examined.

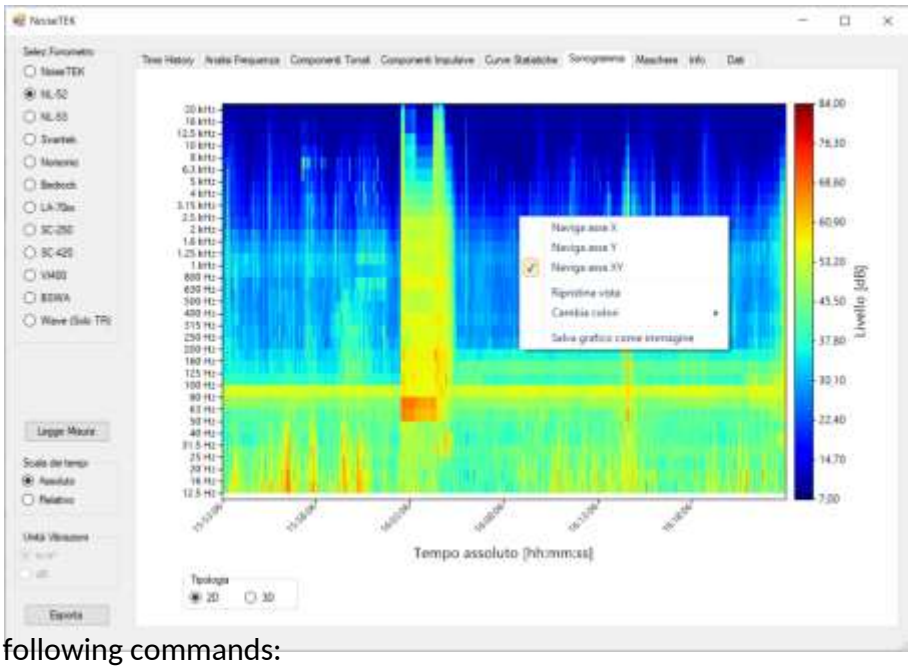
• Mouse click: opens the “Point Detail” window, which allows you to examine all the parameters available at the selected moment. The detail window includes:

o Absolute date and time and relative time of the selected sample. o Parameter table, with the related values in dB. o Graph of the frequency spectrum relative to the selected instant. o Navigation buttons, which allow you to move to the previous or next samples,

with single or rapid advances, or to reach the beginning and end of the measure.



• Context menu: accessible with the right mouse button, allows you to use the commands available to reset the display, manage the scales and save the graph as an image,



includes the following commands:

o “Navigate X-axis”: allows zooming and panning along the time axis only. o “Navigate Y-axis”: allows zooming and panning along the frequency axis only. o “Navigate XY-axis”: allows you to act on both axes simultaneously. o “Reset view”: returns the sonogram to the initial view. o “Change colors”: opens a submenu that allows you to choose between different combinations

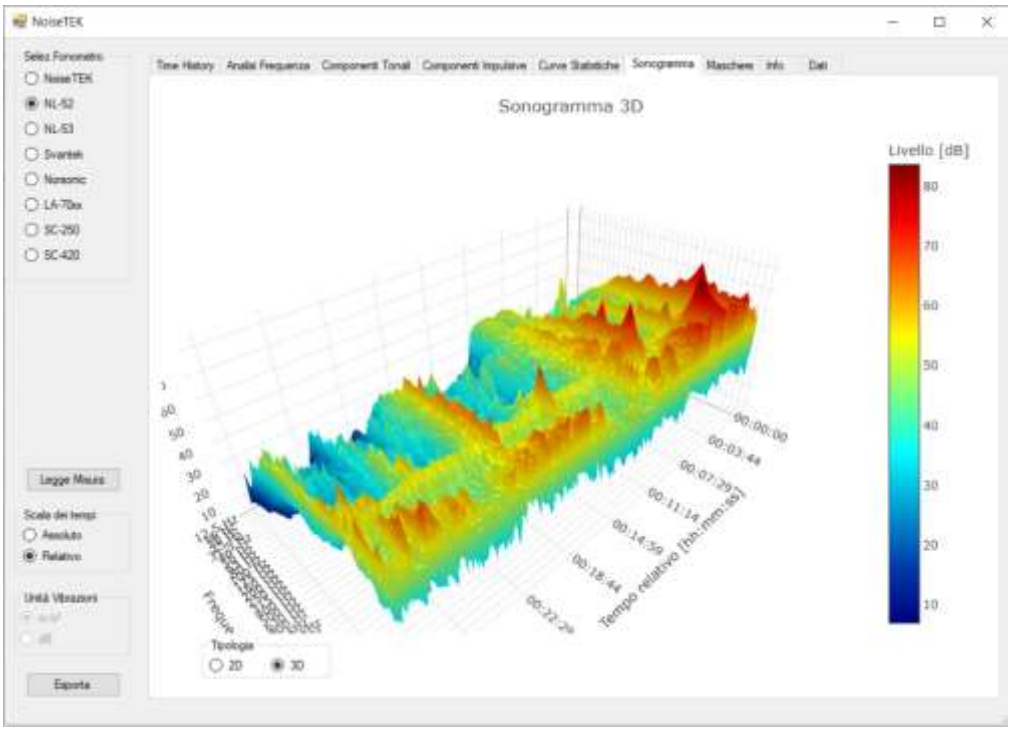
predefined color schemes for representing sound levels. The desired combination is selected with a click and is identified by a check mark. o “Save graph as image”: exports the current view to a file

image.

The selected navigation mode is indicated by a check mark in the menu. Zooming is done with the mouse wheel, while dragging allows you to move the view along the enabled axes.

5.7.2 3D Sonogram

The three-dimensional representation highlights the trend of sound levels through a colored surface, facilitating the identification of peaks and predominant spectral components.



• Rotation: by dragging the mouse on the surface you can change the observation point of the graph.
• Zoom: the mouse wheel allows you to zoom in or out of the three-dimensional view.
• Interactive tooltip: hovering the pointer over the data shows the time values,

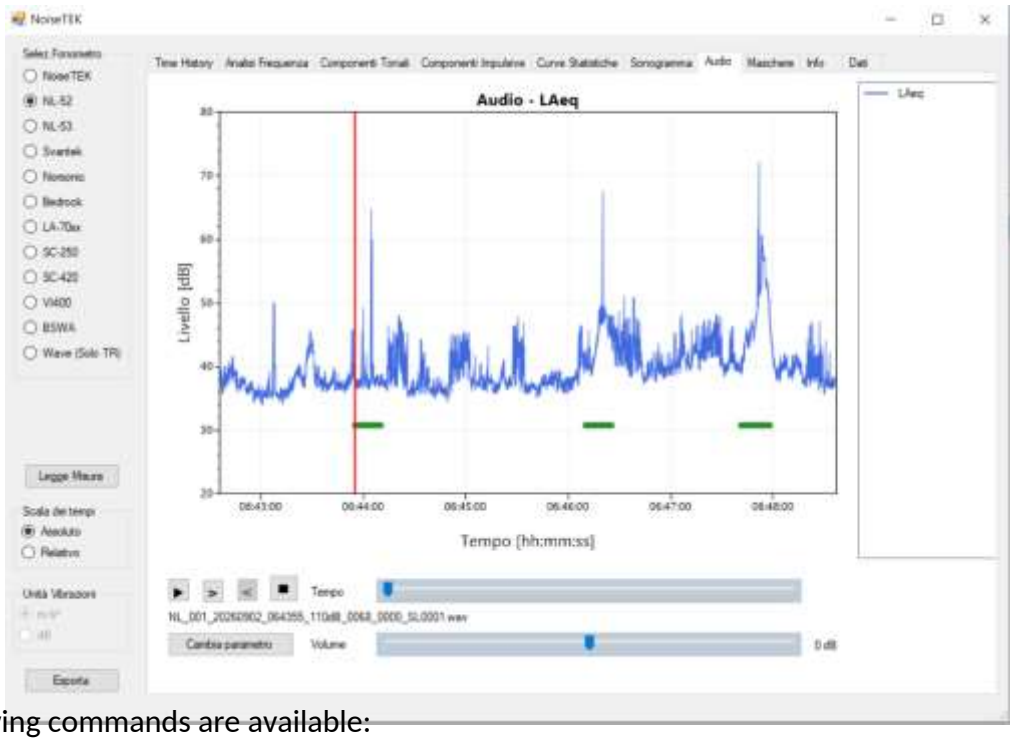
frequency and sound level of the selected point.
• Graph menu: allows you to

or reset view, or change color schemes, or save the current image

5.8 “Audio” Tab

The “Audio” tab is only available when, in addition to the acquisition of sound level data, one or more audio files in WAV format have also been recorded, in continuous mode, at intervals or with recording activated when a threshold is exceeded.

The card allows you to listen to the audio recording synchronized with the measurement. During playback, a vertical line highlights the time on the graph corresponding to the audio being listened to, allowing you to immediately correlate the sound events with the trend of the measured levels.



The following commands are available:

• “Playback”: buttons to start, pause, stop or restart the playback
audio file playback. (“”,”II”, “”)
• “File selection”: if the measurement is associated with multiple recordings, you can switch between them

recording to the next or previous one. (“>”, “<”)
• “Time”: the scroll bar allows you to quickly move to any point in the

recording, automatically updating the highlighted position on the graph.
• “Volume”: the lower slider allows you to adjust the playback volume.
• “Change graph”: allows you to choose which graph to synchronize with audio playback.

In addition to the LAeq value, any other acoustic parameter can be displayed, making it easier to analyze events according to the type of processing desired.

This function is particularly useful for identifying the sources responsible for anomalous events, verifying the nature of the peaks present in the measurement and correctly interpreting the results by comparing the listening with the different graphical representations of the data.

When available, associated audio recordings also allow you to identify ranges to be transformed into masks, maintaining the time reference to the original measure.

Interactive features available in the chart:

Navigation takes place directly with the mouse, in a differentiated way depending on the position of the pointer:

• Mouse wheel on the horizontal axis (X): changes the time scale only,

allowing you to enlarge or reduce the displayed range.
• Mouse wheel on the vertical axis (Y): changes only the scale of the levels, without

change the time interval.
• Dragging with the mouse: allows you to move the displayed portion of the graph, to

examine different ranges.

Right-clicking on the graph displays a menu containing the following commands:

• “Reset View”: Restores the original graph view.
• “Show Full Measurement”: Displays the entire measurement duration, canceling any time limitations introduced by zooming on the x-axis.
• “Adapt Y Scale”: Automatically adjusts the limits of the vertical axis based on the series levels, canceling the zoom on the y-axis.
• “Set Y Limits”: Allows you to manually enter the minimum and maximum values of the vertical axis, to define a specific range of levels.
• “Save Graph as Image”: Exports the current representation as an image file, which can be used in technical documentation.
• “Series Color”: Opens a submenu that allows you to select the series whose color you want to change and then the available color palette:

As in the “Time History” tab, this graph also offers detailed exploration of the measurement, an interactive tooltip, and the ability to switch between absolute and relative time representation.

5.9 “Masks” tab

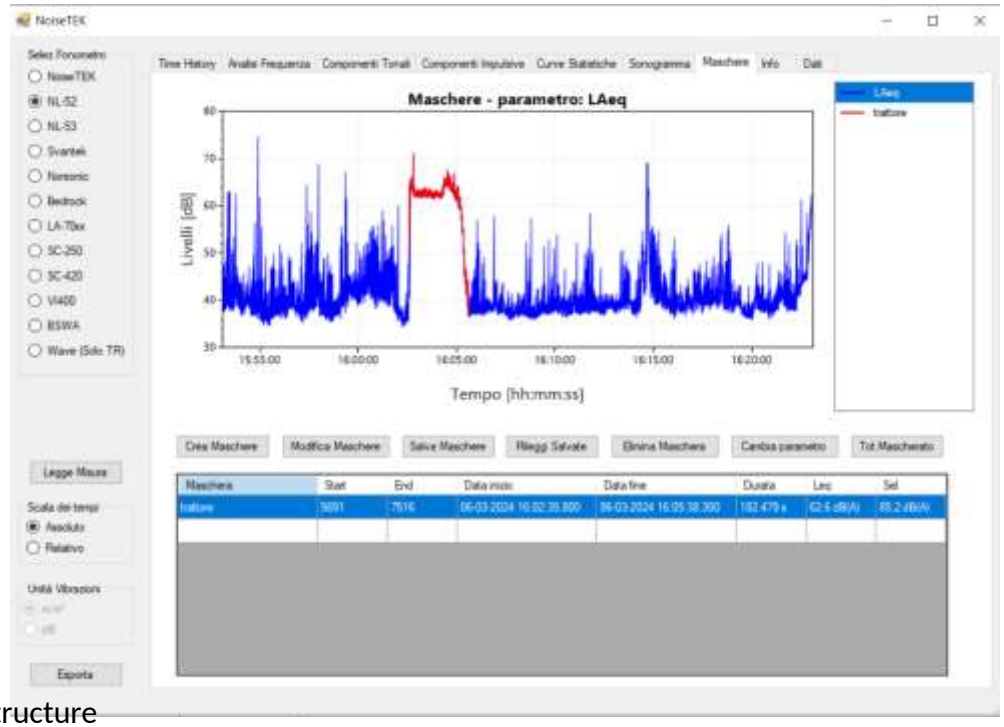
The "Masks" tab allows you to identify, view, and manage time segments of a sound level measurement called masks. Each mask represents a measurement interval that can be analyzed individually or excluded from the overall equivalent level calculation.

This feature is especially useful when analyzing environmental measurements when you want to:

- exclude anomalous or accidental events (passing vehicles, horns, sirens, etc.);
- separate the contribution of specific sound sources;
- automatically identify events above a certain threshold;
- evaluate the influence of individual events on the equivalent level of the measurement.

Masks do not modify the original measurement data in any way. They represent only the ranges used during processing in the "Masks" tab. The original measurement always remains available.

Masks are stored separately from the original measurement and can be saved and later reloaded without modifying the file containing the measurement data in any way.



Window structure

The “Masks” tab screen is divided into three main areas.

A graphic area at the top where the time trend of the measurement is represented.

When opened, the LAeq parameter is displayed, but using the “Change parameter” button you can replace it with any other parameter available in the measurement (for example single frequency bands in thirds of an octave or levels with Fast, Slow, Impulse time constants or with different weightings).

The choice of the parameter affects only the search and display of the masks.

The values reported in the table (Leq and SEL) and the calculation of the Masked Total continue to be performed on the LAeq parameter.

Masks are highlighted by colored curves overlaid on the graph.

The mask management buttons are available in the central part of the screen.

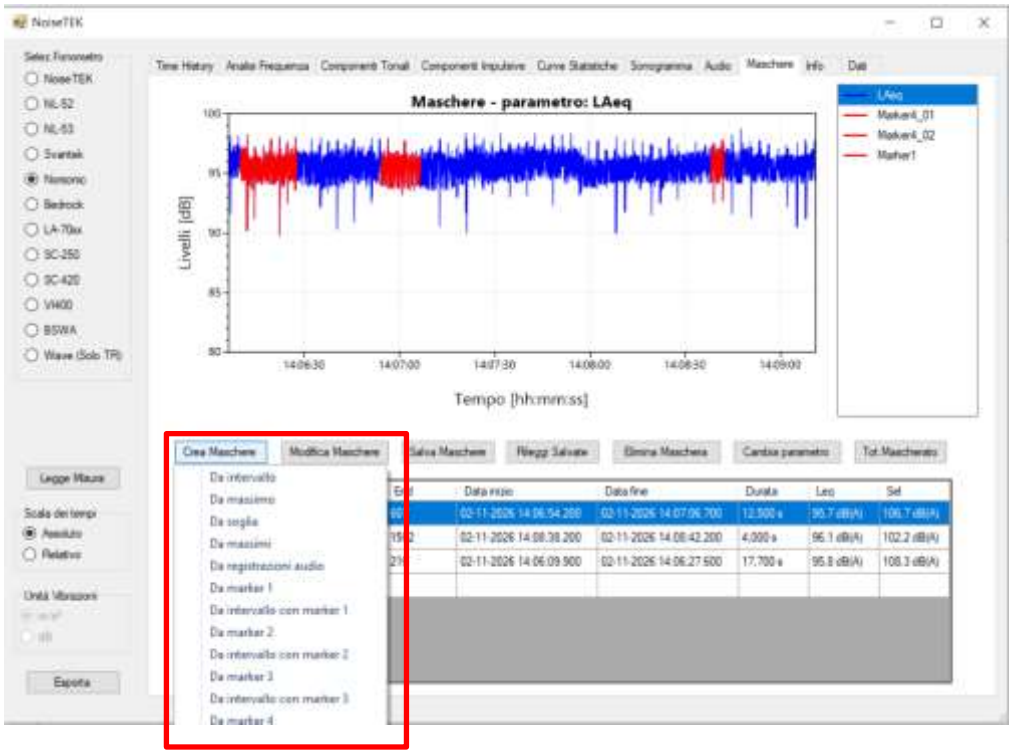
- “Create Masks”
- “Edit Mask”
- “Save Masks”
- “Reread Saved”
- “Delete Masks”
- “Change parameter”
- “Total Masked”

The table below contains all the available masks. For each mask, the following is shown:

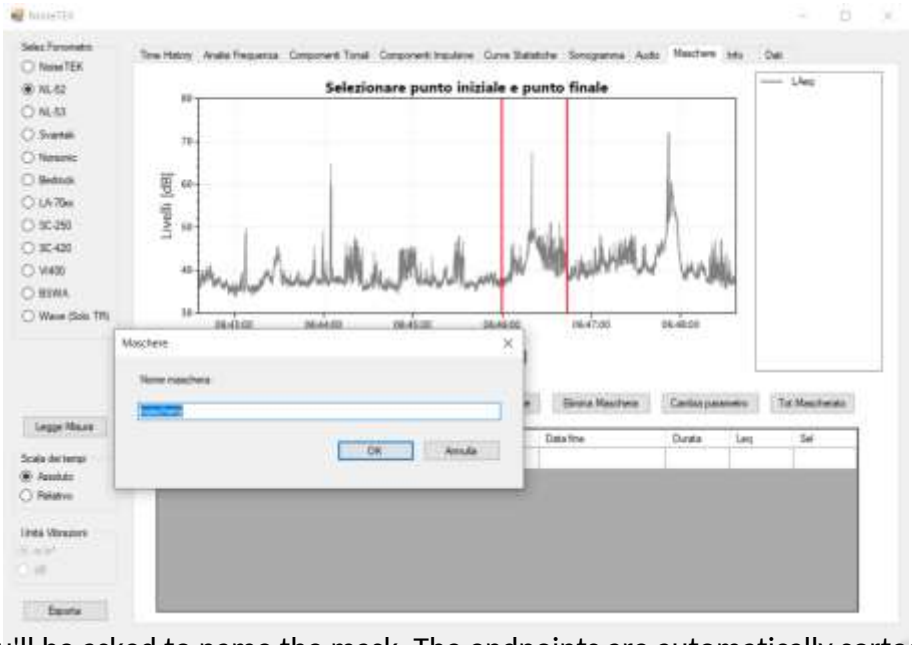
- name;
- start and end index;
- start date and time;
- end date and time;
- duration;
- A-weighted equivalent level (LAeq);
- noise exposure level (SEL).

Creating masks

The “Create Masks” button allows you to choose how to identify the range that will constitute the mask.

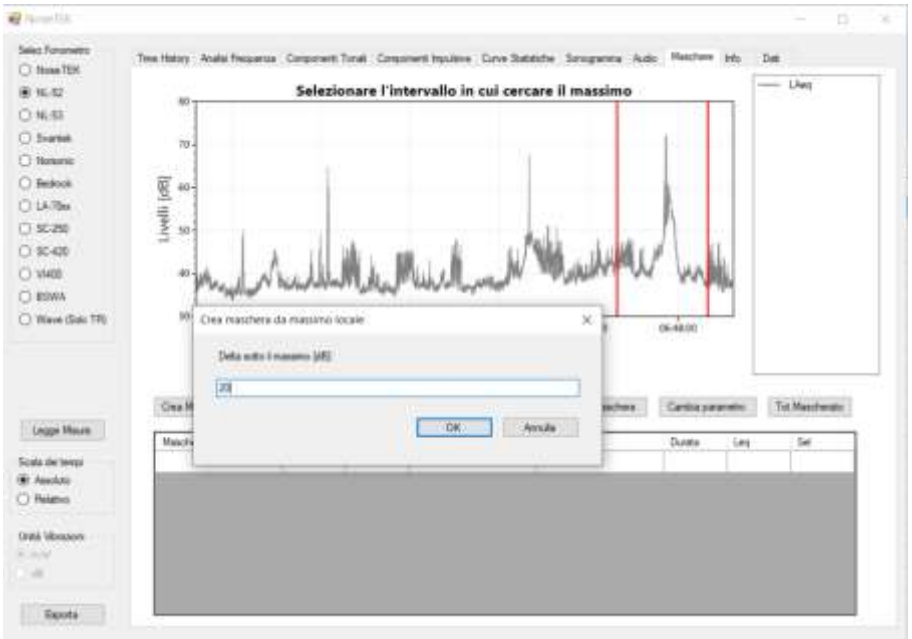


"From Range": This mode is completely manual. The user selects the starting and ending points with two clicks on the graph. Two vertical reference lines are displayed during the selection.



At the end, you'll be asked to name the mask. The endpoints are automatically sorted even if the two points are selected in reverse order. The procedure ends after the mask is created.

"From maximum": In this mode, the user defines the area in which to search for the local maximum with two clicks. The program requests the attenuation value expressed in dB compared to the identified maximum.

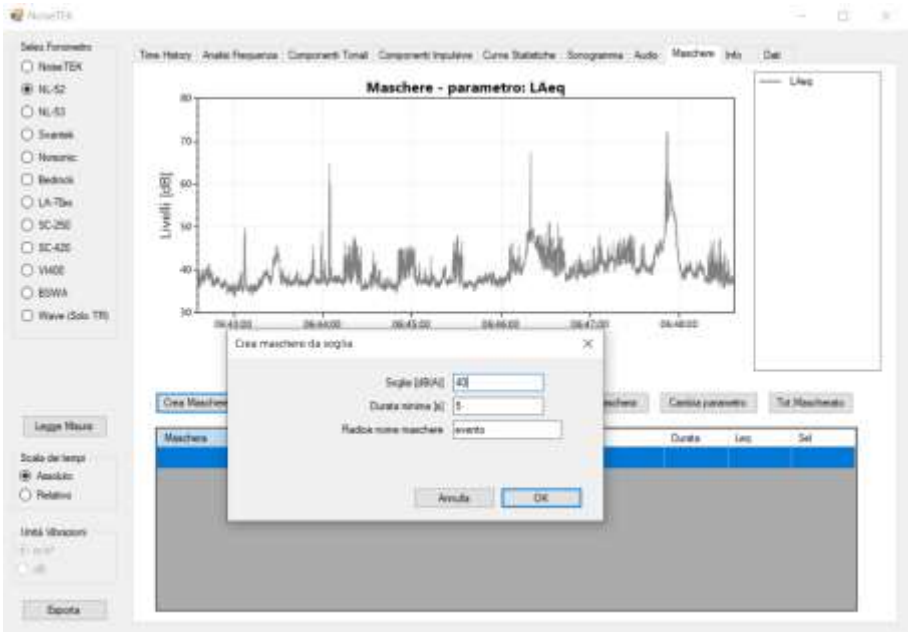


Find the maximum value in the area and search for the mask edges to the left and right until it drops below the Lmax − ΔL level. The mask can then extend beyond the two initially selected points or be smaller. Finally, a unique name is requested.

This mode is suitable for highlighting events characterised by a peak in residual noise, such as the passage of vehicles, aircraft, trains, or other sources with transient characteristics.

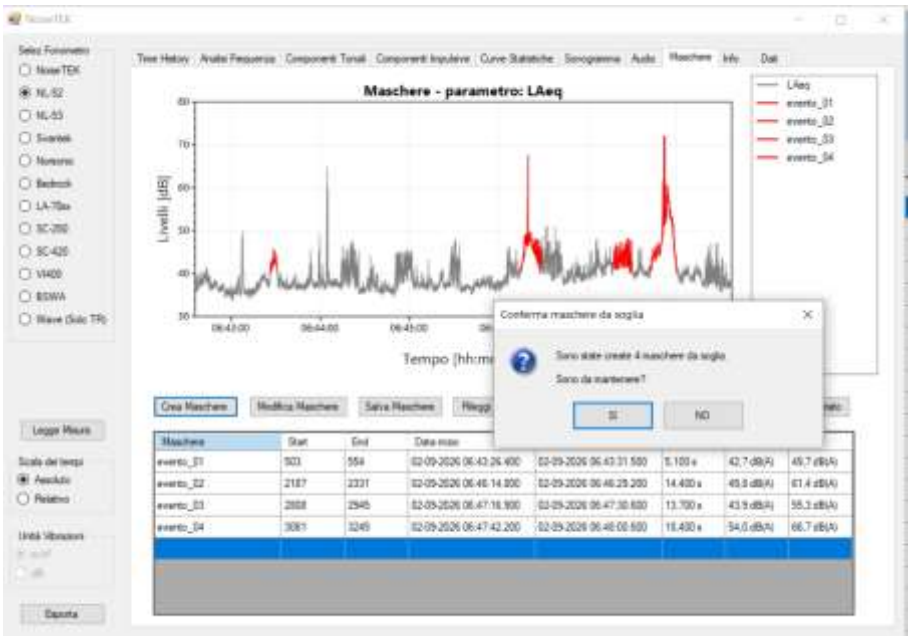
“From threshold”: This procedure allows the automatic creation of multiple masks.

The user is required to set the threshold level, the minimum event duration and the root of the name.



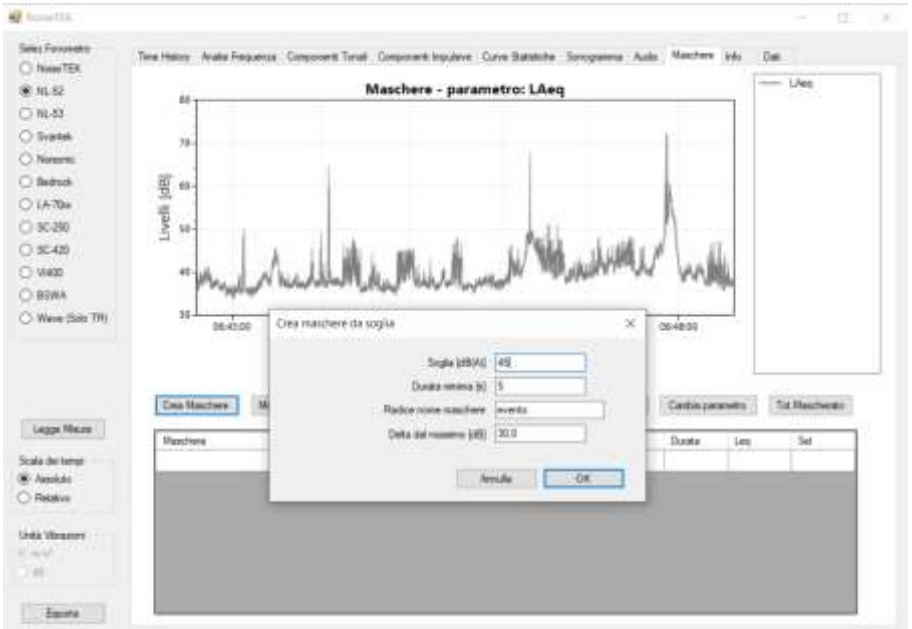
The function automatically searches for intervals in which the represented parameter is greater than or equal to the specified threshold. Only events that meet the minimum required duration are retained.

The program generates progressive names starting from the provided root, for example «Transit_01», «Transit_02», avoiding duplicates.

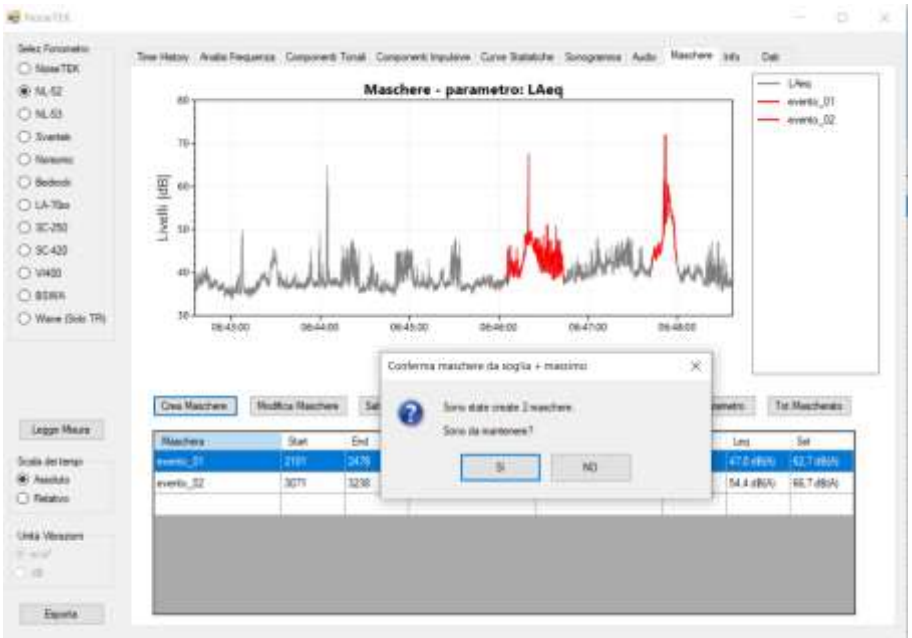


Masks appear in the graph and table; a final confirmation allows you to keep or delete them all.

"From Maximums": This mode combines threshold search with local maximum bounding. The window requires the threshold, minimum duration, root of the name, and attenuation below the maximum.

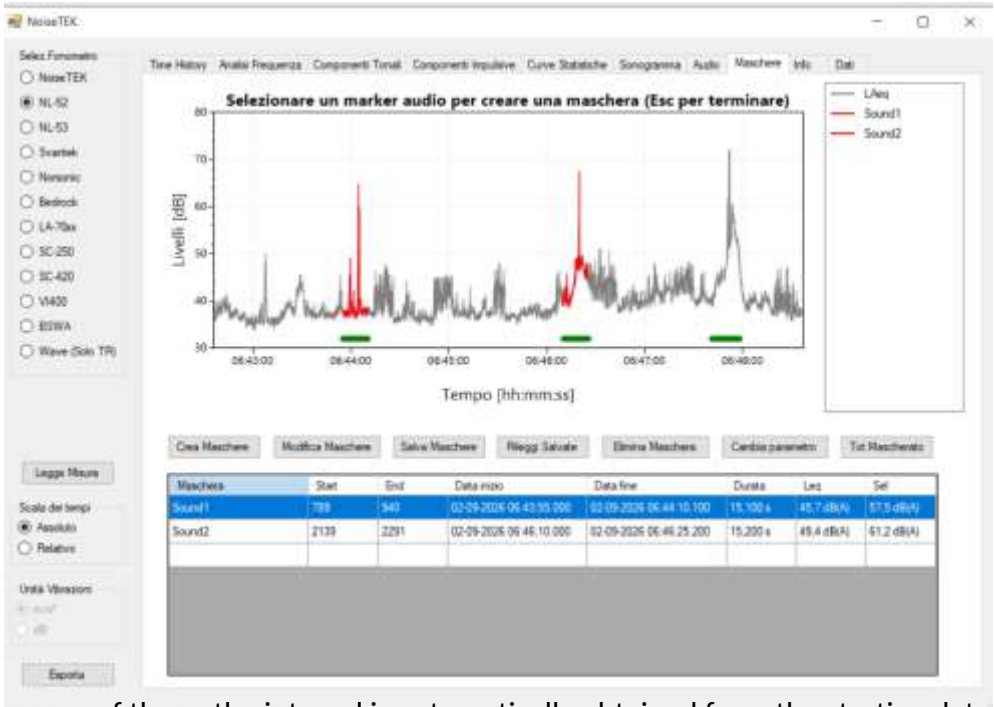


The program first identifies consecutive intervals that exceed the threshold for at least the minimum duration; for each, it finds the local maximum and determines the mask limits by searching, even beyond the initial interval, for points where the level drops below Lmax − ΔL. The masks are automatically numbered and displayed for confirmation; you can keep them or delete all newly created ones.



It differs from ~~"From threshold" because it does not directly use the extremes of the~~ exceeding to define the mask but uses the exceeding to identify the events, and defines the extremes in relation to the maximum.

"From audio recordings": This option is only available if the measurement has audio recordings associated with it. The program displays the recordings' timestamps on the graph.



By clicking on one of them, the interval is automatically obtained from the starting date/time and the duration of the audio, then a progressive name «Sound1», «Sound2», etc. is proposed, which can be modified by the user and the mask is created

The mode remains active to create additional masks from additional recordings. Press ESC to exit.

“From marker N”: When the measurement contains markers, the menu displays the types actually available, for example “From marker 1”, “From marker 2”, etc. The selection displays the corresponding references on the graph. By clicking on a marker, the mask is constructed using the starting time and duration recorded by the instrument. The program proposes a name such as «Marker4_01», which can be modified, and waits for further selections. ESC terminates the mode.

Markers can be used to directly create masks only when they are interval markers; point markers, having no duration, cannot be transformed into masks.

"From interval with marker N": This mode displays markers of the selected type as visual references, but lets the user define the endpoints by double-clicking on the graph. After naming the mask, the markers remain visible, and new intervals can be created without reopening the menu. ESC ends the mode.

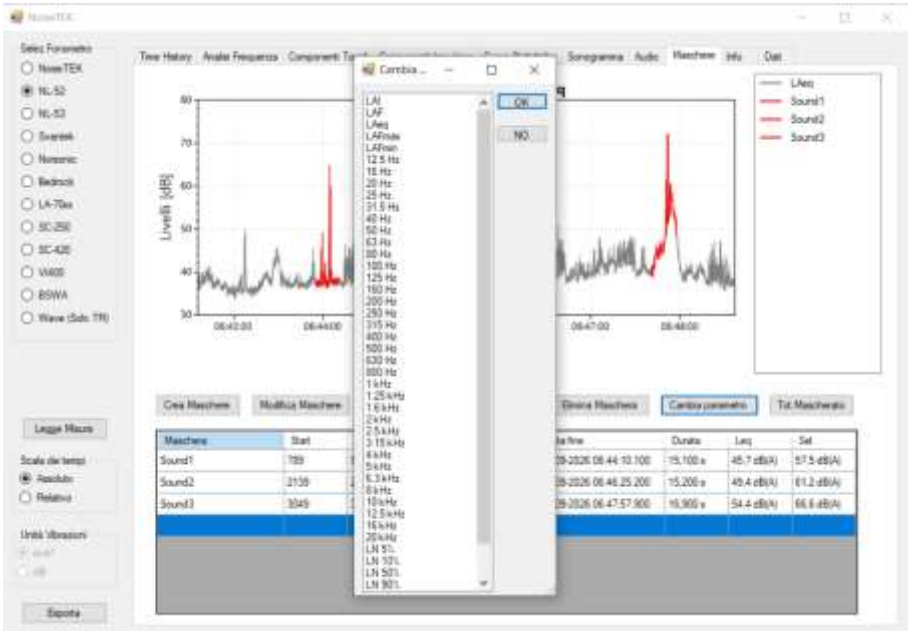
The fundamental difference is therefore that “From marker N” uses the marker extremes directly, while “From interval with marker N” allows a manual selection of the interval but assisted by their visualization.

It is particularly suitable for those sound level meters that have point markers rather than interval markers.

“Change parameter”

The “From maximum”, “From threshold” and “From maximums” functions perform the search on the parameter displayed in the graph of the “Masks” tab.

The “Change parameter” button allows you to select any other parameter available in the measurement, choosing the one that best represents the sound phenomenon you wish to identify.



For example, a source may generate an appreciable increase in sound level only in certain frequency bands, while the overall level remains relatively stable due to the presence of other sources.

In these cases, by selecting the octave or third-octave band most affected by the phenomenon, it is possible to highlight the events and distinguish them more easily from the background noise.

A particularly useful application concerns the recognition of events produced by technological systems that operate intermittently, such as elevators, plumbing systems, or other devices that activate for limited periods.

For these sources, it may be more effective to use the LASmax parameter rather than the LAeq value. The Slow weighting attenuates faster oscillations and can make the temporal trend of events characterized by a relatively short duration but a sustained level more recognizable.

The choice of parameter must therefore be made based on the characteristics of the source and the objective of the analysis, checking on the graph which representation allows the events to be best distinguished from the residual noise.

The selected parameter is used exclusively to identify the temporal extremes of the masks. The Leq and SEL values reported in the table are calculated using the LAeq series managed by the program, regardless of the parameter used for the search.

Editing masks

An existing mask can be modified simply by clicking directly on the relevant curve in the graph or by selecting it in the table and pressing “Edit Mask”; a special editing panel will open:

In this editing panel the following are shown:

- name;
- extremes;
- duration;
- start date;
- end date;
- Leq;
- SEL.



It is possible:

- change the name;
- change the ends by typing the start and end values;
- change the ends using the advance buttons;
- cancel the changes made, restoring the original name and ends of the e

ending the editing session
- accepting the changes while keeping the variations, and ending the editing session

Consistency checks are performed on the modified data:

- The name must be unique
- End must be greater than start
- End must be within the length of the measure

All changes are automatically updated in the graph and table, but are only reflected in the external file after using “Save Masks”

To avoid inconsistencies, the program prevents simultaneous access to the creation, editing and Total Masked functions.

The edit command is therefore not available while creating or modifying a form: you must first finish the current operation.

“Save masks”

Created or modified masks are initially held in the program's memory and are not automatically saved.

To save them and make them available in subsequent work sessions, you need to use the “Save Masks” button.

A file with the .ntk extension is created, containing only the mask definition, without making any changes to the measurement data.

When a measurement is reopened, the program automatically searches for an associated .ntk file and, if present in the same directory with the same name as the measurement, completely reconstructs the previously saved masks.

Warning: If you close the measure or switch to another measure without using Save Masks, all masks created and changes made since the last save will be lost.

The next time you open it, only the masks in the last saved .ntk file will be available.

It is therefore advisable to save the masks after completing the creation, modification or deletion operations.

“Reread Saved”

The “Reread Saved” button allows you to reload the original masks stored in the file, thus canceling all the changes made since the last save; the masks present in memory are replaced by those contained in the .ntk file.

Before proceeding, NoiseTEK displays a confirmation prompt, as this operation discards any unsaved changes.

By confirming, the masks currently present in the work session are deleted and replaced by those contained in the .ntk file associated with the measurement.

This feature is useful when you want to undo a series of changes or deletions and return to the situation of the last save.

“Remove masks”

The “Delete Masks” button allows you to delete one or more masks present in the measurement.

To remove masks:

- Select the mask to be deleted from the table. You can select multiple rows.

delete multiple masks at once.
- Press the “Delete Masks” button.

A confirmation window appears showing the number of masks selected.

Selecting Yes removes the masks from the table and graph; selecting No cancels the operation.

Deleting does not change the original measurement data.

Important: Deleting masks does not automatically update the previously saved .ntk file: to make the deletion permanent, use the “Save Masks” button, which updates the .ntk file.

To recover masks deleted before saving, use Reread Saved, which restores the masks present in the .ntk file.

The delete command is not available when creating or editing a form: you must first finish the current operation.

Total Masked

The “Total Masked” button calculates the equivalent level of the measurement after excluding all ranges covered by masks.

During this mode:

- the masks are excluded from the calculation;
- the trend of the Running Leq related to the residual measurement is displayed;
- the final value represents the equivalent level of the measurement without the intervals masked, in the title of the graph

Furthermore, only the samples used in the calculation are represented in the graph, while the masked intervals are excluded from the Running Leq display.

The calculation is always performed using the LAeq parameter, regardless of the parameter chosen in the Search Graph.

Interactive features available in the chart:

For both graphs, navigation occurs directly with the mouse, in a different way depending on the position of the pointer:

- Mouse wheel on the horizontal axis (X): changes the time scale only, allowing you to enlarge or reduce the displayed range.
- Mouse wheel on the vertical axis (Y): changes only the scale of the levels, without change the time interval.
- Dragging with the mouse: allows you to move the displayed portion of the graph, to examine different ranges.

Right-clicking on the graph displays a menu containing the following commands:

- “Reset view”: restores the original graph view.
- “Show entire measurement”: displays the entire duration of the measurement, canceling any time limitations introduced by zooming on the x-axis.
- “Adapt Y scale”: automatically adjusts the limits of the vertical axis based on the series levels, canceling the zoom on the y-axis.
- “Set Y limits”: allows you to manually enter the minimum and maximum values of the vertical axis, to define a specific range of levels.
- “Save graph as image”: exports the current representation as an image file, which can be used in technical documentation.
- “Series color”: Changes the color of the mask, or of the selected masks, presenting the available color palette.

As in the “Time History” tab, the interactive tooltip and the ability to switch between absolute and relative time representation are available.

5.10 “Reverb Time” Tab

The “Reverberation Time” tab allows you to determine the reverberation times T20 and T30 from the analysis of the sound decay recorded during a measurement.

Processing can be performed both on events produced by impulsive noise, and on decays obtained by interrupting a stationary noise source.

The function is available for measurements containing temporal data with a resolution suitable for decay analysis, including WAV recordings that can be used for this type of processing.

In the case of uncalibrated WAV files, the levels represented are relative; the determination of the reverb time is still based on the decay trend.

Selecting the analysis range

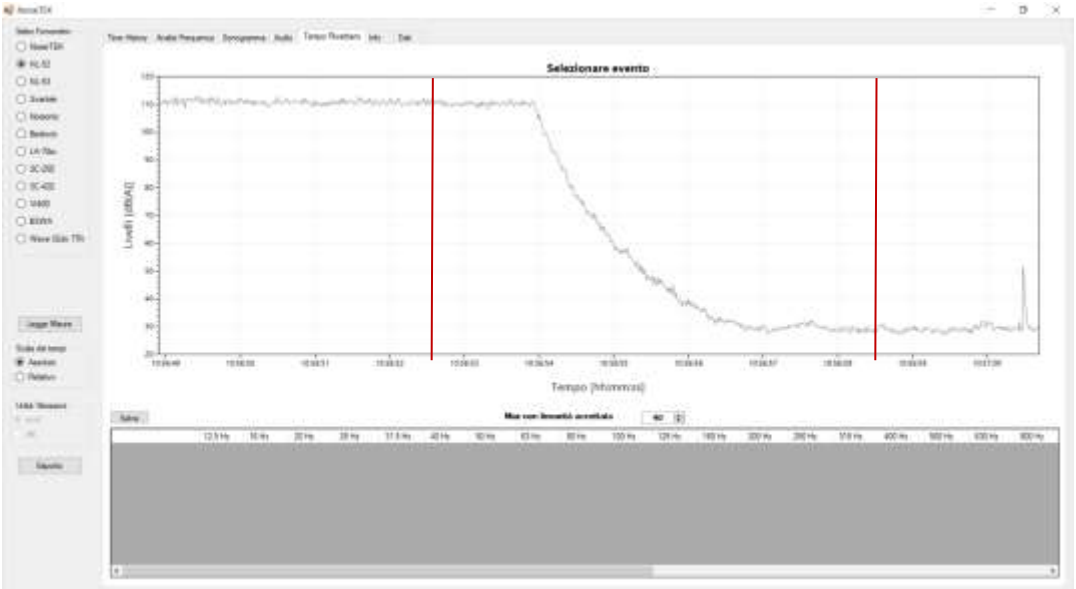
When the tab opens, the time graph of the measurement is displayed, which allows you to identify the event to be processed.

As for creating masks, the user selects by double-clicking on the graph:

- The starting point of the interval.
- The ending point of the interval.

During the selection, two vertical lines appear to identify the chosen extremes.

The interval should include a single decay event, preferably complete, avoiding the inclusion of subsequent events or extraneous disturbances.



Once the selection is complete, NoiseTEK analyzes the signal, identifies the type of decay and automatically starts calculating the reverb times for all available frequency bands.

The program distinguishes between:

- Interrupted noise: the decay is analyzed by linear regression to the minima squares.
- Impulsive noise: the Schroeder inverse integration method is applied, followed from the regression of the decay obtained.

Processing results

For each available frequency band, NoiseTEK calculates and reports in the table:

• T20 [s]: reverberation time extrapolated to a 60 dB decay by regression

in the range from −5 to −25 dB.
• T30 [s]: reverberation time extrapolated to a 60 dB decay by regression

in the range from −5 to −35 dB.
• Nonlinearity T20 [%]: indicator of the deviation of the data from the regression for T20.
• Nonlinearity T30 [%]: indicator of the deviation of the data from the regression for T30.
• Curvature [%]: indicator of the non-uniform trend of the decay.
• Txx [s]: any reverberation time obtained by manually modifying the reverberation line

decay.
• Nonlinearity Txx [%]: indicator available when Txx is determined by

regression.
• Steady-state level [dB]: sound level before decay.
• Background level [dB]: background noise level detected during processing.

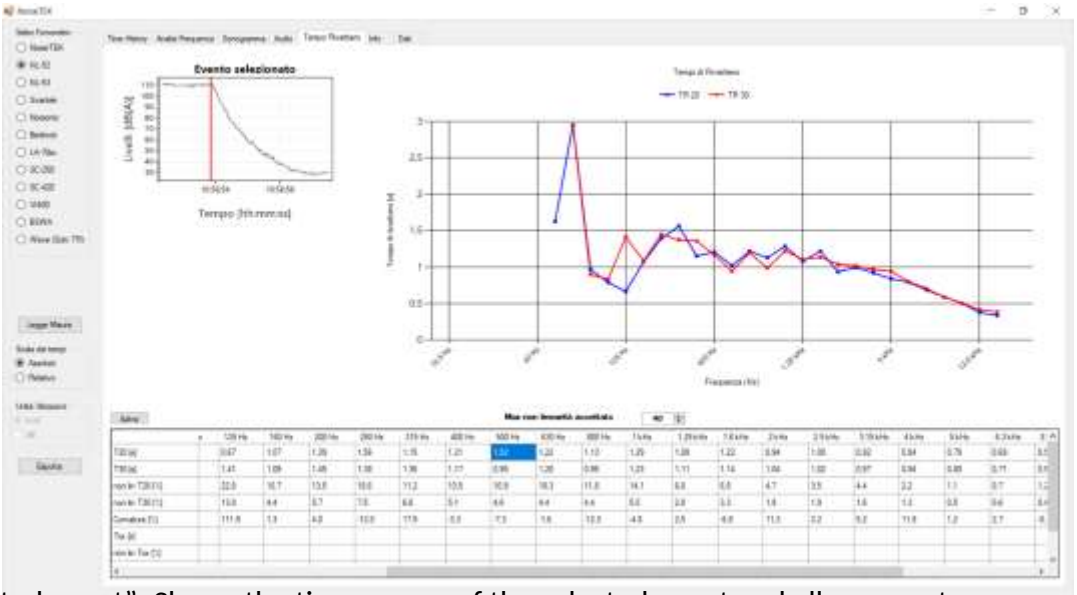
Txx results are initially blank and are only reported when the user makes and accepts a manual decay change.

The “Max accepted nonlinearity” parameter, initially set to 40%, allows you to define the threshold used by the program to evaluate the acceptability of the automatic results.

However, the assessment of the reliability of reverberation times must also consider the regularity of the decay, the background noise and the actual extension of the interval used for the regression.

Graphic representations

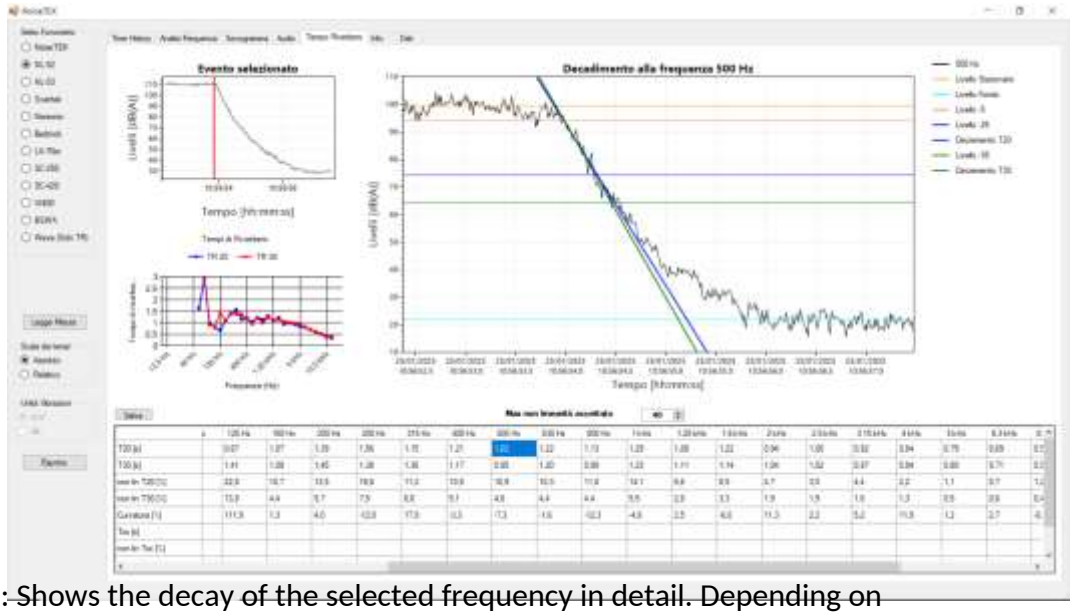
After the calculation, the sheet provides three graphical representations linked to each other.



• “Selected event”: Shows the time course of the selected event and allows you to

Control the range used for processing. Clicking on the graph allows you to return to the initial selection and locate a new event. Choosing a new range starts a new processing, replacing the previous results.

- “Reverberation times”: Graphically represents, as a function of frequency, the times T20 and T30 calculated automatically. The horizontal axis shows frequencies, while the vertical axis shows reverberation times in seconds. Comparing the two curves allows you to quickly identify the bands in which the results show significant differences. Clicking on a frequency, or selecting the corresponding column in the table, displays the "Decay" graph.



- “Decay”: Shows the decay of the selected frequency in detail. Depending on of the type of event and the available results, are represented:
  - o The sound decay curve. o The curve obtained by inverse Schroeder integration, if any. o The reference decay levels at −5, −25, and −35 dB. o The automatic regression lines T20 and T30. o The references to the steady-state level and background noise. o Any manual lines Txr or Txm, if present.

A side legend allows you to identify the displayed curves and their relative values.

In the case of manually modified lines, the level difference ΔL, expressed in dB, between the extremes of the line is also reported.

The decay graph also provides the operational area for manually editing reverb times, which is described in the following sections.

To return to the overall representation of the reverberation times, it is possible to use the summary graph, which remains visible in a reduced form.

The three representations are linked to the same processing: selecting a frequency modifies the displayed decay, without altering the other measurement results.

Impulse Decay Analysis – Schroeder Method

The Schroeder method allows us to determine the reverberation time of a room starting from the sound response produced by an impulsive event, such as the bursting of a balloon or another source capable of generating a sufficiently intense impulse.

Unlike the interrupted noise method, which directly analyzes the decrease in sound level after a stationary source is turned off, the Schroeder method uses a mathematical procedure called ‘inverse integration’, which allows for the reconstruction of a smoother energy decay curve.

A sound pulse initially generates a high level, followed by a succession of reflections on the surfaces of the environment.

The sound energy progressively decreases, but the temporal trend normally presents numerous oscillations, due to the arrival of the individual reflections.

These oscillations would make a linear regression applied directly to the impulse signal unreliable.

Schroeder's method solves this problem by integrating the sound energy ‘backwards in time’, from the tail end of the decay towards the instant of the impulse.

This operation produces a curve that represents the residual sound energy over time and which generally has a smoother trend than the original impulse response.

The curve thus obtained is expressed in decibels and used to determine the decay rate of sound energy.

When an impulsive event is detected in the selected range, NoiseTEK automatically applies the Schroeder method to the individual available frequency bands.

Processing includes the following operations:

1. Identification of the impulse and subsequent decay phase. 2. Evaluation of the background noise level at the end of the recording. 3. Conversion of the sound levels into linear energy values and subtraction of the energy contribution.

of the background. 4. Inverse integration of the sound energy, up to the beginning of the area identified as background noise.

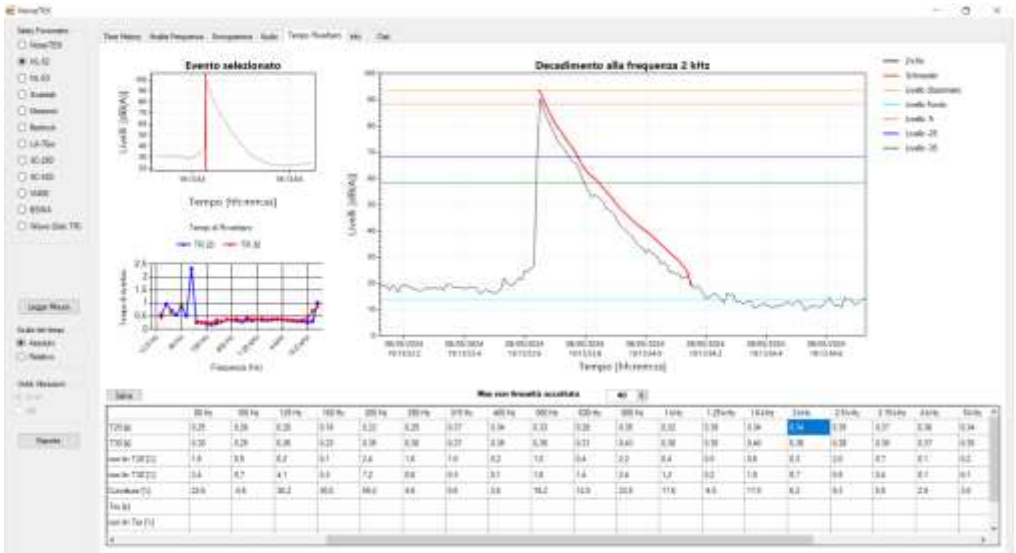
background. 5. Reconstruction of the decay curve expressed in dB. 6. Determination of the sections between −5 and −25 dB and between −5 and −35 dB. 7. Calculation of the regression lines and the corresponding times T20 and T30, extrapolated to a

60 dB decay.

The processing is repeated for each frequency band, since the reverberant behavior of the room can vary significantly with frequency.

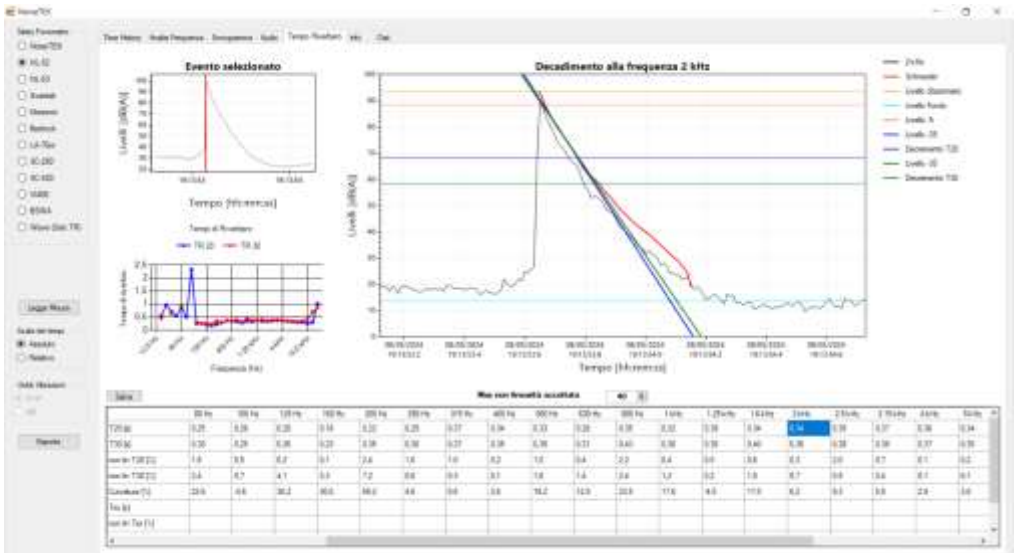
Impulse decay visualization

The “Decay” graph shows the original impulse response and the curve obtained by inverse Schroeder integration.



The original response normally has an initial peak followed by an irregular trend, while the Schroeder curve is generally more regular and suitable for determining regression lines.

The T20 and T30 lines are calculated, as regression lines, on the Schroeder curve, not directly on the impulse response oscillations.



The representation therefore allows to compare the acquired signal with the energy decay used for the calculation.

To obtain reliable results it is important that the pulse is sufficiently intense compared to the background noise, the recording includes the entire decay, and there are no subsequent pulses or extraneous events that alter the decay.

The mere presence of a Schroeder curve does not therefore guarantee the validity of the results: it is necessary to verify the regularity of the decay and the absence of significant interferences.

Interactive features available in charts

The graphs allow navigation using the mouse:

Zoom and move: Navigation is done directly with the mouse, in a differentiated way depending on the position of the pointer:

• Wheel on the horizontal axis (X): changes the time scale only, allowing you to enlarge or reduce the displayed range.
• Wheel on the vertical axis (Y): changes the scale of the levels only.
• Dragging with the mouse: allows you to move the displayed portion of the graph, keeping the scale unchanged.

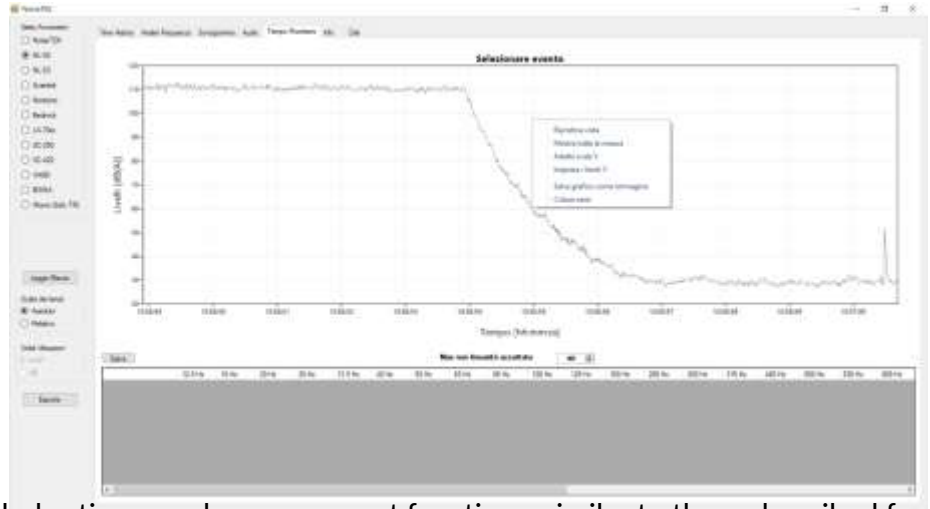
Interactive tooltip: In the “Selected Event” graph, moving the pointer over the curve displays an information window containing:

• Timestamp of the point, in absolute or relative format depending on the time mode selected.
• Name of the parameter represented.
• Level value expressed in dB.

Chart context menus

Right-clicking on the graphs displays the commands available for the selected representation.

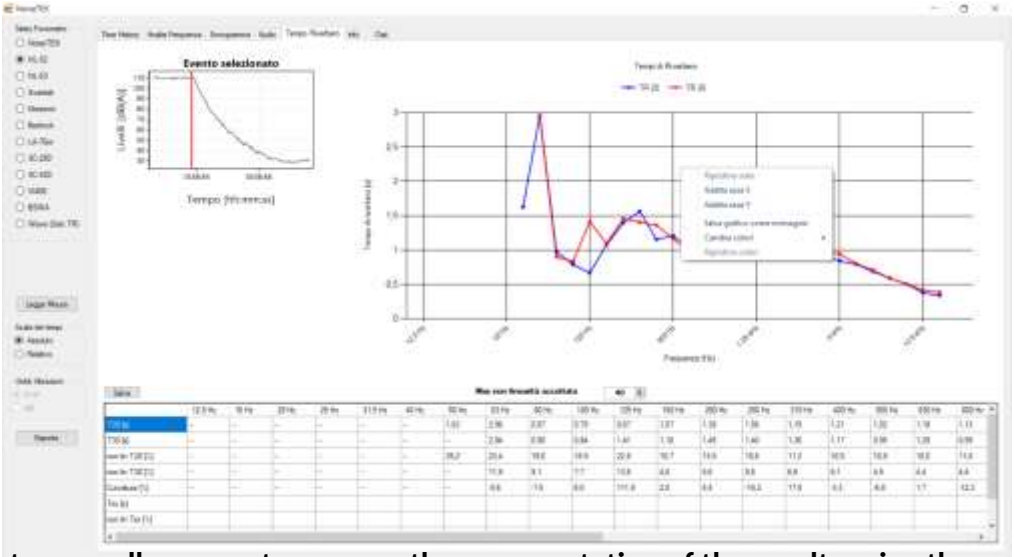
“Selected Event” Chart Menu



The menu includes time graph management functions, similar to those described for the “Time History” tab:

• “Reset View”: Restores the original view.
• “Show Full Measurement”: Displays the entire time duration.
• “Fit Y Scale”: Automatically adjusts the vertical limits.
• “Set Y Limits”: Allows you to manually define the minimum and maximum values.
• “Save Graph as Image”: Exports the current representation.
• “Series Color”: Allows you to change the color of the represented curve.

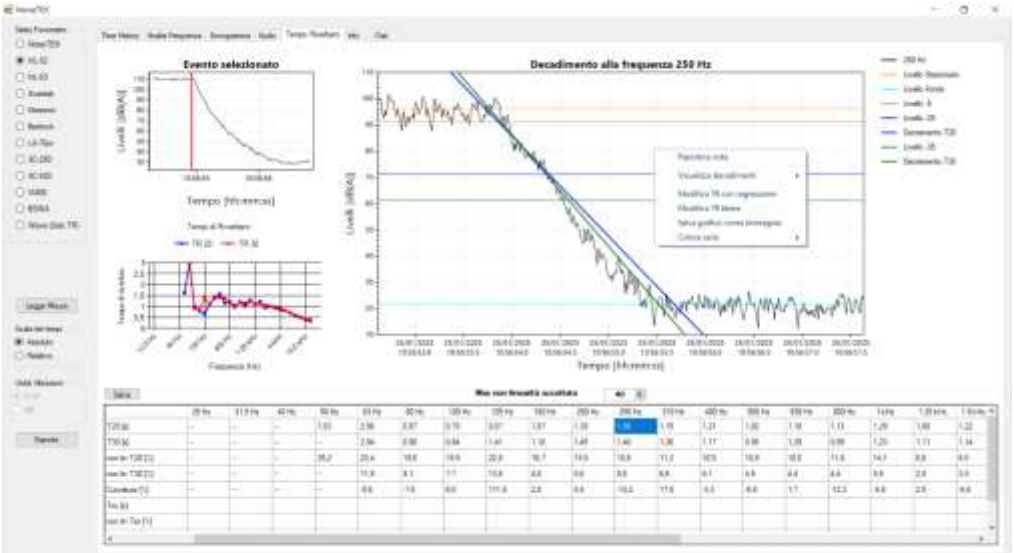
“Reverberation Times” graph menu



The context menu allows you to manage the representation of the results using the commands provided for frequency graphs.

Key features include view restoration, scale adjustment, T20 and T30 color management, and saving the graph as an image.

“Decay” chart menu



The context menu of the “Decay” graph includes, in addition to the display functions, specific commands for manually modifying the reverberation times.

“Reset View”: Restores the original limits of the axes, canceling the zooms and movements performed during the decay examination.

“Show decays”: Opens a submenu where you can choose which lines to display:

- “T20”: shows or hides the T20 regression line.
- “T30”: shows or hides the T30 regression line.
- “TR with regression”: shows or hides the Txr line, when available.
- “Free TR”: shows or hides the Txm line, when available.

A check mark identifies the displayed lines.

The Txr and Txm options are enabled only when the corresponding processing is available and no incompatible editing is in progress.

The choice of visible lines affects only the graphical representation: the calculated and accepted results remain stored.

“TR Edit with Regression”: Activates the modification of the reverb time using a new linear regression, defined by selecting the extremes of the decay range.

“Free TR modification”: Activates the modification using a straight line defined directly by the user, with the possibility of moving both ends.

During an edit, the related command becomes “Close TR edit with regression” or “Close free TR edit”.

“Clear Txx”: The command appears when, for the selected frequency, there is a previously accepted manual line.

Allows you to delete the Txx result, restoring the situation where only the automatic T20 and T30 values are available. Deletion requires confirmation.

“Save Graph as Image” Saves the decay graph in the current configuration, including the visible curves and their legend.

“Series Color”: Allows you to select a visible curve and change its color through the color selection window.

Manually changing the reverb time

NoiseTEK allows you to influence the automatic T20 and T30 results by defining a modified reverb time, indicated as Txx.

The change is made separately for each frequency band and does not alter the originally calculated automatic values.

There are two modes available:

- Txr — TR with regression, which calculates a new line by linear regression on a selected range.
- Txm — Free TR, which allows you to directly define a line using two endpoints mobile.

Only one accepted manual line can be stored for a given frequency. If a new line is defined, it replaces the previous one only after the user confirms.

TR modification with regression (Txr)

This mode allows you to recalculate the reverb time by selecting a different portion of the decay curve.

It is particularly useful when the range used by the automatic calculation is not representative, for example due to the presence of noise, decay irregularities or the influence of background noise.

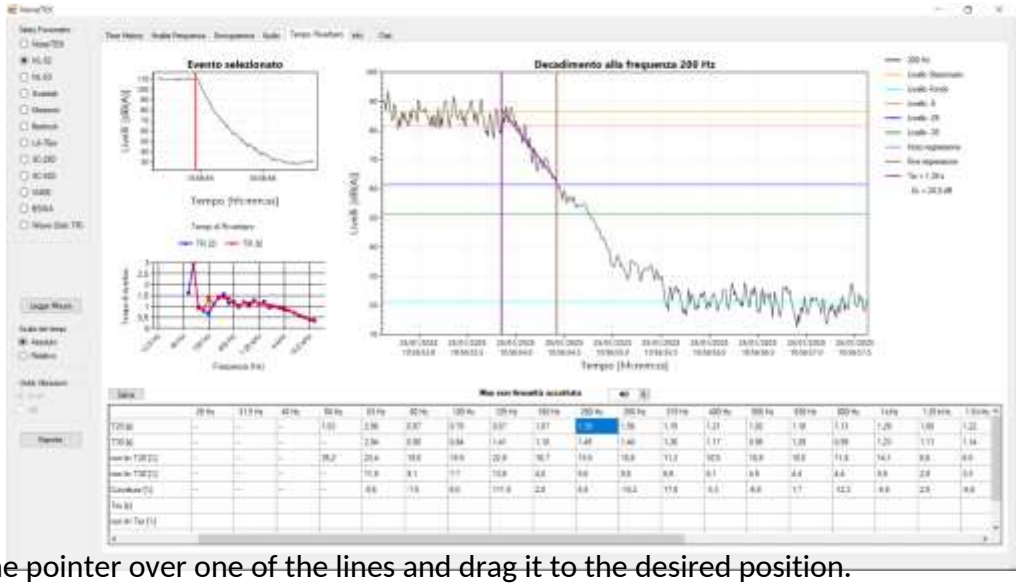
Operating procedure

1. Select the frequency you want to change in the “Reverberation Times” table or graph.

2. In the “Decay” graph, right-click.

3. Select “Edit TR with regression”.

4. Two vertical lines appear, marking the regression range.



5. Place the pointer over one of the lines and drag it to the desired position.

6. Repeat on the other line, if necessary.

As you move the sliders, NoiseTEK automatically updates the regression line and the corresponding reverb time.

The cursors indicate the time limits of the interval used for the calculation. The line is automatically determined by a least-squares fit to the points within the interval.

The Txr value and the corresponding level difference ΔL are updated in the legend.

7. Confirm the change: when the result is satisfactory, open the context menu again and select “Close TR edit with regression”.

The program asks whether to accept the change.

- “Accept”: the new time is stored in the Txx row of the table.
- “Abandon”: the current change is cancelled, maintaining any line.

  previously accepted.

The program checks the validity of the regression before accepting the result. An invalid regression is not stored.

Free TR Edit (Txm)

This mode allows you to manually define a decay line without constraining it to regression on the points of the curve.

Unlike Txr mode, in which only the time ends of the interval are moved, in Txm mode it is possible to independently change the horizontal and vertical position of the two ends.

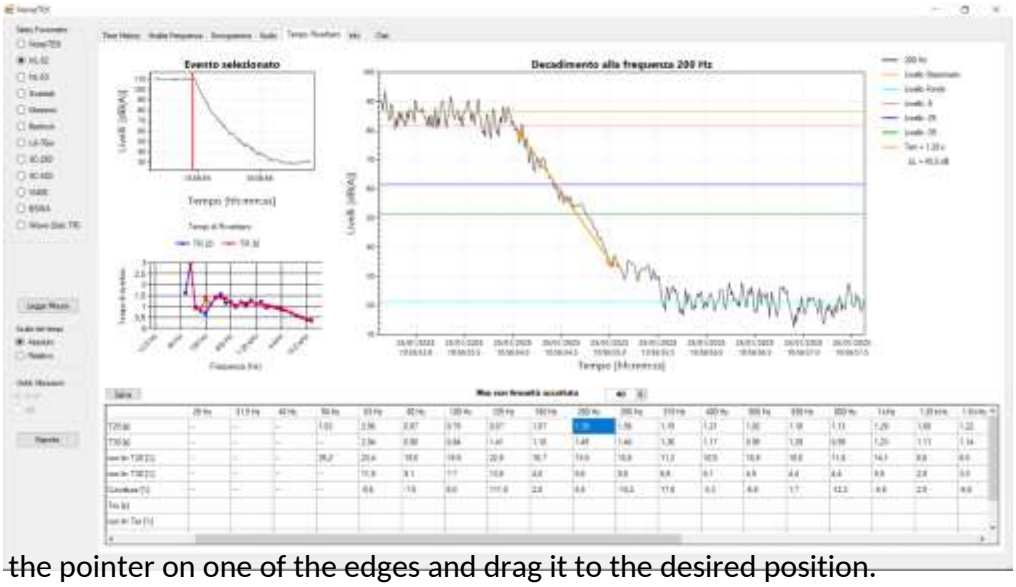
Operating procedure

1. Select the frequency to change.

2. Open the context menu of the “Decay” graph.

3. Select “Free TR Edit”.

4. A line with two movable endpoints appears.



5. Position the pointer on one of the edges and drag it to the desired position.

6. Repeat the operation on the other extreme until you obtain the straight line considered to represent the decay.

While dragging, the line and the related time Txm are updated automatically. The legend shows the calculated time and the level difference ΔL between the two extremes.

The reverberation time is obtained from the slope of the line, extrapolating the decay represented to 60 dB.

To obtain a valid value, the line must have a positive duration and a negative slope.

7. Confirm the change: when the result is satisfactory, open the context menu again and select “Close free TR editing”.

The program requires confirmation:

- “Accept”: stores the Txm value in the Txx line.
- “Abandon”: cancels the current changes and restores any previously set line.

accepted.

Difference between Txr and Txm

The two modes allow you to act on the same Txx result, but they use different criteria.

Txr — Regression: The line is automatically recalculated at the points of the curve between the two time cursors. The user chooses the interval, while the slope and vertical position are derived from the regression. A nonlinearity indicator is then calculated and reported in the corresponding row of the table.

Txm — Free Line: The user directly defines the position of the two endpoints of the line, both in time and in level. The result depends on the slope of the line thus identified. Since it is a line defined directly by the user, the nonlinearity of the regression is not calculated for Txm. The corresponding table cell displays "--".

When a Txr or Txm line is displayed, the legend also displays the value: ΔL = ... dB. This value represents the difference in level between the start and end of the line in question. This data allows you to immediately verify the amplitude of the decay used to determine Txx. The ΔL value is updated as the endpoints are moved, allowing you to evaluate the extent of the selected segment before confirming the change.

Replacing and Deleting a Txx

If there is already a Txx for the selected frequency, you can change it again.

By recalling the same mode, the extremes of the previously accepted line are proposed again, which can be further modified.

If you switch from Txr to Txm, or vice versa, NoiseTEK will ask you to confirm before replacing the existing mode. The new line will replace the previous one only after you accept the change.

To completely delete a Txx, select the affected frequency and use the “Delete Txx” command from the context menu. The manual line is deleted and the cells relating to Txx and its nonlinearity are emptied.

Saving reverb times

The “Save TR” button allows you to save the results of the reverb time processing, including any manual changes.

The program creates a file with the extension `.ntktr`, associated with the original measurement and saved in the same directory.

The file contains:

- The extremes of the range selected for processing.
- The T20 and T30 values.
- Any Txx results.
- The information needed to recognize the manual method used, Txr or Txm.
- The coordinates of the extremes of the accepted manual lines.

The `.ntktr` file does not modify the original data acquired by the sound level meter.

Warning: Saving is not automatic. If you switch to another measurement or close the program without using "Save TR," any changes made since the last save will be lost.

Rereading saved results

When a measurement is reopened, NoiseTEK automatically searches for the associated `.ntktr` file.

If the file is present and valid, the processing range, the results table and any previously saved manual lines are restored.

By selecting a modified frequency, you can then display the Txr or Txm line again and make further adjustments if necessary.

To make the new changes permanent, you need to use “Save TR” again.

Saving only affects the current measurement.

Entering Reverb Times into NoiseTEK Modules

When the “Reverb Time” page is opened from a module that requires reverb times, the “Insert” button allows the processing results to be transferred to the calling module.

If only automatic T20 and T30 results are available, the transfer is made using those values.

If there is at least one valid Txx, NoiseTEK asks which result set to use:

- “Use Txx”: Uses the modified values only on frequencies for which a Txx is available valid.
- “Use T20/T30”: Use automatic results only.

If you choose “Use Txx”, in the modified frequencies the Txx value replaces both the T20 and T30 values transferred to the module.

The other frequencies maintain their automatic values.

The application is submitted only once, regardless of the number of frequencies modified.

The selection made only affects the transfer of results and does not change the data displayed on the “Reverb Time” page or the contents of any `.ntktr` file.

Once the transfer is complete, the processing window is closed and the program returns to the calling module.

The ability to use modified Txxs allows subsequent processing to be performed with user-verified reverb times, while still retaining the original T20 and T30 values.

Data export

The “Export” button allows you to export the measurement data into Excel format, including the results of the reverberation time analysis: T20, T30, Txx, related indicators and any manual editing method used.

The data is reported in the “data” sheet of the Excel file, regardless of the template selected.

The organization and presentation of the results in the other sheets of the template can be customized by the user, as described in Chapter 7 – Managing Templates.

Exporting does not replace “Save TR”, which is required to preserve the processing in the `.ntktr` file.

5.10.1 Direct import of measurements from NL-52 sound level meter

The software allows, for the Rion NL-52 sound level meter, the direct import of reverberation time measurements processed by the Reverberation Time (RV) module of the sound level meter itself.

This mode allows you to quickly analyze all the measurements contained in the summary file produced by the tool, verifying the automatically calculated results before their possible use in projects.

The function is intended exclusively for the analysis and verification of reverberation time measurements.

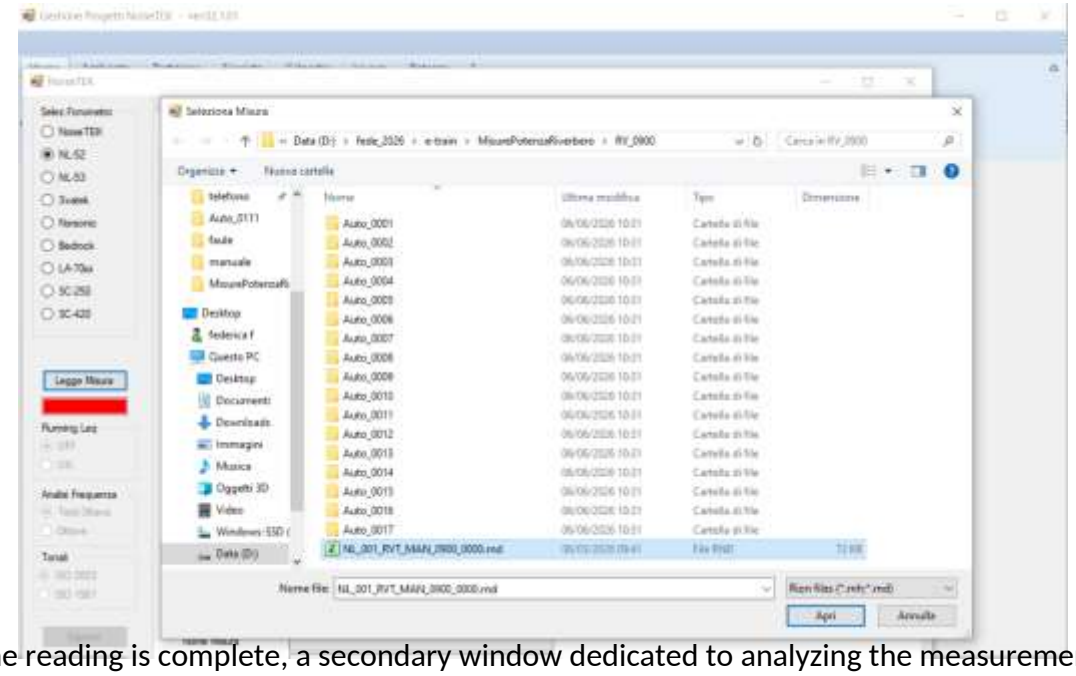
The displayed values can be imported into software modules that require reverberation times, such as passive acoustic requirements or sound power projects.

Loading the measure

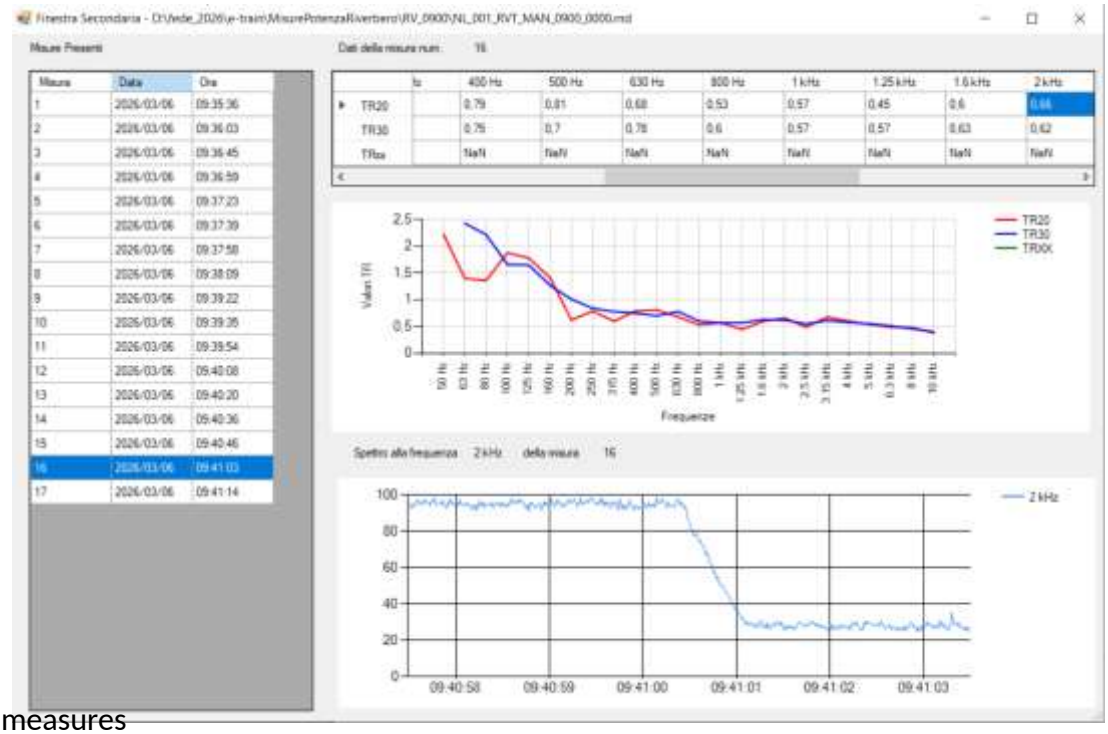
After selecting the NL-52 sound level meter, press the “Read Measurement” button.

Unlike the normal display of measurements, the Auto_xxxx.rnh file relating to a single acquisition does not need to be selected, but rather the file: NL_001_RVT_MAN_*.rnd contained in the reverberation time measurement folder.

The file contains a summary of all the measurements taken by the sound level meter and the related automatically calculated reverberation times.



Once the reading is complete, a secondary window dedicated to analyzing the measurements opens.



List of measures

On the left side of the window is a grid containing a list of all the reverb time measurements available in the file.

Selecting a measurement automatically updates all the information in the other areas of the window.

Results table

The upper grid shows, for each available frequency band, the reverberation times determined by the sound level meter.

They are displayed:

- the T20 values;
- the T30 values;
- any Txx value manually set by the user on the sound level meter.

Reverberation time graph

The central graph shows the trend of the values reported in the previous table as a function of frequency.

The graphical representation allows you to quickly identify any anomalies or inconsistent trends between the different frequency bands.

Decay curve

By selecting a frequency band in the results table, the lower graph shows the relative decay curve used by the sound level meter to calculate the reverberation time.

This view allows you to visually verify the quality of the measurement and the correctness of the automatically determined reverberation time, making it easy to identify any irregular or noise-influenced decays.

5.11 “Info” tab

The “Info” tab contains one or more information tables with the measurement configuration parameters, obtained from the data read by the individual sound level meters

The contents vary depending on the type of sound level meter used and the measurement settings: each device provides a different set of accessory data.

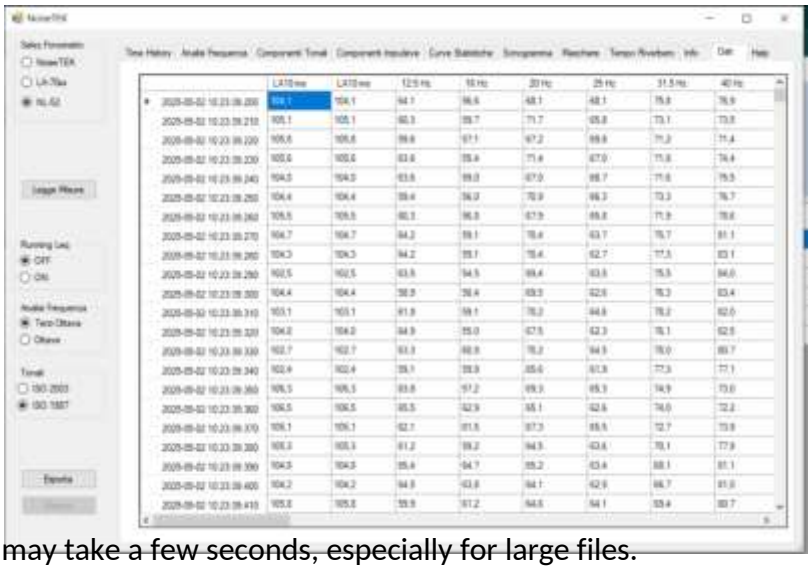
The information reported may include, for example:

- Weighting type and time constant - Duration, sampling time, active channels - Filtering, trigger thresholds, start mode, etc.

Note: The data displayed depends exclusively on what was recorded by the instrument during the measurement: for a detailed description, please refer to the sound level meter documentation.

5.12 “Data” tab

The "Data" tab presents a complete grid with all the numerical values detected during the measurement. Each row represents a moment in time, each column a parameter.



The initial loading may take a few seconds, especially for large files.

Once loaded, the table is fully navigable via horizontal and vertical scrolling.

You can select all or part of the data to copy and paste directly into an Excel spreadsheet or other processing software.

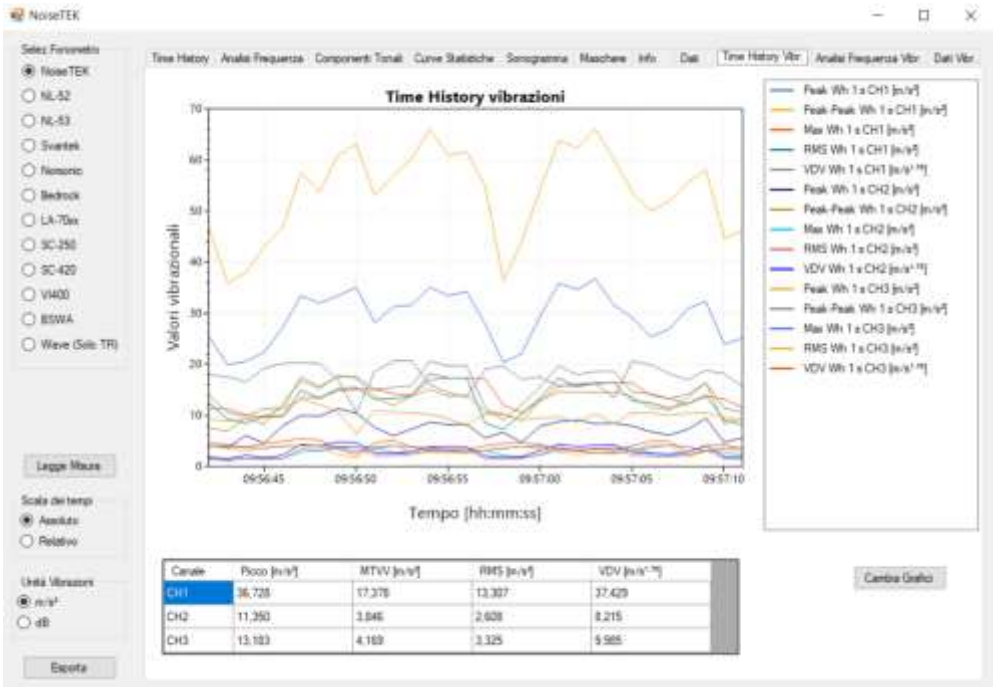
This table can be useful for:

- Manual checks on raw data - Checking for anomalous or out-of-range values - Additional analyses outside of the NoiseTEK software

5.13 “Time History Vibrations” Tab

The “Vibration Time History” tab represents the vibrational parameters acquired by the instrument on the different measurement channels over time.

Depending on the data available in the acquired file, the graph can display RMS, VDV, peak, and maximum values for individual channels. The displayed curves are identified by the legend next to the graph.



The table at the bottom shows the overall values associated with the measurement for each channel. The available parameters and their units depend on the instrument's configuration and the content of the acquired file.

The navigation controls and context menu are identical to the “Time History” tab

Using the “Vibration Units” box in the right sidebar, acceleration data can be displayed in the physical unit m/s² or as a level expressed in dB.

The conversion is performed using the relationship:

$$L_a = 20 \cdot \log\left(\frac{a}{a_0}\right)$$

Where:

- □□ is the acceleration level expressed in dB;
- □ is the value of the acceleration expressed in m/s²;
- □0 = 10−6 m/s² is the reference value.

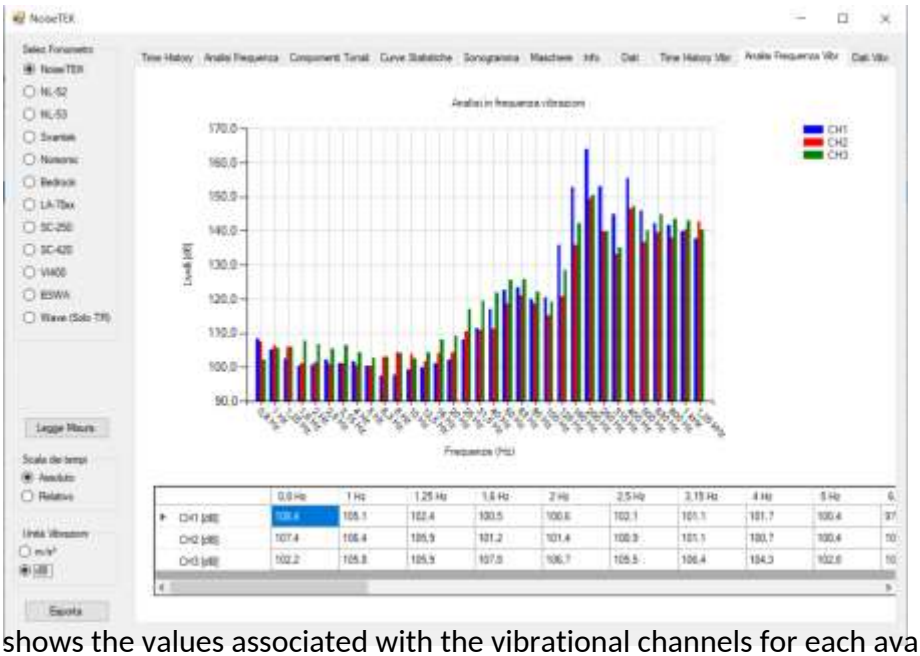
Selecting the unit only changes the display mode. The original data read from the file is not replaced or altered; therefore, you can switch between m/s² and dB at any time.

The previous image showed the data representation in physical units, while the next one shows the same values converted to dB.



5.14 “Vibration Frequency Analysis” Tab

The “Vibration Frequency Analysis” tab shows the spectrum of the accelerations detected on the different channels.



The top graph shows the values associated with the vibrational channels for each available frequency band. The different series are identified by colors and abbreviations corresponding to the acquisition channels.

The lower grid reports the same data in numerical form, organized with:

- one row for each channel;
- one column for each available frequency.

The representation allows to compare the spectral trend of the different channels and to identify the bands in which the most significant vibrational components are present.

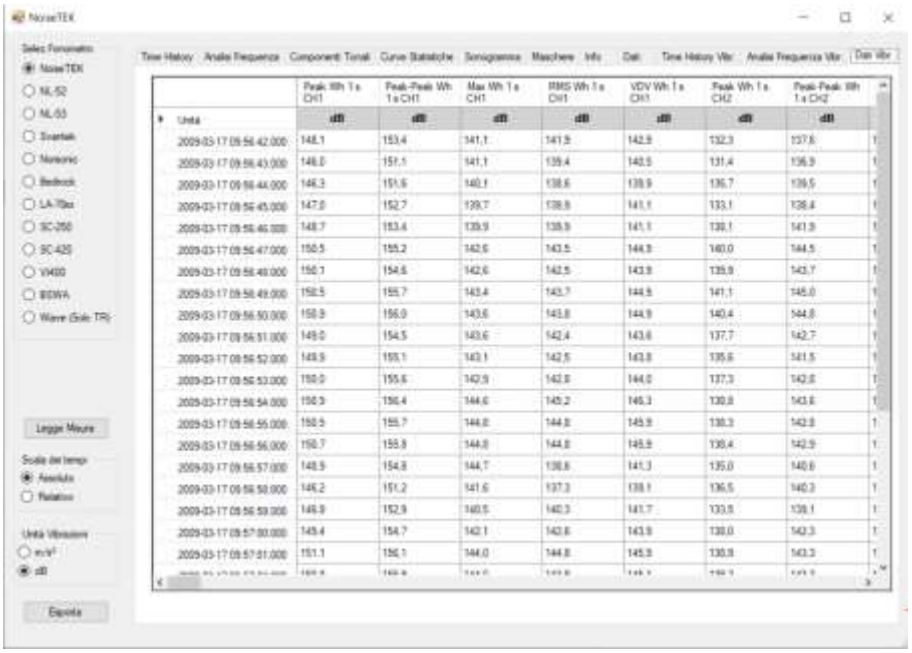
In this tab, too, the "Vibration Units" box allows you to choose between m/s² and dB display. This selection simultaneously updates the graph, the vertical axis scale, and the values reported in the table.

The navigation controls and context menu are identical to the “Frequency Analysis” tab

5.15 “Vibration Data” Tab

The “Vibration Data” tab presents in tabular form all the vibration values available in the measurement file.

Each row corresponds to an acquisition instant, while the columns report the various parameters recorded on the active channels. The first column contains the measurement time reference.



The displayed parameters may include, depending on the instrument configuration:

- RMS values;
- VDV values;
- peak values;
- maximum values;
- additional quantities recorded on the individual channels.

The table can be navigated using the horizontal and vertical scroll bars. You can also select and copy data for use in spreadsheets or other word processing programs.

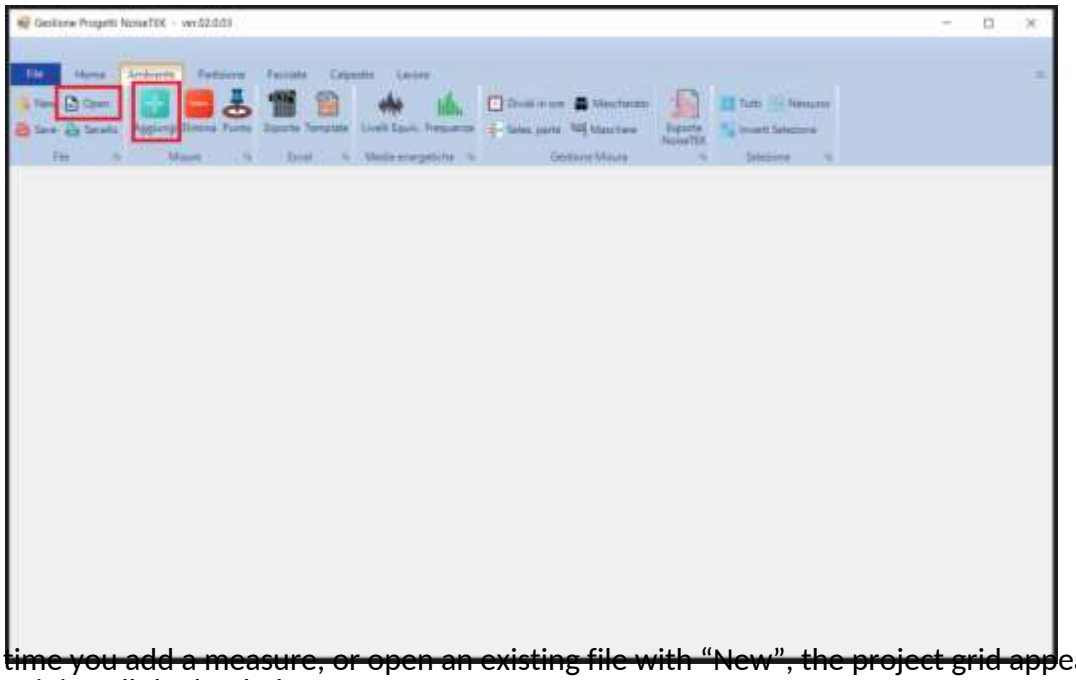
The choice made in the “Vibration Units” box is also applied to this table:

Note on units: When viewing in physical units, NoiseTEK uses the appropriate unit for each measurement. Acceleration values, such as peak, maximum, and RMS, are expressed in m/s², while the VDV vibration dose value is expressed in m/s$^{1.75}$. If dB is selected, the values are presented as levels relative to the reference value used by the program. This conversion affects the display only and does not change the original data acquired by the instrument.

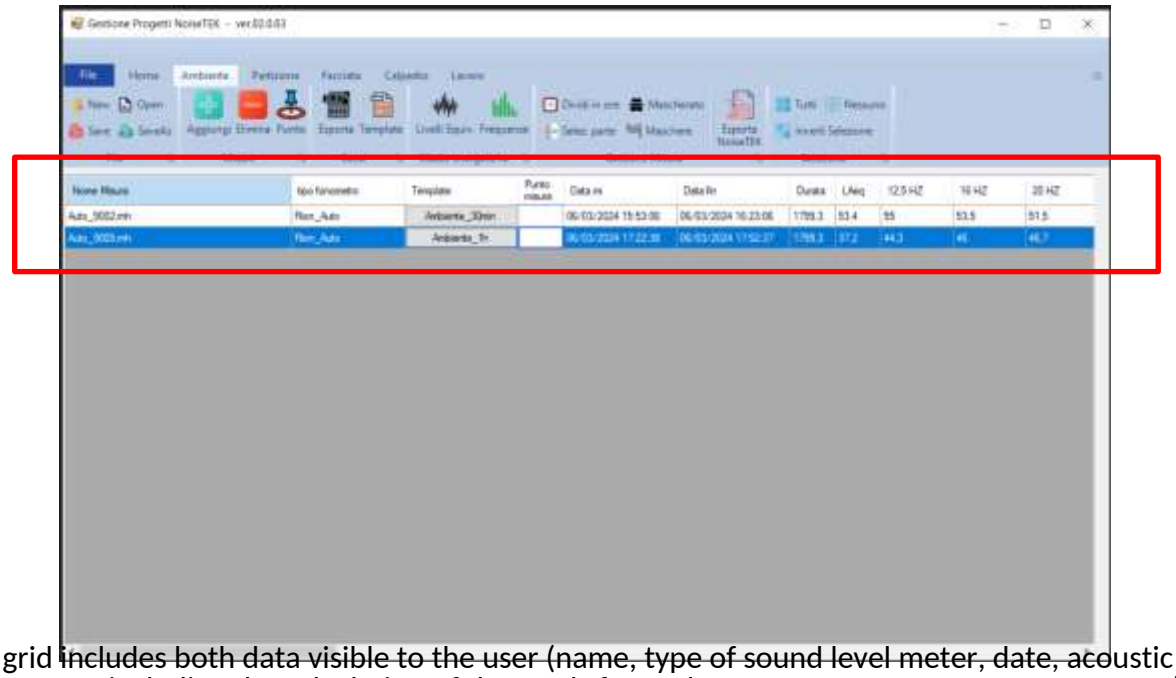
6 Applied Acoustics Projects

6.1 Project structure and insertion of measures

Each project in NoiseTEK allows you to collect and organize the sound measurements needed for subsequent processing. A new project can be started using the "New" command in the "File" section, or automatically when the first measurement is entered into a blank screen.



The first time you add a measure, or open an existing file with "New", the project grid appears, a table containing all the loaded measures.

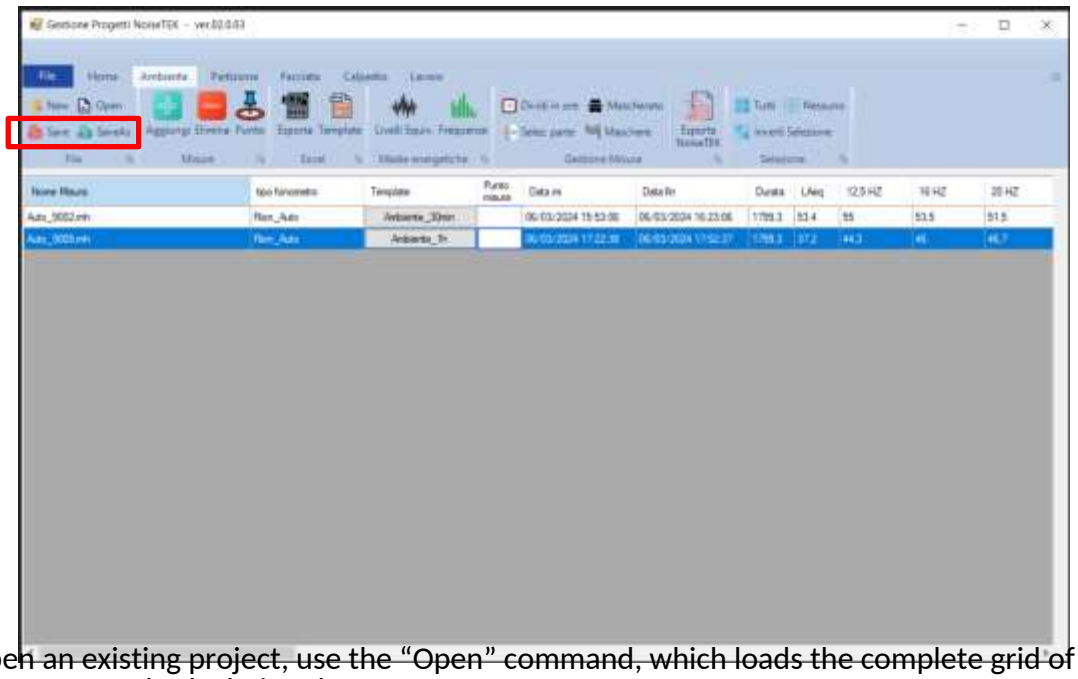


This grid includes both data visible to the user (name, type of sound level meter, date, acoustic parameters, including the calculation of the totals for each necessary measurement parameter), and data invisible but necessary for internal management.

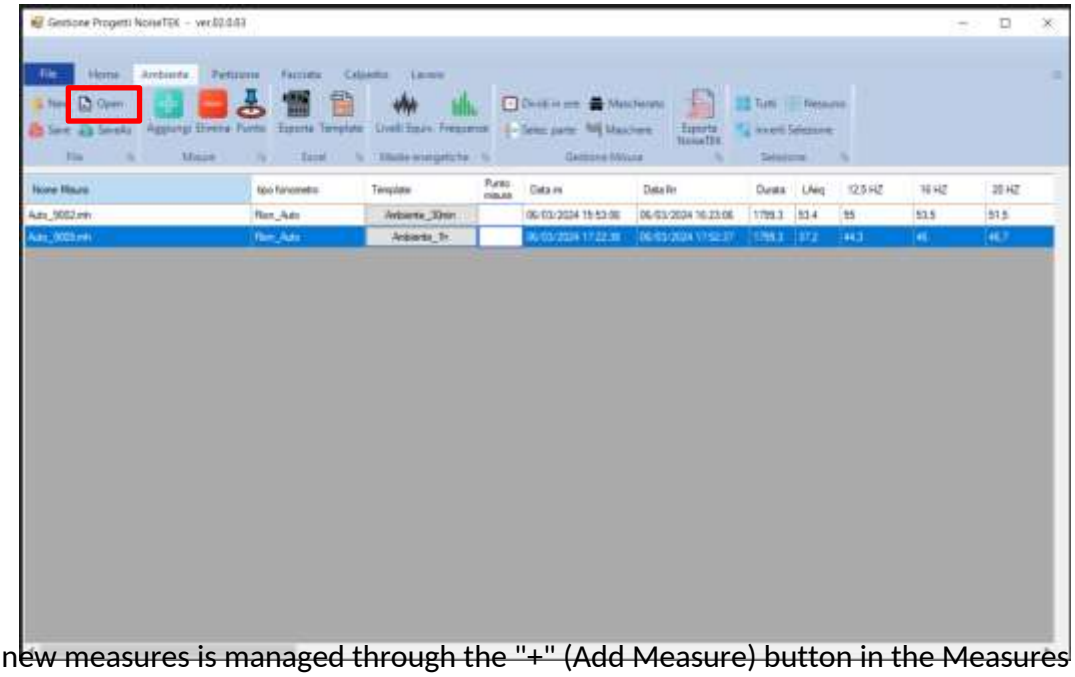
Only the data present in the grid is saved in the projects and, in the case of passive acoustic requirements, also some additional data necessary for calculating and printing the certificates.

The complete measurement files are not saved in the project: only the file name and its path on disk are recorded.

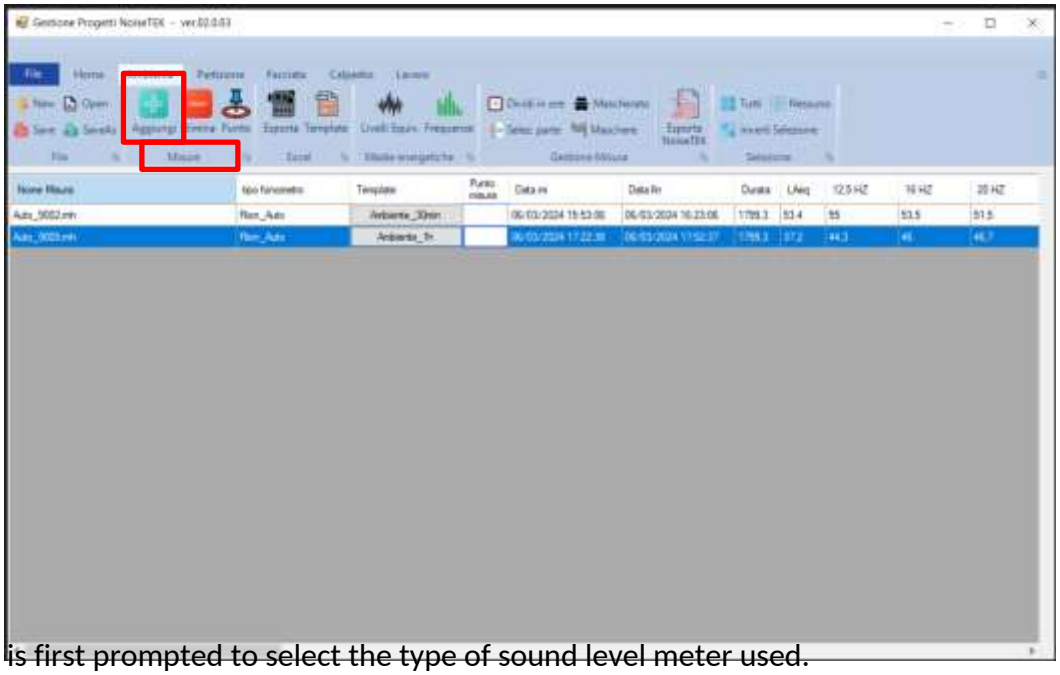
Projects can be saved with “Save” or “Save As”, generating a file with a specific extension based on the project type (see Appendix B)



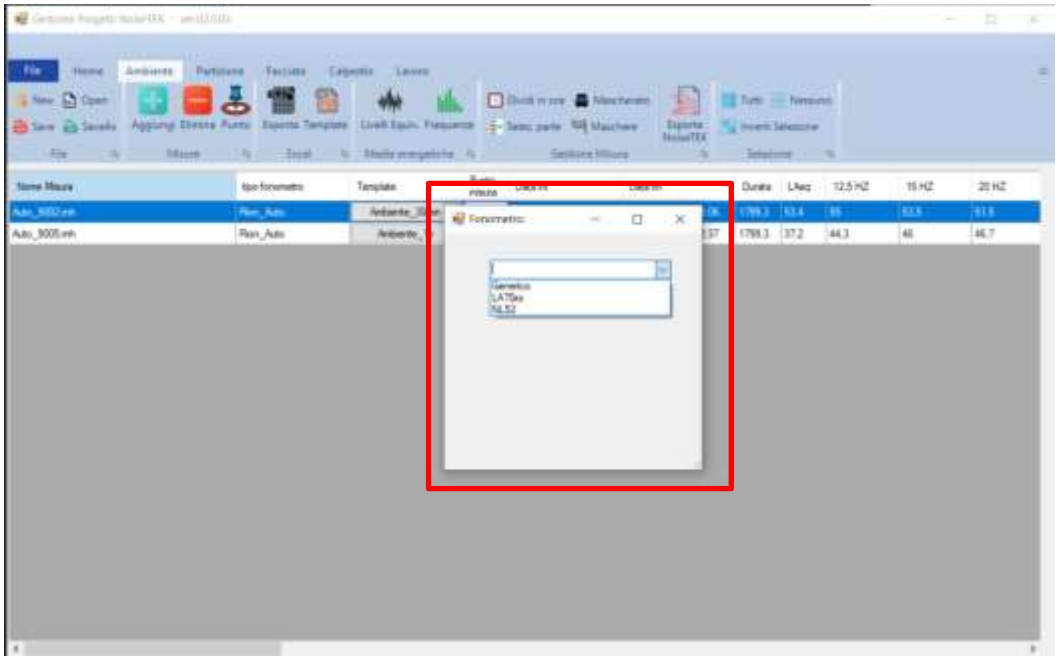
To reopen an existing project, use the “Open” command, which loads the complete grid of measurements and calculation data.



Adding new measures is managed through the "+" (Add Measure) button in the Measures section.

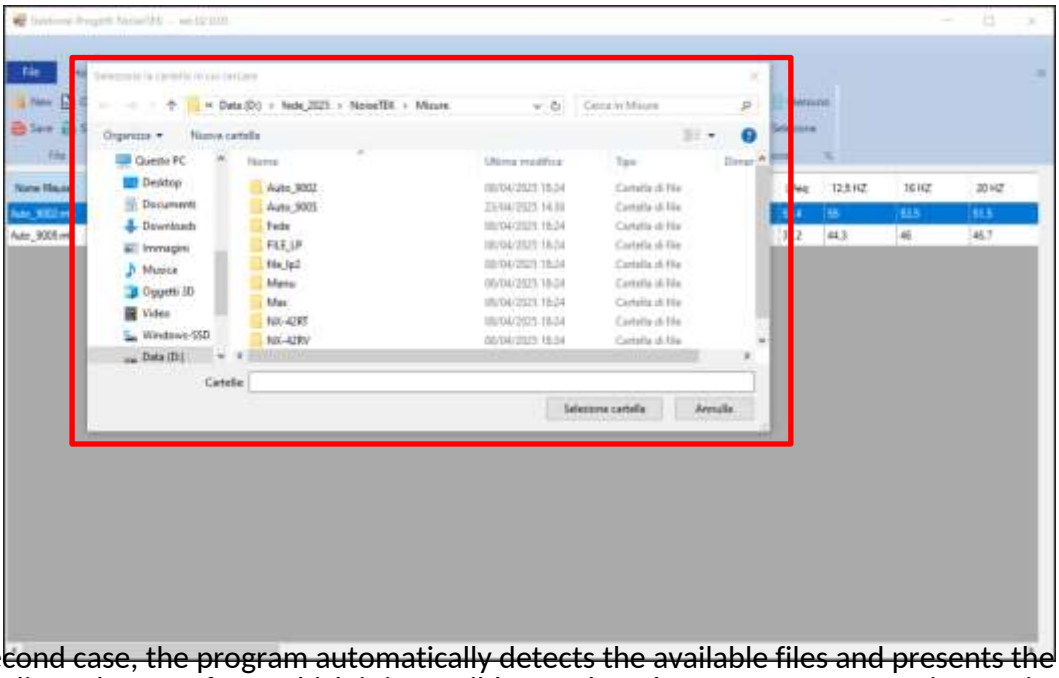


The user is first prompted to select the type of sound level meter used.

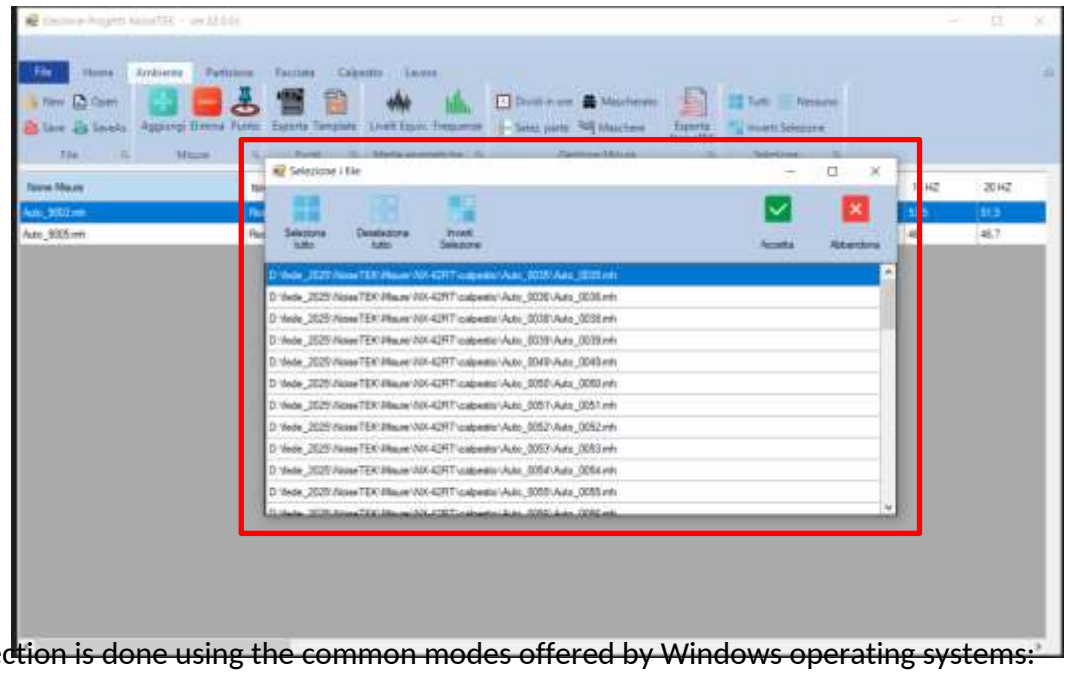


Depending on your choice, you can:

- manually select one or more files from the computer;
- in the case of particular sound level meters (e.g. Rion or Cesva), indicate a directory containing measures.



In this second case, the program automatically detects the available files and presents the user with a dedicated screen from which it is possible to select the measurements to import into the project.



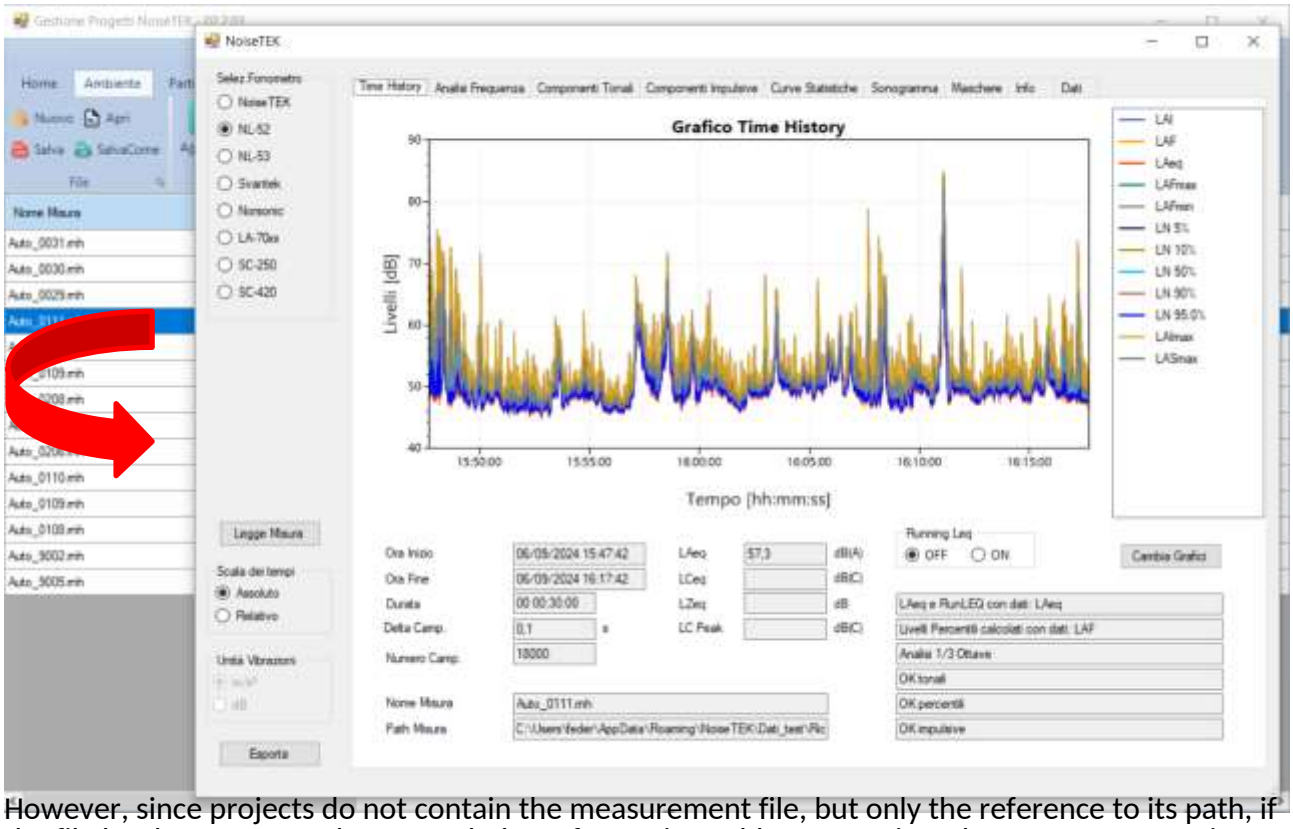
The selection is done using the common modes offered by Windows operating systems:

- Single click to select a row
- Ctrl + Click for multiple non-contiguous selections
- Shift + Click for multiple contiguous selections

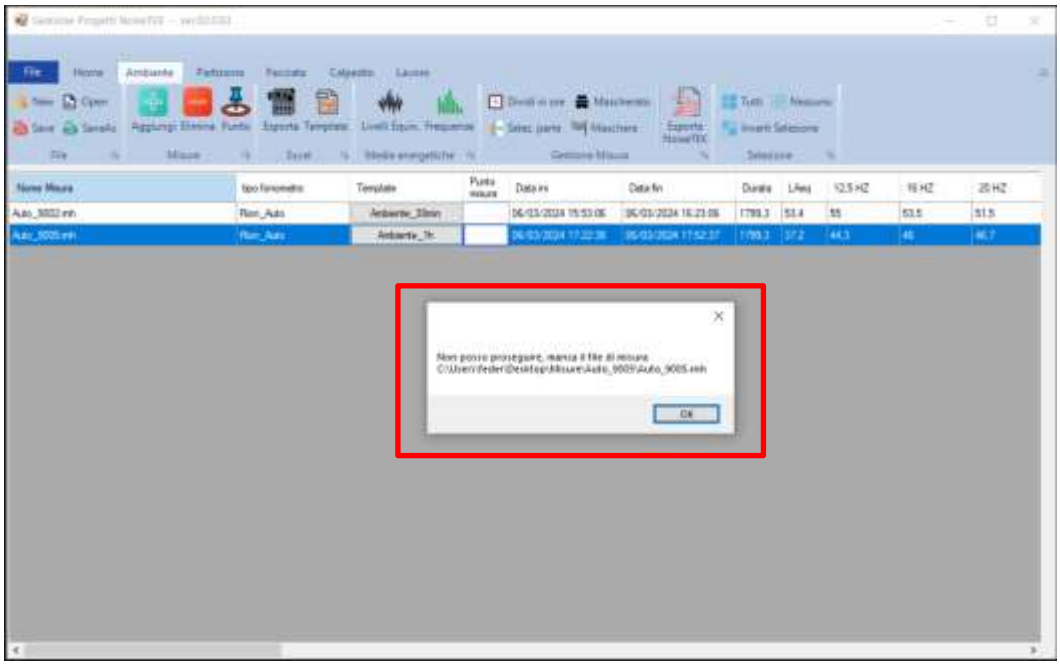
Additionally, the commands: Select All, Deselect All, Invert Selection, allow you to make the selection easier, once finished you can accept and transfer the measurements to the project.

6.2 Viewing complete measurements

Double-clicking on a grid row opens the measurement analysis module (see Chapter 5).



However, since projects do not contain the measurement file, but only the reference to its path, if the file has been removed or moved, the software is unable to open it and an error message is displayed:



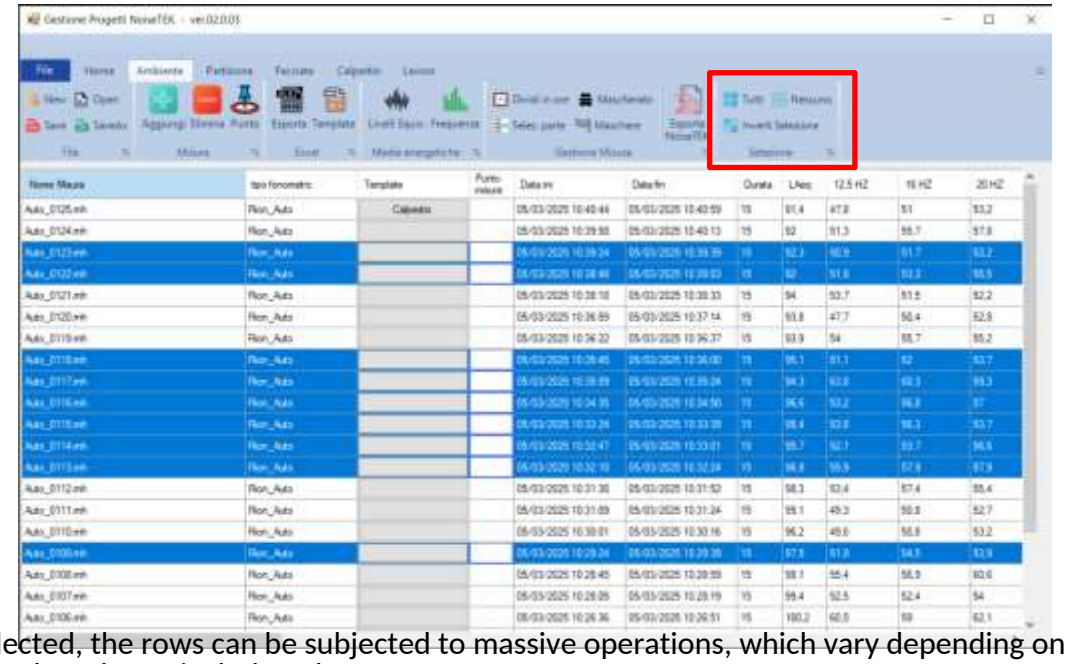
6.3 Common operations

Within each project's data grid, NoiseTEK provides tools for selecting and managing multiple measurements simultaneously. You can select one or more rows using common methods offered by Windows operating systems:

- Single click to select a row
- Ctrl + Click for multiple non-contiguous selections
- Shift + Click for multiple contiguous selections

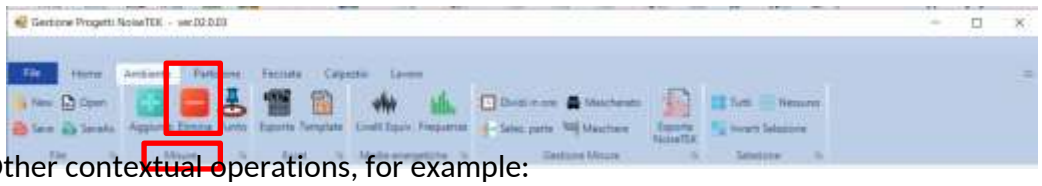
Additionally, in the “Selections” section of the program, the following commands are available:

- “Select All”
- “Deselect All”
- “Invert Selection”



Once selected, the rows can be subjected to massive operations, which vary depending on the type of project, but always include at least:

- Deleting the selected measures, using the "-" (Delete measure) button available in each module



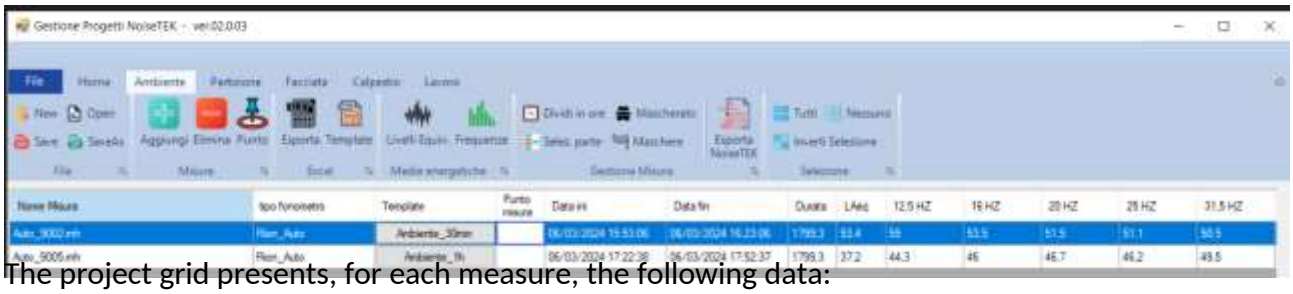
- Other contextual operations, for example:
  - modification of the export template (in the Environment and Work modules)
  - multiple exports to Excel (in the Environment and Work modules)
  - definition of points, areas and groupings (in the Environment and Work modules)
  - assignment of measurements to a specific category (emitter, receiver, background...)

    in the forms for Passive Acoustic Requirements

Using selections facilitates quick and efficient management even of complex projects, with many measures to organize and analyze.

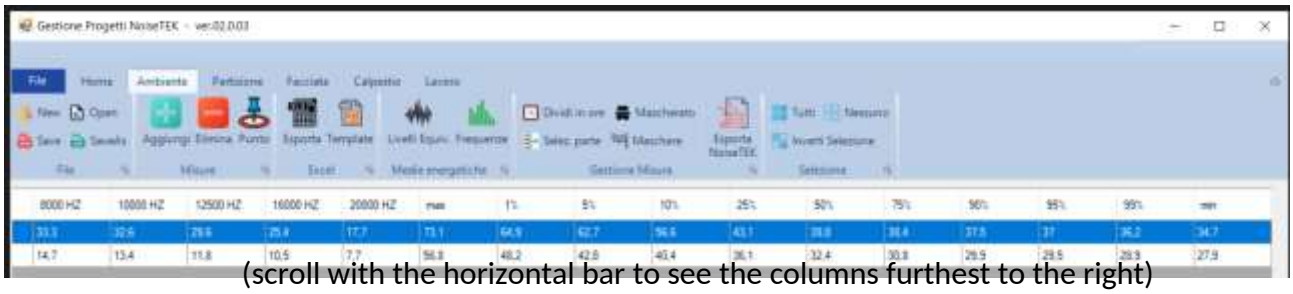
6.4 Environmental Acoustics

The Environmental Acoustics module is designed for the management and analysis of measurements performed in unstructured external or internal contexts, typically for environmental noise monitoring campaigns, but not only.



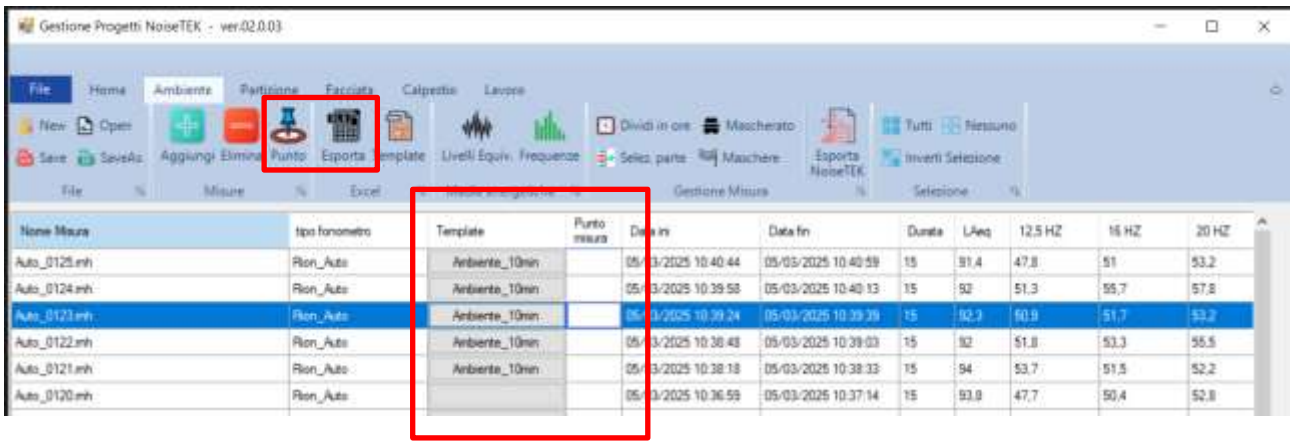
The project grid presents, for each measure, the following data:

- Measurement name
- Sound level meter type
- Assigned template (editable)
- Measurement point (editable)
- Start/end date and time
- Duration
- Average LAeq
- Average values for third-octave bands (e.g. 20 Hz, 25 Hz, ...)
- Maximum, minimum, percentile values

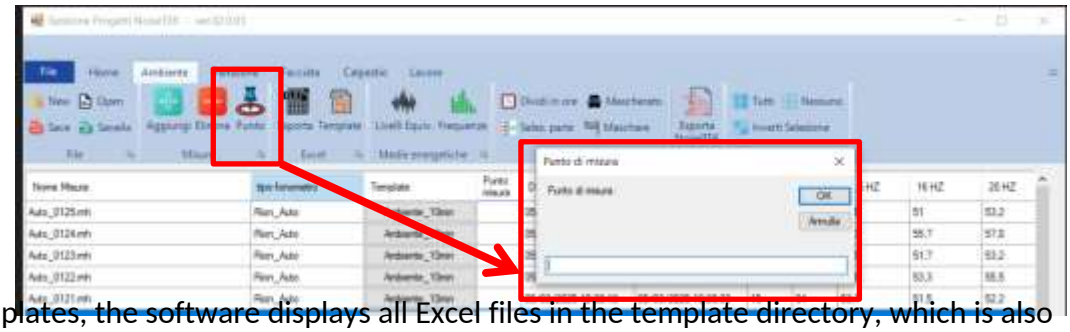


(scroll with the horizontal bar to see the columns furthest to the right)

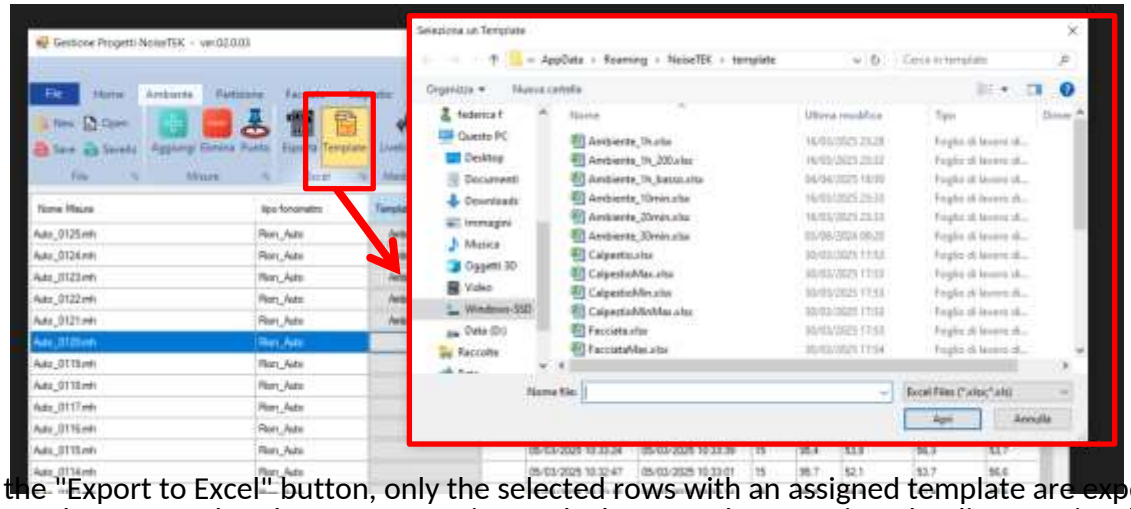
The Template and Measurement Point fields can be edited either individually, on the grid itself, or in bulk, using the "Template" and "Point" buttons.



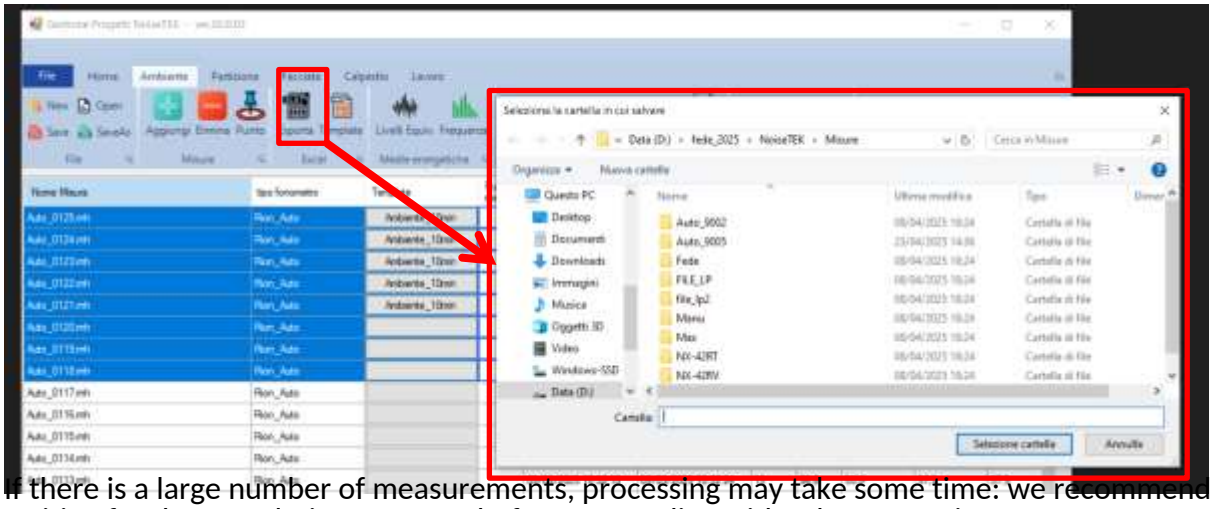
By selecting the “Point” button, the name is requested and inserted in all selected rows.



For templates, the software displays all Excel files in the template directory, which is also accessible via a desktop shortcut created during installation. The user must select one to associate.



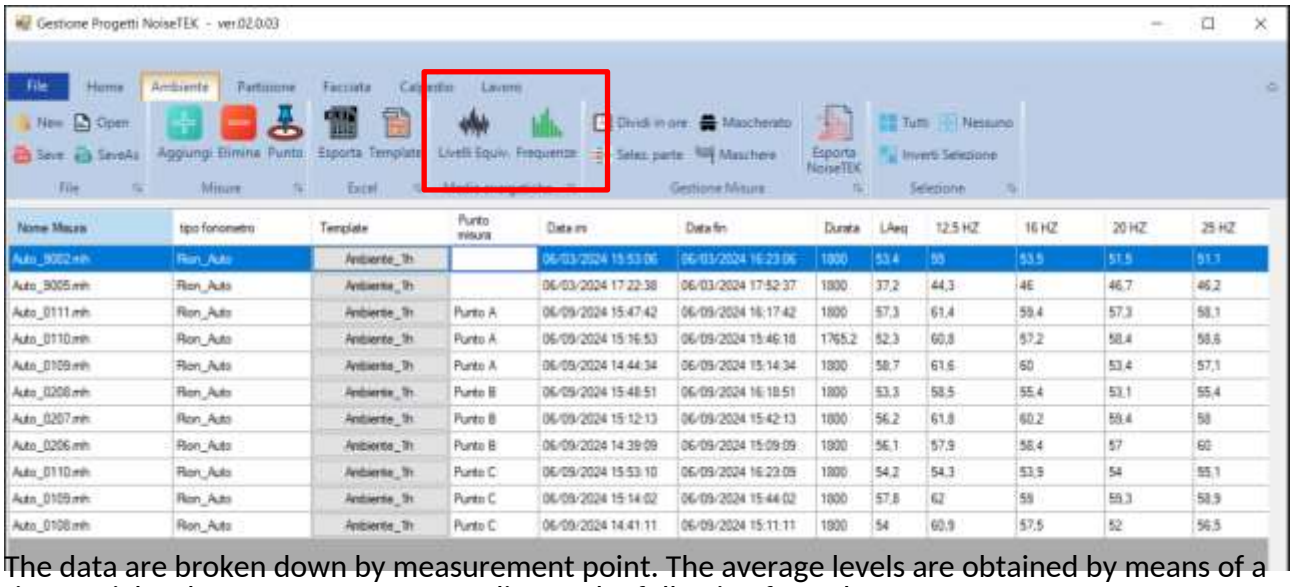
Using the "Export to Excel" button, only the selected rows with an assigned template are exported. Unselected or untemplated measures are ignored. The procedure requires the directory in which to save the measures; the file will have the same name as the measure with the .xlsx extension.



If there is a large number of measurements, processing may take some time: we recommend waiting for the completion message before proceeding with other operations.

6.4.1 Energy Averages

The Energy Averages section provides the option to calculate the average values of the overall measurement campaign.



Nome Misura	tipo fonometro	Template	Punto misura	Data in	Data fin	Durata	LAeq	12.5 HZ	16 HZ	20 HZ	25 HZ
Auto_9002.mh	Rion_Auto	Ambiente_1h		06/03/2024 15:53:06	06/03/2024 16:23:06	1800	53.4	55	53.5	51.5	51.1
Auto_9005.mh	Rion_Auto	Ambiente_1h		06/03/2024 17:22:38	06/03/2024 17:52:37	1800	37.2	44.3	46	46.7	46.2
Auto_0111.mh	Rion_Auto	Ambiente_1h	Punto A	06/09/2024 15:47:42	06/09/2024 16:17:42	1800	57.3	61.4	59.4	57.3	58.1
Auto_0110.mh	Rion_Auto	Ambiente_1h	Punto A	06/09/2024 15:16:53	06/09/2024 15:46:18	1765.2	52.3	60.8	57.2	58.4	58.6
Auto_0109.mh	Rion_Auto	Ambiente_1h	Punto A	06/09/2024 14:44:34	06/09/2024 15:14:34	1800	58.7	61.6	60	53.4	57.1
Auto_0208.mh	Rion_Auto	Ambiente_1h	Punto B	06/09/2024 15:48:51	06/09/2024 16:18:51	1800	53.3	58.5	55.4	53.1	55.4
Auto_0207.mh	Rion_Auto	Ambiente_1h	Punto B	06/09/2024 15:12:13	06/09/2024 15:42:13	1800	56.2	61.8	60.2	59.4	58
Auto_0206.mh	Rion_Auto	Ambiente_1h	Punto B	06/09/2024 14:39:09	06/09/2024 15:09:09	1800	56.1	57.9	58.4	57	60
Auto_0110.mh	Rion_Auto	Ambiente_1h	Punto C	06/09/2024 15:53:10	06/09/2024 16:23:09	1800	54.2	54.3	53.9	54	55.1
Auto_0109.mh	Rion_Auto	Ambiente_1h	Punto C	06/09/2024 15:14:02	06/09/2024 15:44:02	1800	57.8	62	59	59.3	58.9
Auto_0108.mh	Rion_Auto	Ambiente_1h	Punto C	06/09/2024 14:41:11	06/09/2024 15:11:11	1800	54	60.9	57.5	52	56.5

The data are broken down by measurement point. The average levels are obtained by means of a time-weighted energy average, according to the following formula:

$$L_{medio} = 10 \cdot \log\left(\frac{1}{T_{tot}} \cdot \sum_{i=1}^{n} T_i \cdot 10^{L_i/10}\right)$$

Measurement uncertainty

In some calculations, the sampling uncertainty is calculated, if at least three points are present, taking into account the duration of the individual measurements according to the formula:

$$u_a{}^2 = \frac{1}{T_{tot} \cdot (T_{eff} - 1)} \cdot \sum_{i=1}^{n} T_i \cdot (L_i - L_{medio})^2$$

With: □□□□= ∑ □□ □ □=1 and □□□□=$\frac{T_{tot}{}^2}{\sum_{i=1}^{n} T_i{}^2}$

Where:

□□ is the duration (in seconds) of the i-th measurement

□□ is the equivalent level of the i-th measure

□□□□□□ is the time-weighted average energy level

□□□□ represents the actual sampling time

□□ is the type A (sampling) uncertainty on the mean value

In the calculation of type A uncertainty, the usual normalization based on the number of measurements □ is not used, as is the case in classical sample variance $\frac{1}{\square\square(\square-1)}$, because in this case the measures do not all have the same temporal weight.

The uncertainty estimation takes into account the duration of each measurement through an energy-weighted approach, where the actual sampling time □□□□ replaces the simple

counting □. This allows us to correctly represent the relative influence of each measurement on the average result. The formula adopted is therefore consistent with the analysis of equivalent time-weighted noise levels.

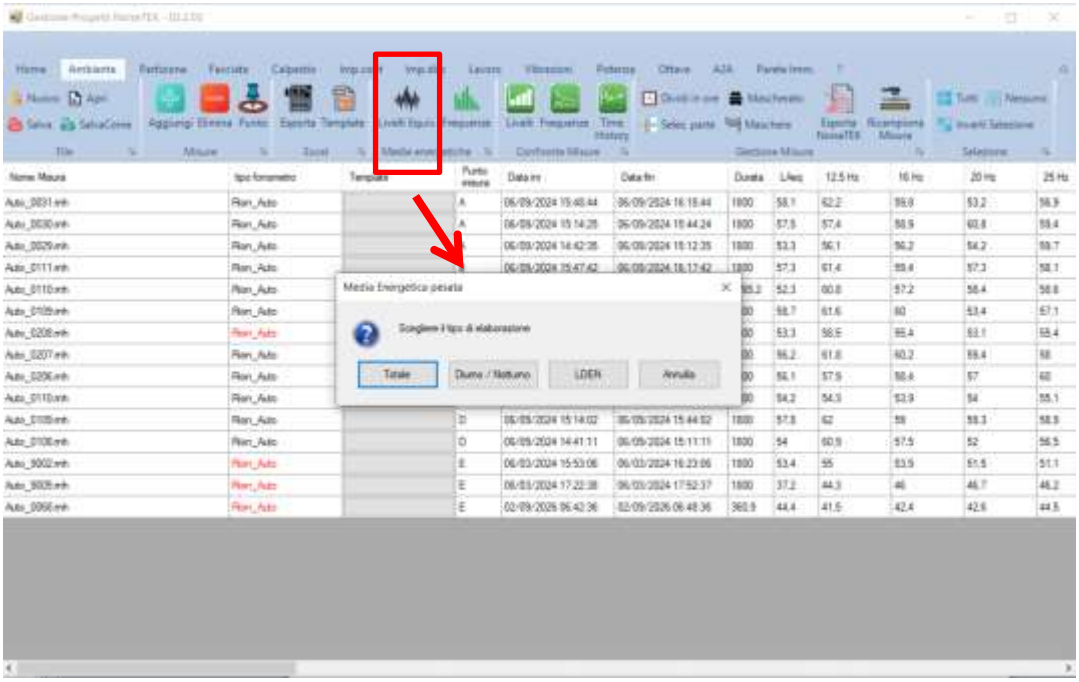
In the particular case where all durations are equal, i.e. □□= □ for each i, □□□□= □□ and $T_{eff} = \frac{{T_{tot}}^2}{\sum_{i=1}^{n} {T_i}^2} = \frac{(nT)^2}{\square\square 2 = \square}$, substituting we get:

$$ {u_a}^2 = \frac{1}{n \cdot (n-1)} \cdot \sum_{i=1}^{n} (L_i - L_{medio})^2 $$

which is exactly the classical formula of the sample variance.

Energy averages -> Equivalent levels

In the case of the energy averages of the A-weighted equivalent levels of LAeq, it is possible to choose between three different processing modes via a selection window:



- Total: calculates the overall equivalent level of the selected measures, considering the duration of each recording. This is useful when you want to obtain a single value representative of all the measurements.

- Daytime / Nighttime: divides the data according to the reference periods provided for by the Italian legislation, distinguishing the daytime period (06:00–22:00) from the night-time period (22:00–06:00). This allows for the equivalent levels of the two periods to be obtained separately, even when the recordings include both.

- LDEN: processes the data distinguishing the three periods of the day: Day (06:00–20:00), Evening (20:00–22:00) and Night (22:00–06:00) and calculate the overall Lden indicator:

$$ L_{den} = 10 \cdot \log\left(\frac{14 \cdot 10^{Lday/10} + 2 \cdot 10^{(Levening+5)/10} + 8 \cdot 10^{(Lnight+10)/10}}{24} \right) $$

The results are presented in the relevant summary tables, divided by the defined points, only when the data for the selected periods are available. Lden is calculated only if all three of its component values are present.

Total Day/Night

Media Energetica pesata

Punti	LAeq	Ua
A	56,8	1,54
B	56,9	2,00
C	55,4	0,96
D	55,7	1,26
E	50,2	7,84
F	47,1	0,78

Media Energetica pesata

Punti	TR diurno	TR notturno	Ua diurno	Ua notturno
A	56,8	–	1,54	–
B	56,9	–	2,00	–
C	55,4	–	0,96	–
D	55,7	–	1,26	–
E	50,2	–	7,84	–
F	48,6	42,4	0,51	0,44

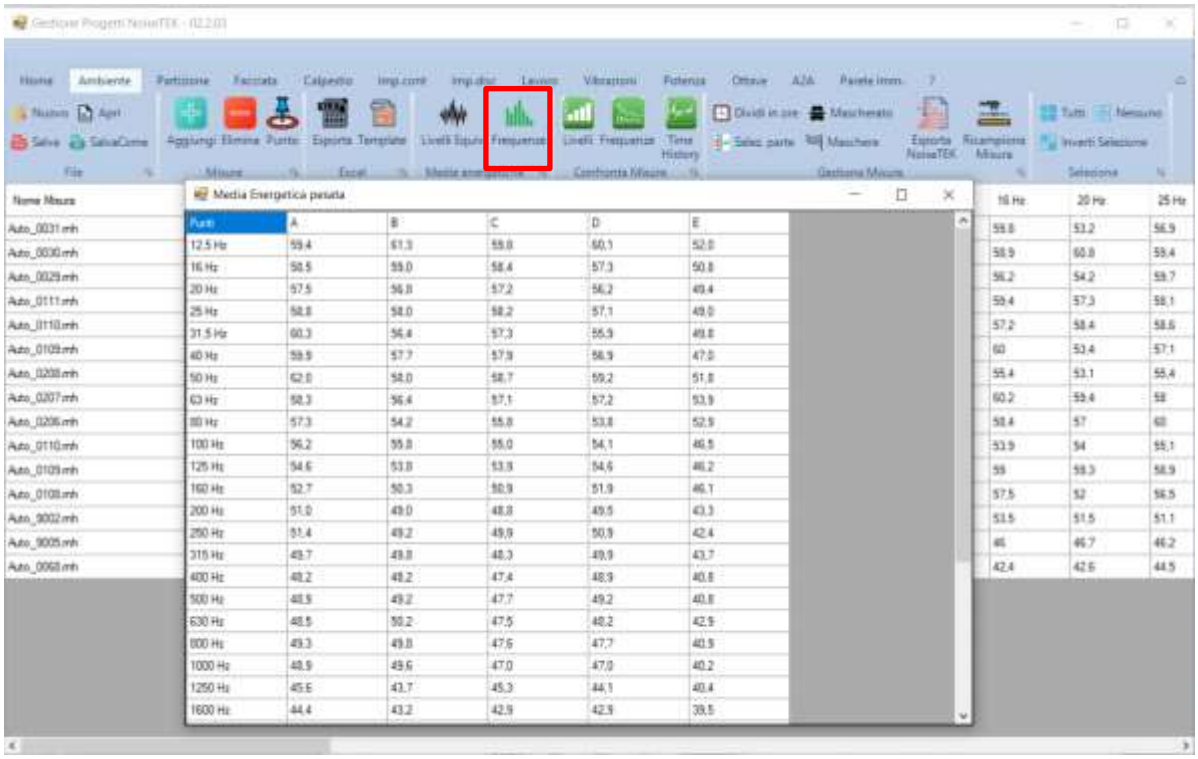
LDEN

Media Energetica pesata

Punti	Lday	Levening	Lnight	Lden
A	56,8	–	–	–
B	56,9	–	–	–
C	55,4	–	–	–
D	55,7	–	–	–
E	50,2	–	–	–
F	48,7	48,2	42,4	50,7

Energy Averages -> Frequencies

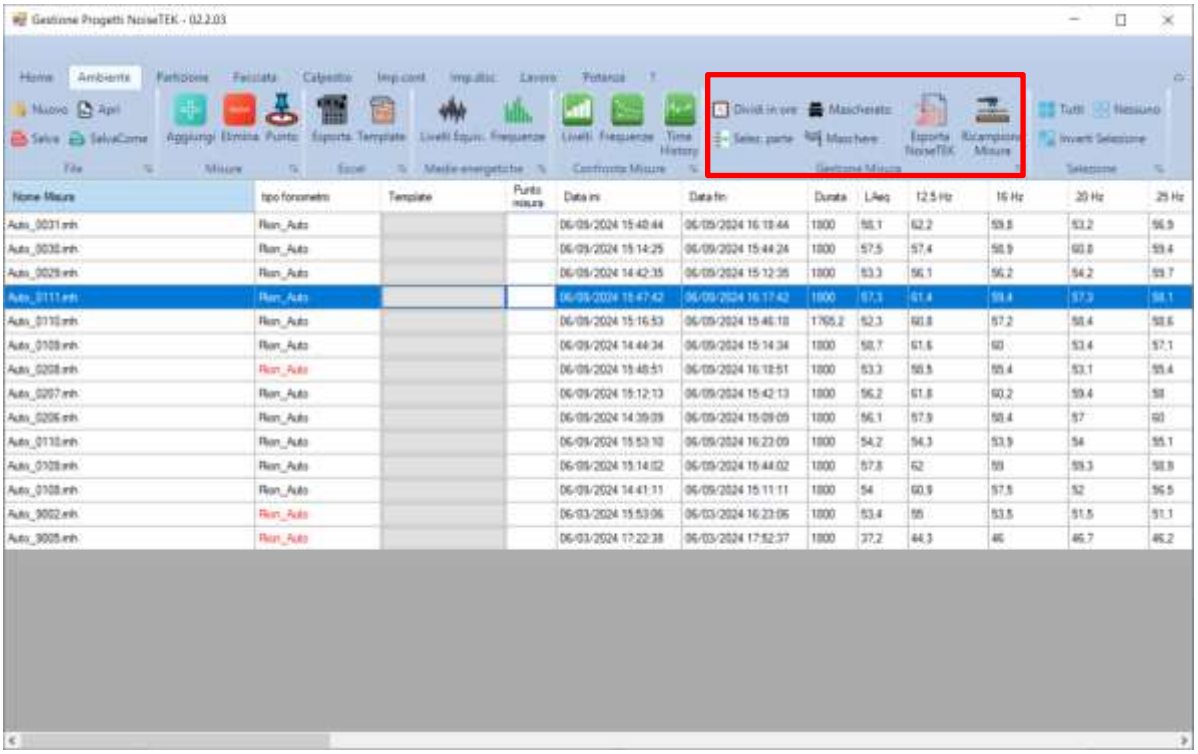
In the case of energy averages by frequency, the data for each frequency present in the grid is reported, divided into the defined points:



6.4.2 Measure Management

In the Measurement Management section, NoiseTEK provides various functions to process, split, extract, convert and resample measurements acquired from different instruments.

These operations allow you to obtain new measurements from the original data, facilitating the analysis of specific periods, the management of masked events, the resampling of long and 'dense' measurements to make them easier to use, and the exchange of data from different instruments.



Division into time intervals

This function allows you to split a long-duration measurement, such as a 24-hour recording, into separate measurements corresponding to individual time intervals.

The division occurs at clock hours, allowing for measurements to be obtained for periods such as 08:00–09:00, 09:00–10:00 and so on.

The program prompts you to select the destination folder and automatically generates a CSV file for each range.

Each file contains the time data and acoustic parameters for the extracted period and can be subsequently imported into NoiseTEK as a standalone measurement.

If the recording does not start or end at an exact time, start and end intervals shorter than one hour are also generated.

This function is particularly useful for analyzing the hourly trend of environmental noise separately, comparing levels in different periods of the day and identifying the most significant hours.

Extraction of a numerically defined portion

The function allows you to extract a portion of the original measurement by specifying the start and end indices of the samples to be considered.

The user enters the two numeric indices that delimit the selection and indicates the name and location of the destination file.

NoiseTEK generates a CSV file containing only the samples within the selected range, maintaining their time references and available parameters.

The extracted measurement can later be imported and analyzed independently of the original recording.

This mode is particularly useful when you want to isolate a period of interest identified during the examination of the time history.

Extracting masks as separate measurements

When a measurement contains masks, the sound level meter type is displayed in red in the measurement management grid.

Masks identify time portions of the recording, such as particular sound events, periods to exclude, or intervals to analyze separately.

The function allows you to export each mask as an independent measurement.

After you select the destination folder, NoiseTEK generates a CSV file for each mask, using the name you assigned to the mask itself.

Each file contains samples from the selected time range and can then be imported into the project as a standalone measurement.

This function allows, for example, to compare single sound events, separately analyze periods characterized by different sources or perform further processing on selected data only.

Creating a measure without masked portions

This function allows you to obtain the acoustic results of the measurement by excluding all the intervals identified by the masks from the calculation.

NoiseTEK processes the unmasked samples and inserts a new row containing the resulting values directly into the grid.

Unlike extraction functions, a new file containing the purified recording is not generated.

The new line therefore represents a processing result of the original measurement and not a standalone measurement stored on disk.

By double-clicking on the line, the program opens the original measurement, including the previously defined masks.

This operation is particularly useful for determining the sound levels net of events not relevant to the source being assessed.

Export to CSV format

This function allows you to convert a measurement acquired from one of the instrument formats supported by NoiseTEK into the generic CSV format recognized by the program.

The exported file contains the time references and parameters available in the original measurement, maintaining the sequence of samples.

The CSV format used by NoiseTEK requires fields to be separated by semicolons and a period as the decimal separator.

This feature allows you to:

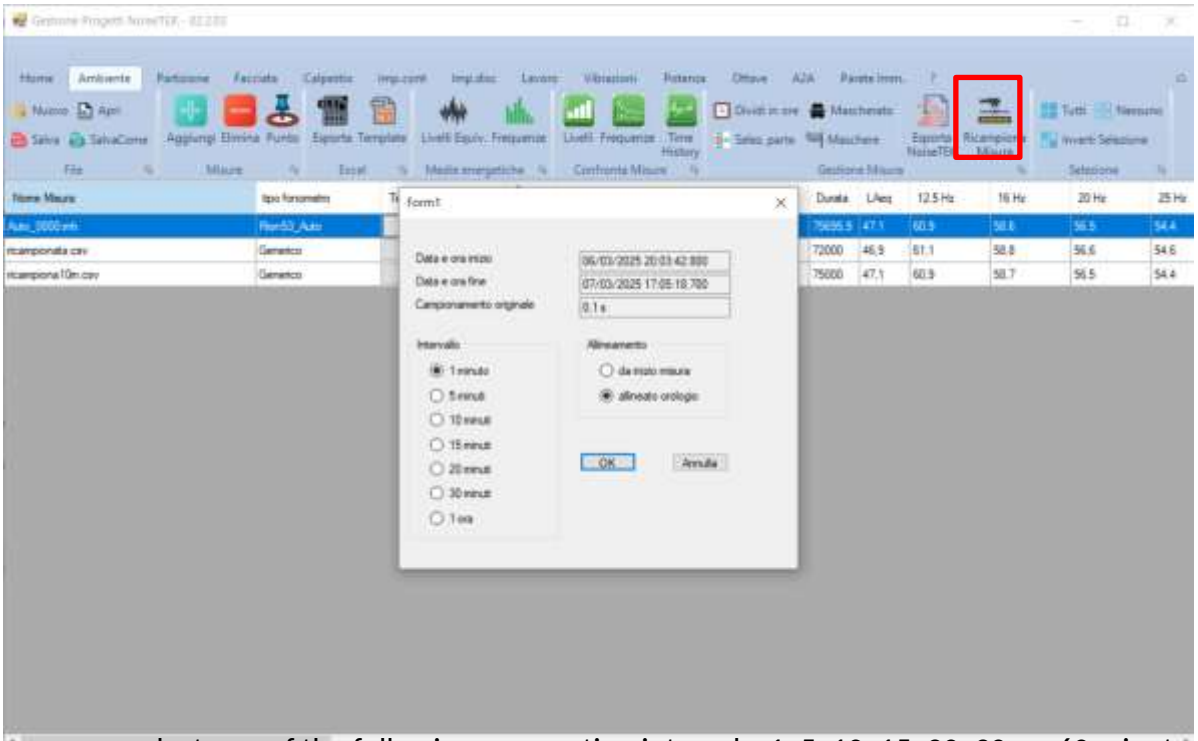
• Keep a copy of the data in a text format independent of the original file instrument.
• Transfer measurements between different NoiseTEK installations and reimport the data into the program as NoiseTEK type measurements
• Share recordings from different sound level meters, even when the recipient is not has the related proprietary files directly at its disposal.

Exporting retains the original time signature and should not be confused with the resampling feature described below.

Temporal resampling of the measurement

The function allows you to obtain a new measurement characterized by a sampling time interval greater than that of the original recording.

It is available for measurements with an original sampling step not exceeding 1 second.



The user can select one of the following aggregation intervals: 1, 5, 10, 15, 20, 30, or 60 minutes.

For each interval, NoiseTEK processes the original data and generates a single sample representative of the period considered.

The resampling window allows you to choose whether to align the intervals to the clock.

- Without alignment: the intervals are calculated starting from the initial instant of the measurement.

  For example, a recording started at 08:03:42 and resampled to 10 minutes produces intervals starting at 08:03:42, 08:13:42, 08:23:42, and so on.

- With alignment: the ranges are referred to multiples of the selected range

  on the clock. In the same example, with 10-minute resampling, the first complete interval would be 08:10:00–08:20:00, followed by 08:20:00–08:30:00, and so on.

For each interval, equivalent levels are calculated by energy averaging the original samples.

The calculation is applied to the available parameters with A, C and Z weighting and to the levels of the frequency bands present in the measurement.

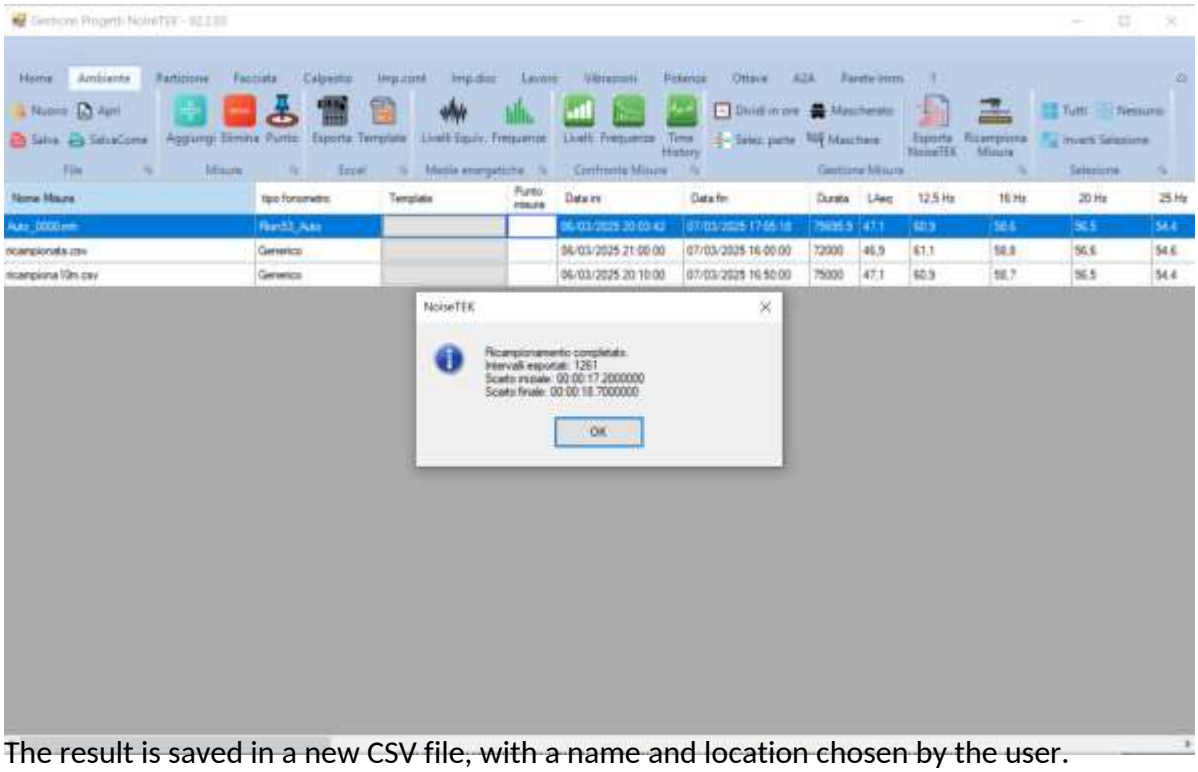
For global parameters, the original equivalent level (LAeq, LCeq, or LZeq) is preferably used. In its absence, the corresponding levels with the Fast or Slow time constant are used, if available.

Impulse time weighting is not used as a replacement parameter.

Resampling only considers complete time intervals.

Any initial and final portions that do not reach the selected duration are excluded from the export.

Once processing is complete, NoiseTEK reports the number of ranges exported and the duration of the excluded initial and final portions.



The result is saved in a new CSV file, with a name and location chosen by the user.

Each row represents an aggregation interval and is identified by the start date and time of the interval itself.

The file can then be imported into NoiseTEK as a NoiseTEK measurement, to view the time trend of the aggregated levels, make comparisons, or use the data in further processing.

When the original measurement contains the LAF parameter, NoiseTEK calculates for each interval the statistical levels L1, L5, L10, L25, L50, L75, L90, L95 and L99.

In the absence of the LAF parameter, LAeq is used, if available.

Statistical levels refer to the original samples belonging to each interval and not to the resampled equivalent values, nor to previous percentiles present in the original measurement.

The calculated percentiles are reported in the resulting CSV file, but the percentiles calculated for individual intervals cannot be directly combined to reconstruct the overall percentiles of the original measure. For this reason, the overall percentiles may not be available in the resampled measure summary grid.

Resampling is particularly useful for reducing the amount of data from long-duration recordings, obtaining 10-, 15-, or 60-minute time profiles, and comparing measurements at different sampling rates.

Management of results and measures generated

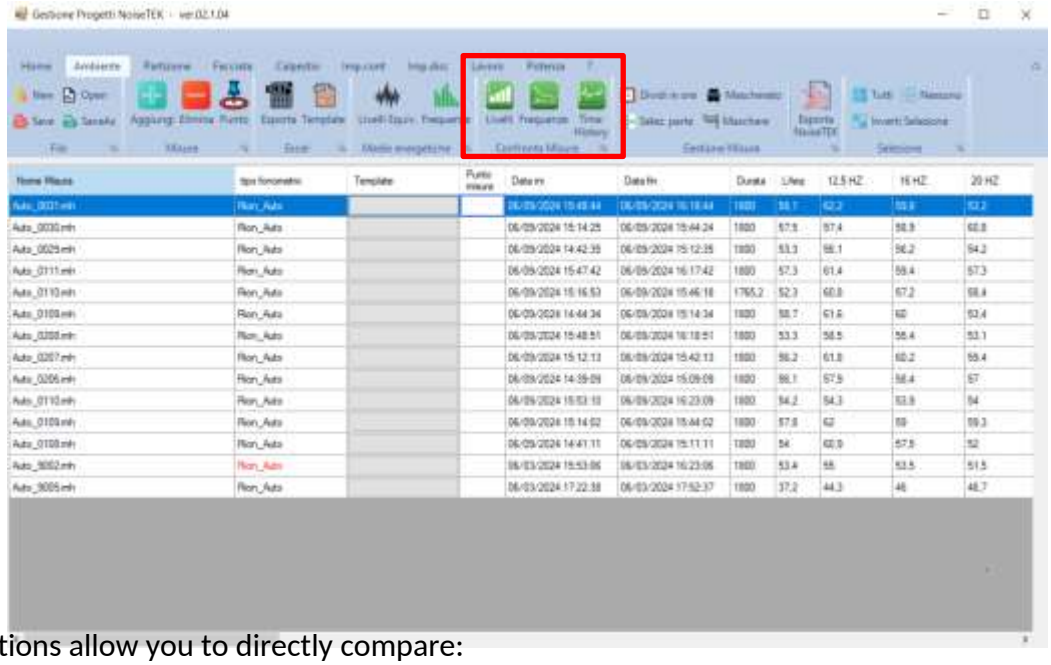
The time split, number extraction, mask extraction, CSV export, and resampling operations produce files that can be imported back into the project as NoiseTEK-type measurements.

Creating a measurement without the masked portions, however, constitutes an internal processing: the program adds a row to the grid containing the calculated results, without generating a new associated file.

The extraction and resampling operations do not modify the original files, which remain available for any subsequent processing.

6.4.3 Comparison between measures

It is possible to make comparisons between two or more acoustic measurements, even those coming from different instruments or taken at different times.



The functions allow you to directly compare:

- the A-weighted equivalent levels;
- the frequency spectra (in octave or third-octave bands) of the equivalent levels;
- the time history of the acquired measurements, superimposing multiple graphs

in the same representation comparing the Time Histories

either by maintaining the absolute time reference of the individual measurements; or by making the initial instant of the measurements coincide.

The form is particularly useful for:

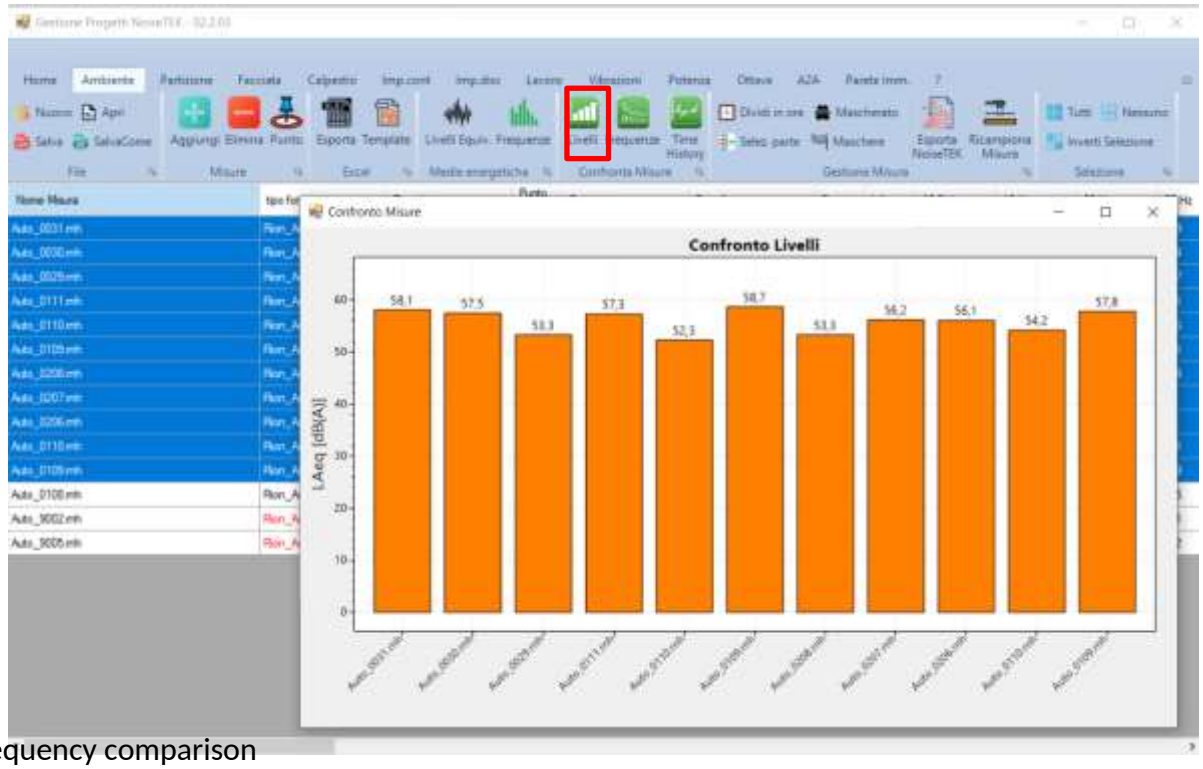
- compare surveys performed simultaneously at different points;
- verify the repeatability of the measurements;
- compare "before" and "after" scenarios for a noise mitigation intervention.

Before proceeding with the comparison, you must select the measurements you wish to compare.

All the zoom, pan, and contextual menu commands already seen in the previous chapter 5 are available in the resulting graphs.

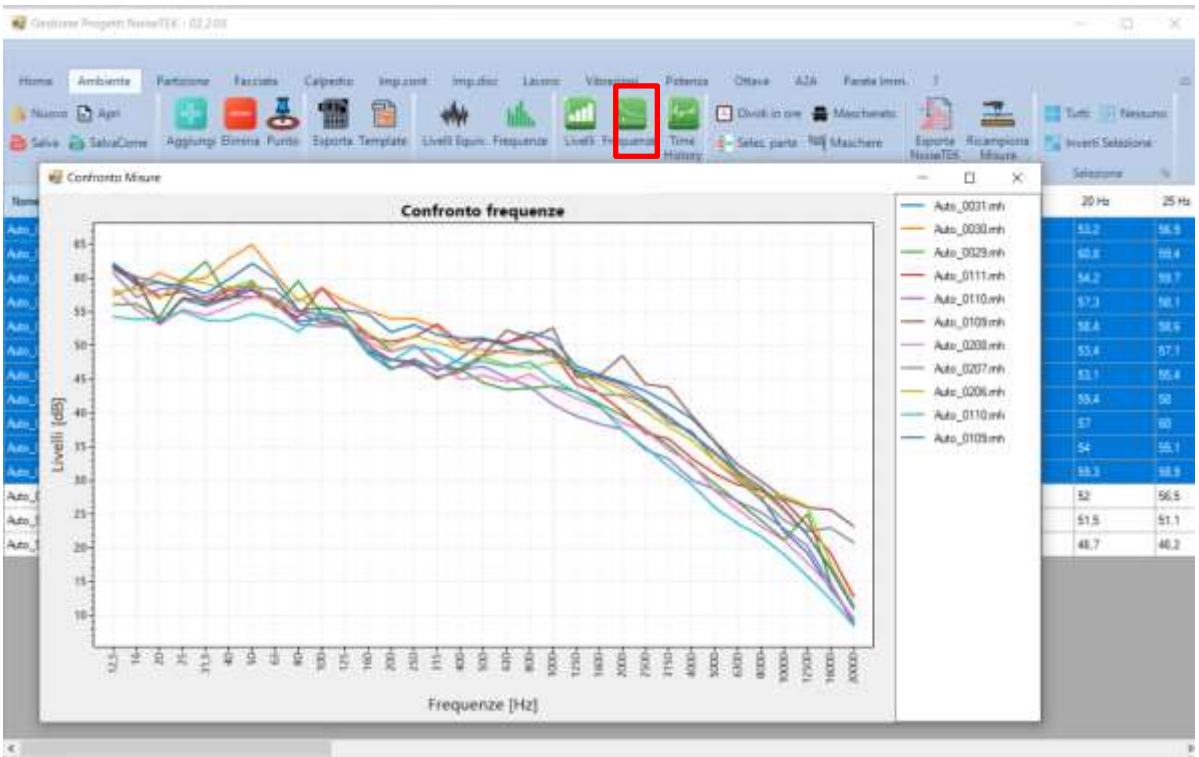
Level comparison

By choosing the comparison by levels, a bar chart is displayed showing the A-weighted equivalent levels of the selected measures.



Frequency comparison

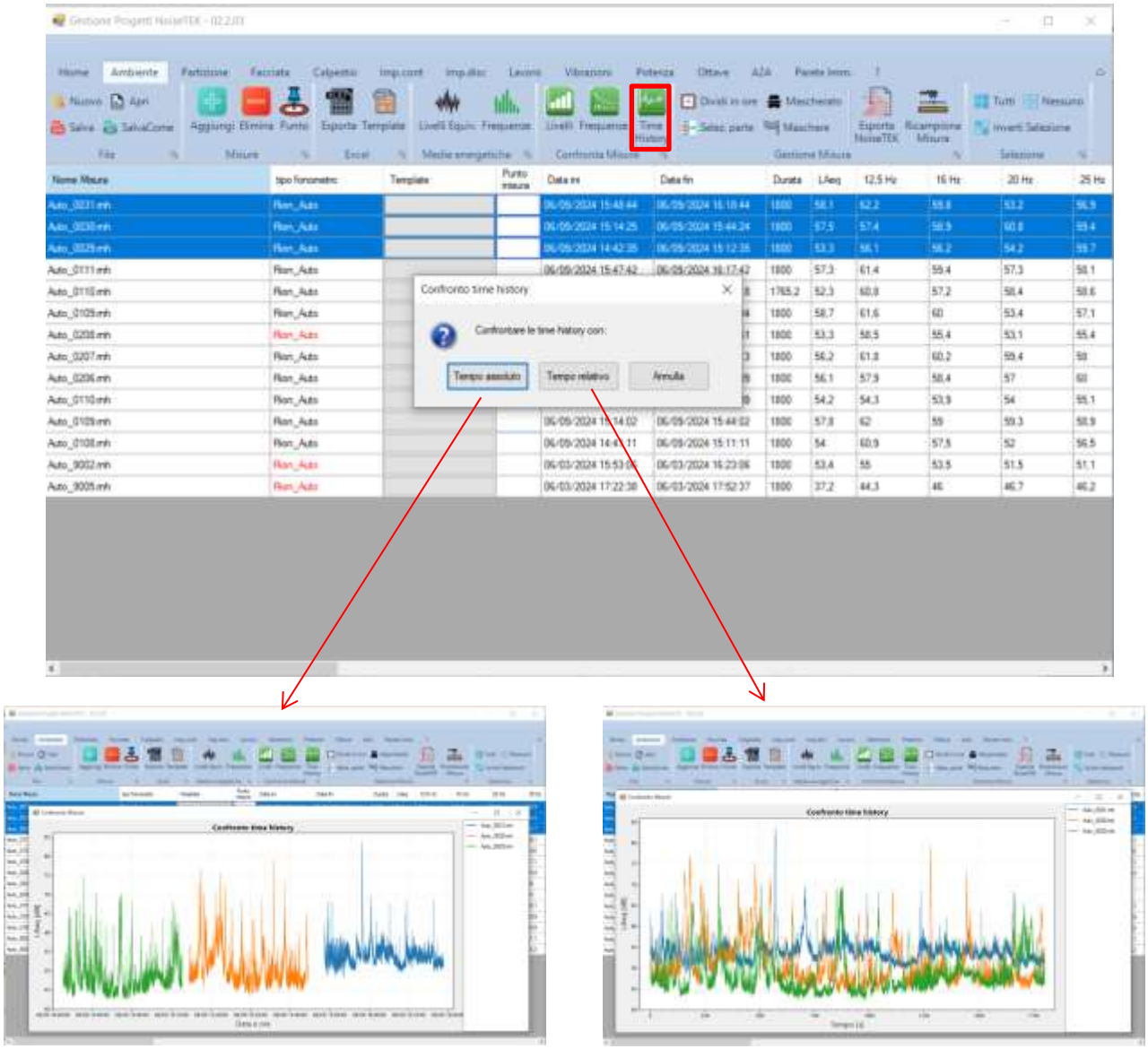
The frequency comparison allows you to view the frequency spectra of the selected measurements in the same graph.



Comparison of Time Histories

To compare time histories, you must first choose the temporal representation mode. Measurements can be compared:

- in absolute time, maintaining for each measurement the actual date and time of acquisition;
- in relative time, making the initial instant of all measurements coincide and representing the time elapsed since the start of the acquisition.



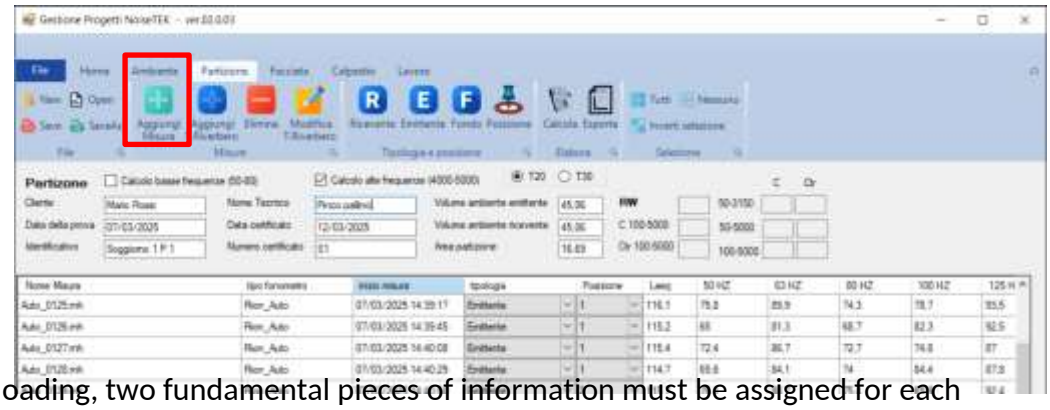
Time History comparison can only be done if the complete measurement files are still available in the original location and have not been removed or moved to another directory and, most importantly, have the same sampling.

Processing times depend on the number and duration of the selected measurements. The readability of the graph may also decrease as the number of simultaneously displayed measurements increases.

6.5 Partitions

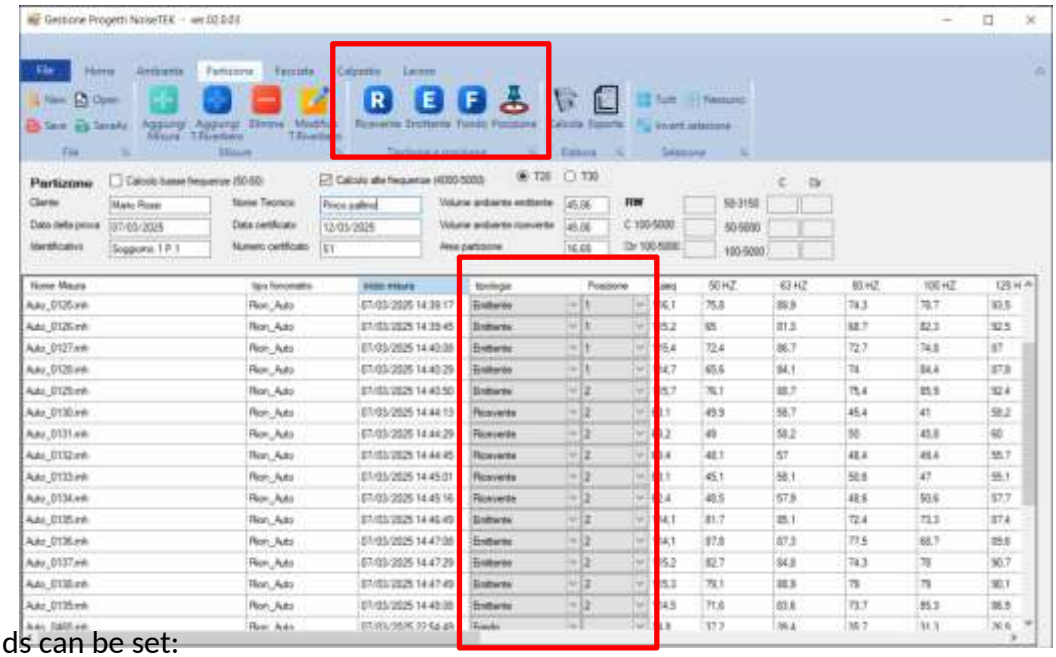
The Partitions module is used to analyze the apparent sound reduction power between adjacent rooms, as required by the regulations for verifying passive acoustic requirements. This module manages the measurements acquired in the emitting, receiving, and background rooms, as well as the reverberation times, required to calculate the □□□ index and the correction coefficients □ and □□□.

The measurements are inserted as usual using the "Add Measurement" button, selecting the files based on the type of sound level meter(s) used.



After uploading, two fundamental pieces of information must be assigned for each measurement:

- “Type”: Emitter, Receiver, Background
- “Source position”: i.e. the position of the sound source during the measurement



Both fields can be set:

- directly on the single row of the grid
- massively, by selecting multiple rows and using the buttons:
    - E = Transmitter
    - R = Receiver
    - F = Background
    - Position = Source position

The “Source position” field is essential to indicate which generator configuration each measurement refers to.

It is used to allow, as required by the legislation, the partial results to be calculated separately for each source position, which will then be averaged to obtain the final values.

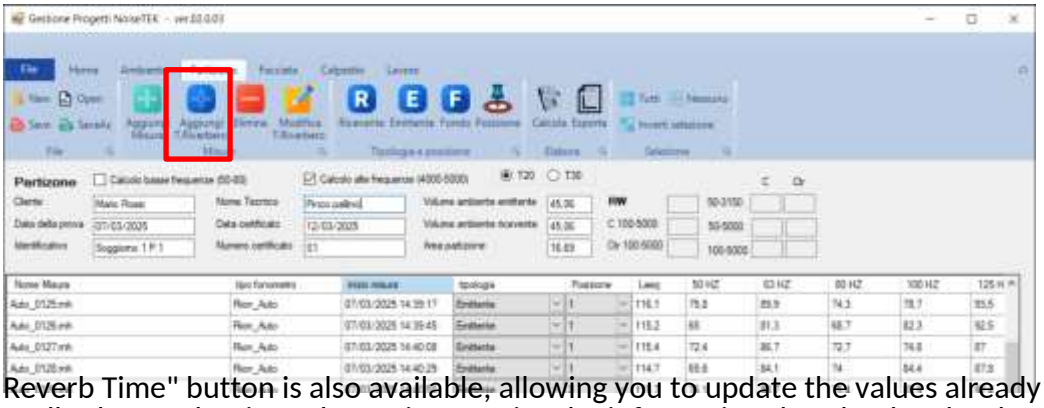
The software automatically reads for each measurement:

- Start date and time
- Sound level meter type
- Calculate average LAeq
- Calculate the average level value for frequency bands from 50 Hz to 5000 Hz

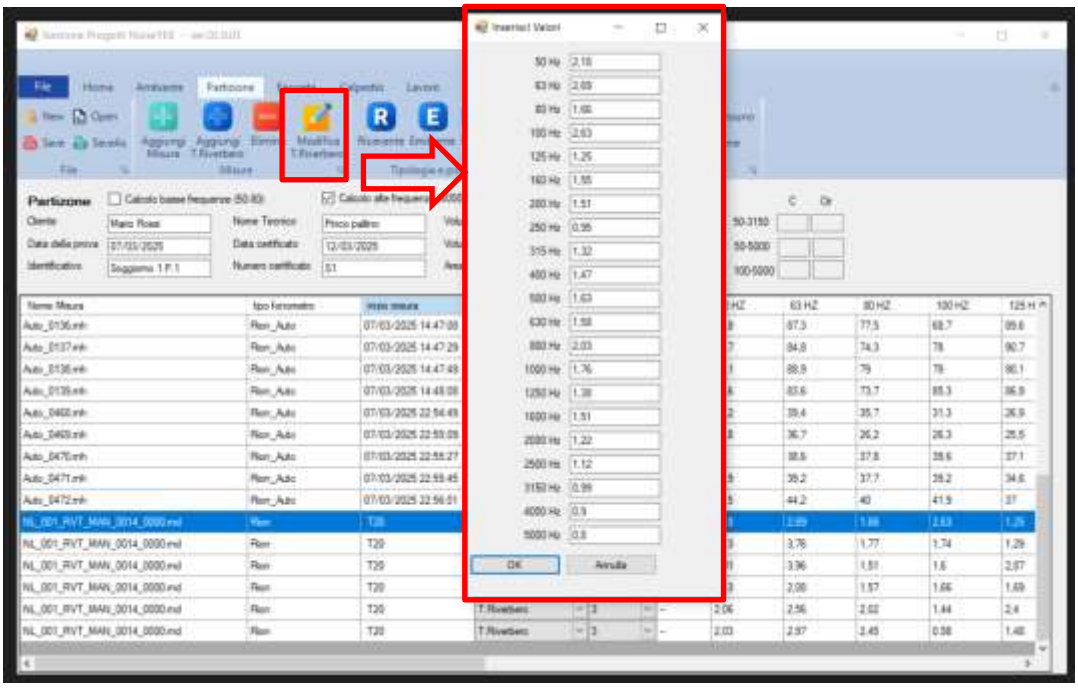
Reverb times are added using the “Reverb Time” button. Three methods are supported:

- Direct reading from a file produced by the sound level meter (e.g. Rion),
- Exporting from a measurement via the Measurement Management described in Chapter 5
- Manual insertion, via a dedicated window, useful if using other software (e.g.

  ARTA)

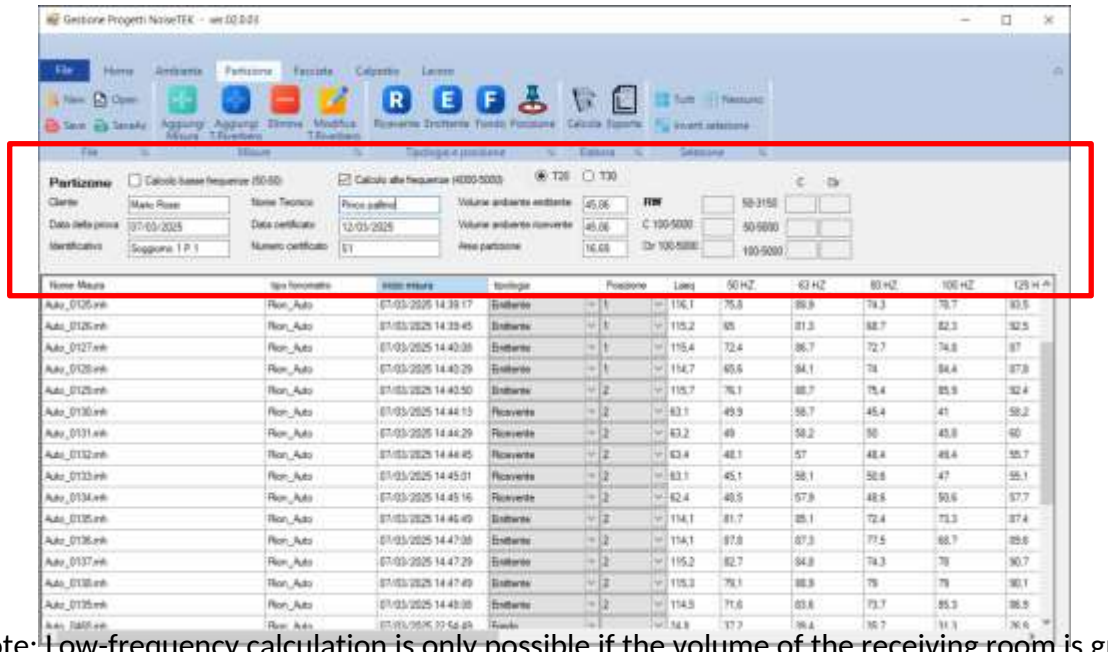


The "Edit Reverb Time" button is also available, allowing you to update the values already entered. If you manually change the time, the project retains the information that the data has been altered since the original import.



In the section between the command bar and the grid containing the measurements, the following additional data is requested, which is stored in the project:

- Customer
- Test ID
- Test date
- Certificate date
- Certificate number
- Technical name of the writer
- Volume of the emitting room, in m3
- Volume of the receiving room, in m3
- Partition area, in m2
- Choice between calculation with T20 or T30 (default: T20, according to the advice of UNI 12354-1)
- Activation of low frequency calculation (50–80 Hz)
- Activation of high frequency calculation (4000–5000 Hz)

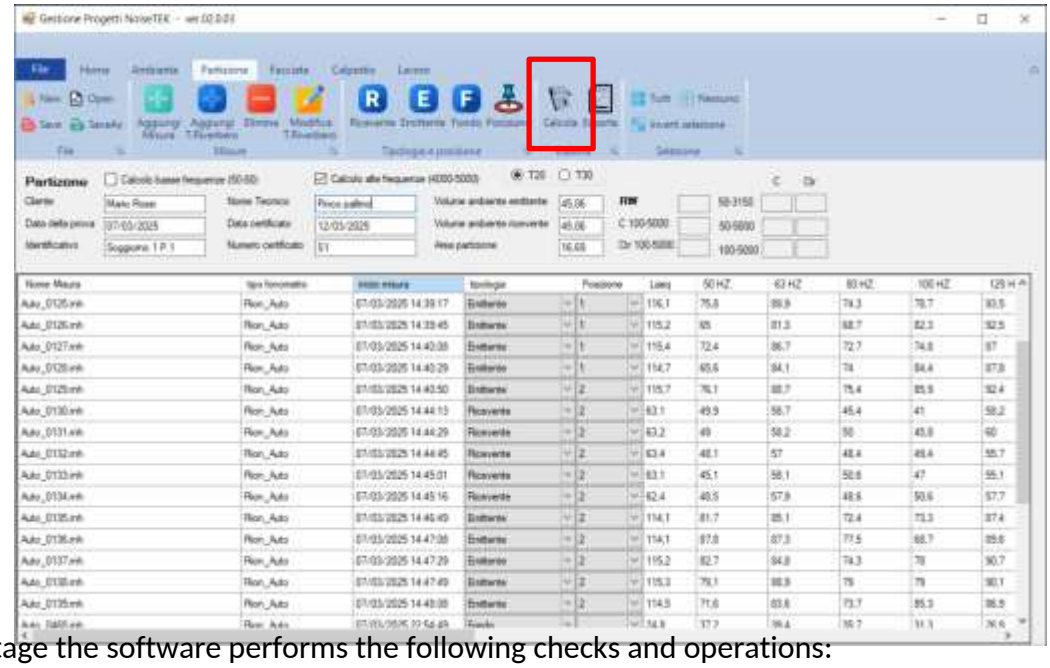


 Note: Low-frequency calculation is only possible if the volume of the receiving room is greater than 25 m^3. Low-frequency calculation is not currently supported for receiving rooms with a volume below this value.

 Note: Volumes and area can be entered in numeric format (using either the dot or the comma as decimal separator) or via a mathematical formula with the symbols: +, –, *, /, ( ).

Some data is mandatory for the correct generation of the acoustic test certificate, which can then be exported in a predefined format; other data is necessary for the calculation itself.

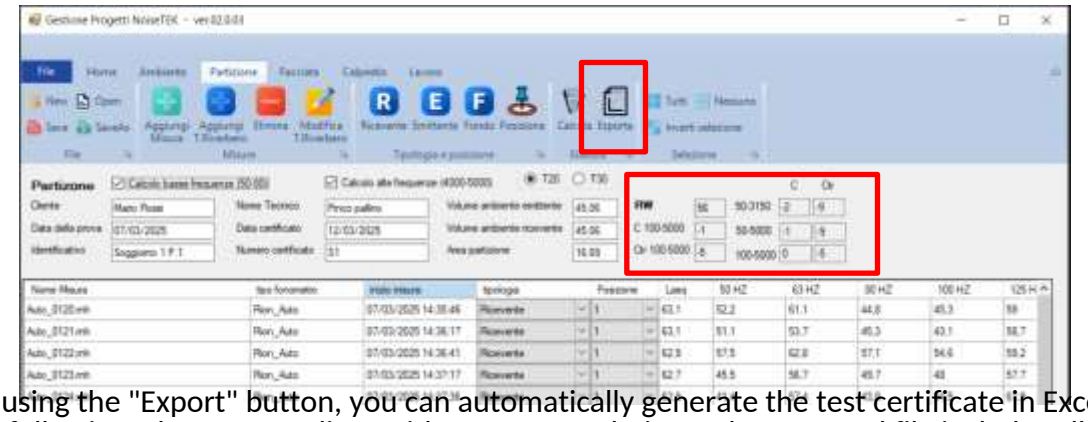
Once all the data has been entered, you can start the automatic processing by clicking the “Calculate” button.



At this stage the software performs the following checks and operations:

- Verification of data completeness, in particular:
    - Presence of at least one Emitting and one Receiving measurement for each position source
- Presence of reverberation times for each necessary position
- Signalling of any lack of background level: in this case, the calculation is performed without applying the correction for background noise
- Calculation of the index ??? and the correction coefficients ? and ???
- Automatic display of the results in the appropriate fields of the window

Any missing or inconsistent data is highlighted and the calculation is blocked until it is corrected.



Finally, using the "Export" button, you can automatically generate the test certificate in Excel format, following a layout compliant with current regulations. The exported file includes all the technical data, calculation results, and descriptive information entered in the project.

Apparent sound reduction power in accordance with ISO 16283-1

On-site measurement of airborne sound insulation between rooms

Client: Mario Rossi

Test date: **07/03/2025**

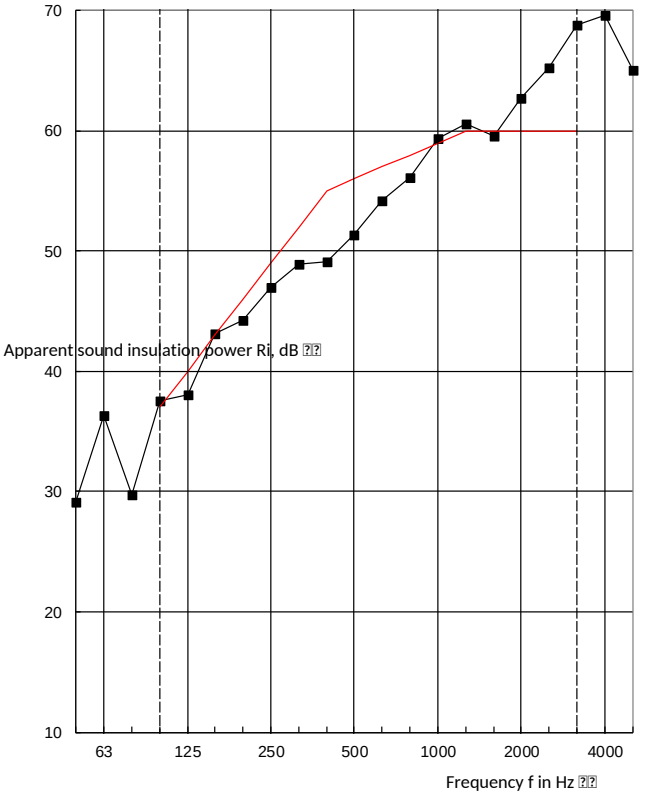
Building ID and Test: Living Room 1 P.1

Common partition area: 17 m² Frequency range according to the reference value curve

Volume of the emitting environment: m³ 45 reference value curve (ISO 717-1)

Volume of the receiving room: m³ 45 curve of calculated values Ri

Frequency Ri Hz	dB
50	29,1
63	36,3
80	29,7
100	37,6
125	38,1
160	43,1
200	44,2
250	47,0
315	48,9
400	49,1
500	51,4
630	54,2
800	56,1
1000	59,4
1250	60,6
1600	59,6
2000	62,7
2500	65,3
3150	68,8
4000	69,6
5000	65,1



Evaluation according to UNI EN ISO 717-1:

$R'_w(C; C_{tr}) =$ *56 (-1,-5) dB* $C_{50-3150} =$ -2 dB $C_{50-5000} =$ -1 dB $C_{100-5000} =$ 0 dB

Evaluation based on results of on-site measurements obtained using a technical design method $C_{tr,50-3150} =$ -9 dB $C_{tr,50-5000} =$ -9 dB $C_{tr,100-5000} =$ -5 dB

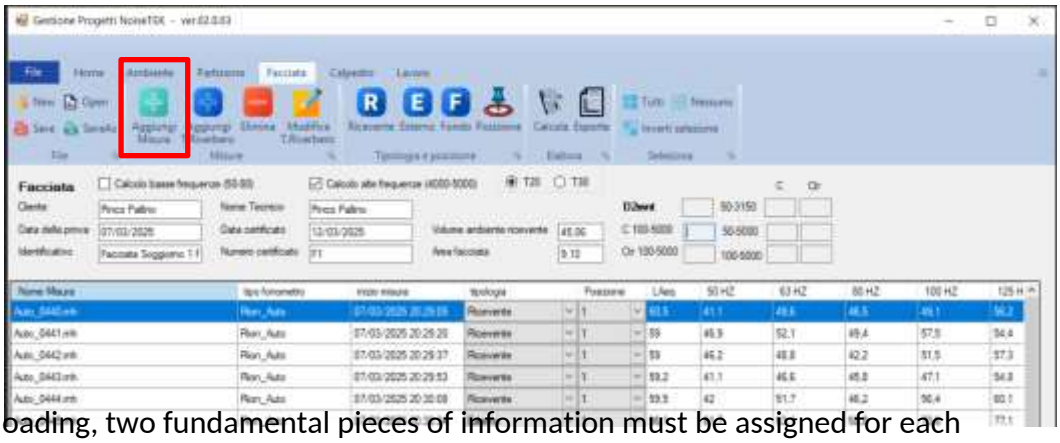
Test report number: S1 Technical name: Pinco pallino

Date: Signature: **12/03/2025**

6.6 Facades

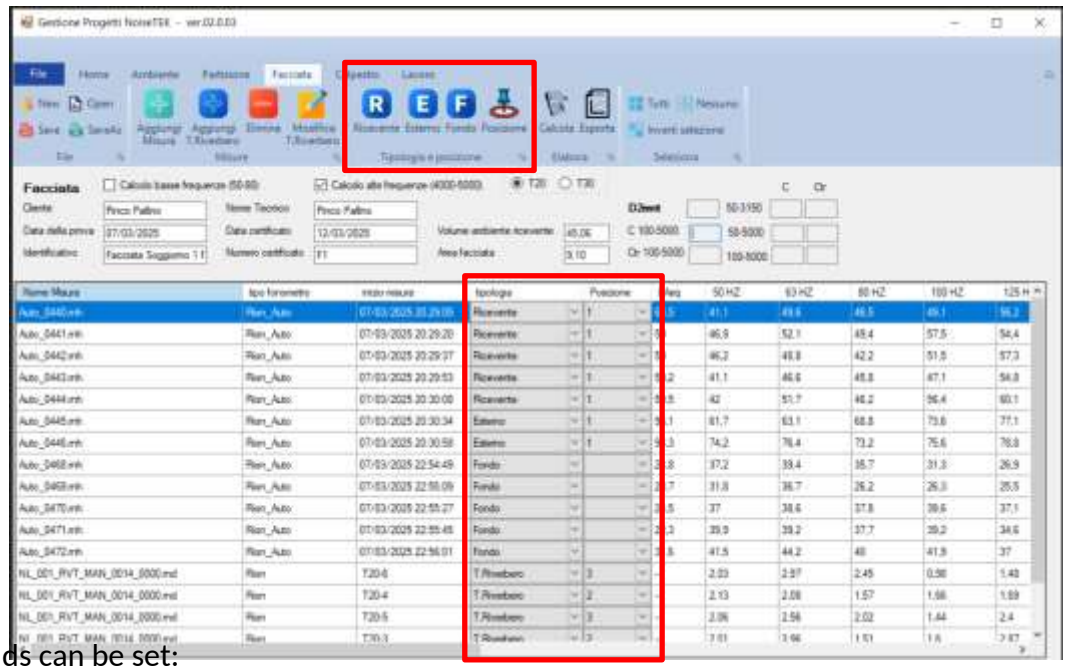
The Facades module is dedicated to analyzing the acoustic insulation of facades, as required by the regulations for verifying passive acoustic requirements. This module manages measurements acquired in the external, receiving, and background environments, and the insertion of reverberation times, necessary for calculating the □2□ □□ □ index and the correction coefficients □ and □□□.

The measurements are inserted as usual using the "Add Measurement" button, selecting the files based on the type of sound level meter(s) used.



After uploading, two fundamental pieces of information must be assigned for each measurement:

- “Type”: External, Receiving, Background
- “Source position”: i.e. the position of the sound source during the measurement



Both fields can be set:

- directly on the single row of the grid
- massively, by selecting multiple rows and using the buttons:
    - E = External
    - R = Receiving
    - F = Bottom
    - Position = Source position

The “Source position” field is essential to indicate which generator configuration each measurement refers to.

It is used to allow, as required by the legislation, the partial results to be calculated separately for each source position, which will then be averaged to obtain the final values.

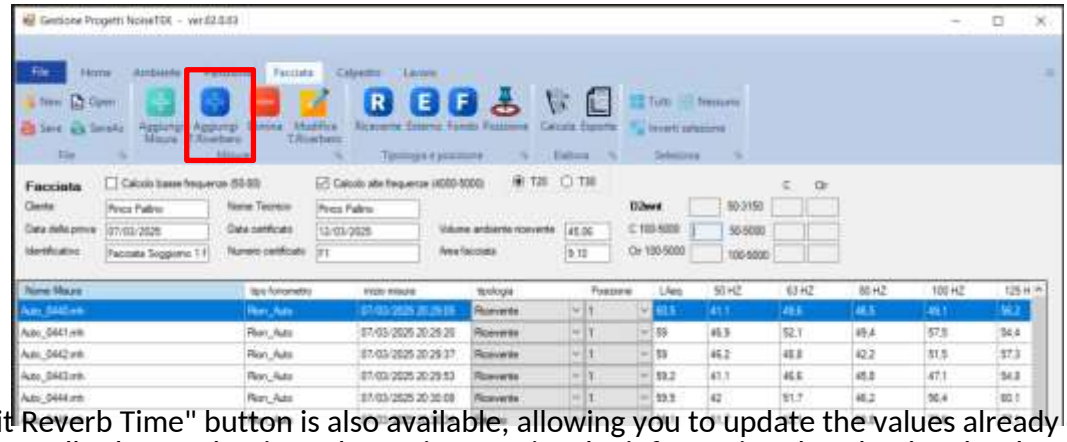
The software automatically reads for each measurement:

- Start date and time
- Sound level meter type
- Calculate average LAeq
- Calculate the average level value for frequency bands from 50 Hz to 5000 Hz

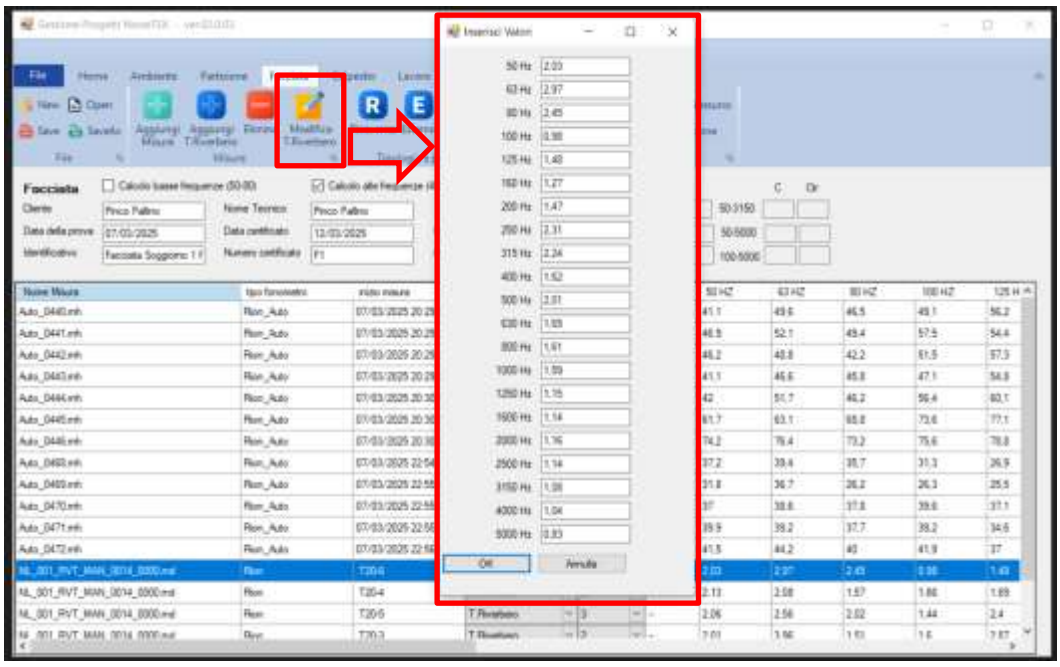
Reverb times are added using the “Reverb Time” button. Three methods are supported:

- Direct reading from a file produced by the sound level meter (e.g. Rion),
- Exporting from a measurement via the Measurement Management described in Chapter 5
- Manual insertion, via a dedicated window, useful if using other software (e.g.

  ARTA)

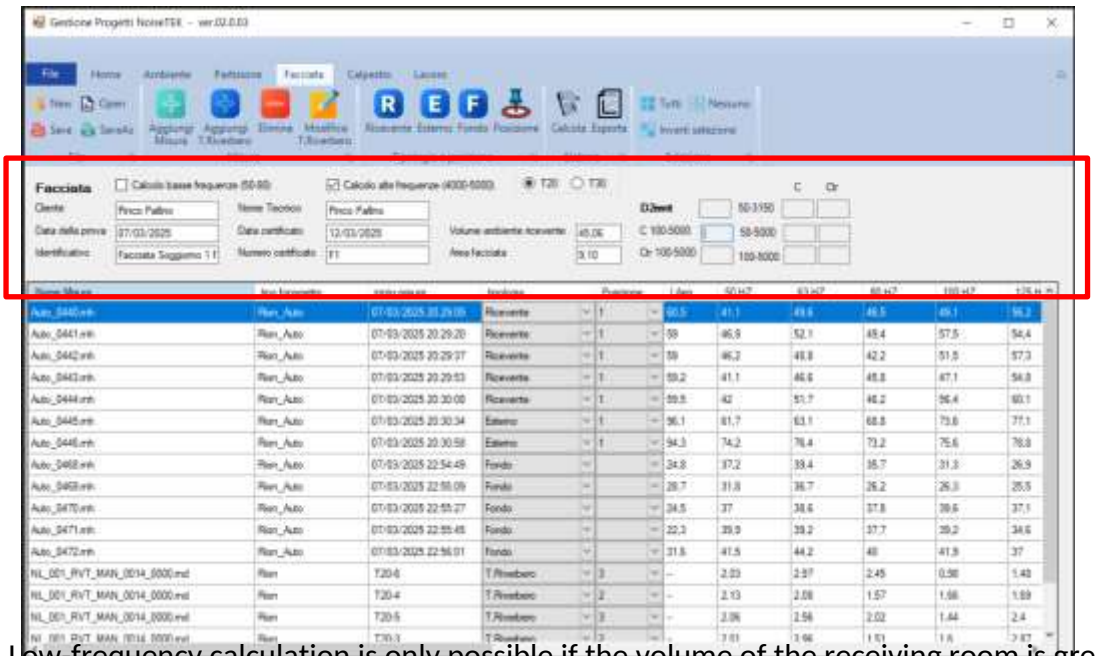


The "Edit Reverb Time" button is also available, allowing you to update the values already entered. If you manually change the time, the project retains the information that the data has been altered since the original import.



In the section between the command bar and the grid containing the measurements, the following additional data is requested, which is stored in the project:

- Customer
- Test ID
- Test date
- Certificate date
- Certificate number
- Technical name of the writer
- Volume of the receiving room, in m3
- Facade area, in m2
- Choice between calculation with T20 or T30 (default: T20, according to the UNI 12354-1 recommendation)
- Activation of low frequency calculation (50–80 Hz)
- Activation of high frequency calculation (4000–5000 Hz)

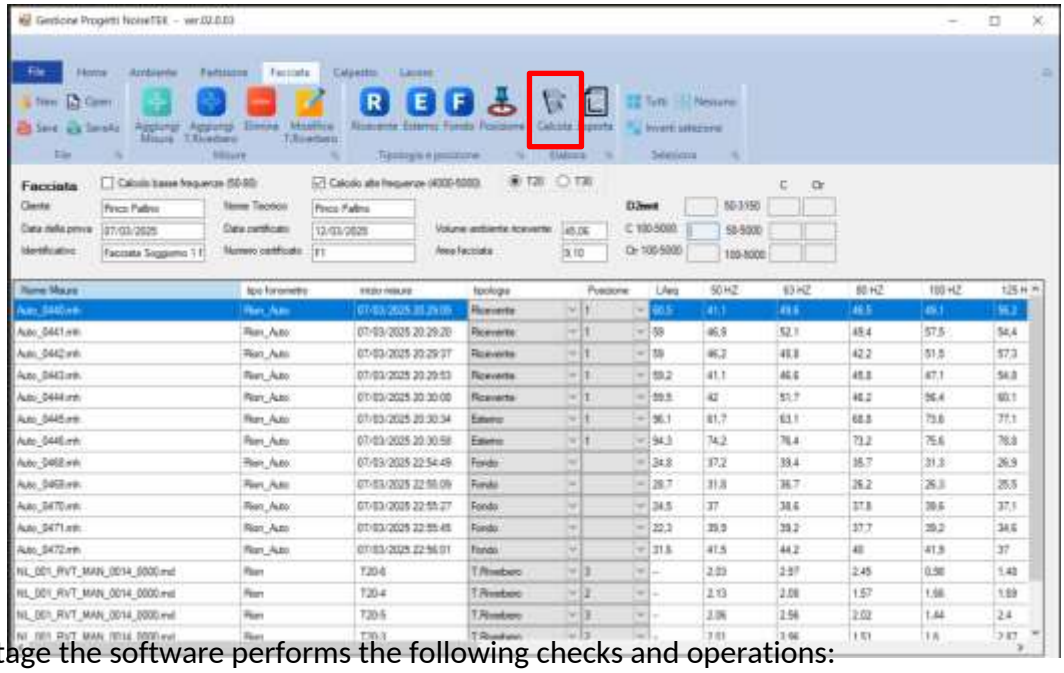


 Note: Low-frequency calculation is only possible if the volume of the receiving room is greater than 25 m^3. Low-frequency calculation is not currently supported for receiving rooms with a volume below this value.

 Note: Volume and area can be entered in numeric format (using either the dot or the comma as decimal separator) or via a mathematical formula with the symbols: +, −, *, /, ( ).

Some data is mandatory for the correct generation of the acoustic test certificate, which can then be exported in a predefined format; other data is necessary for the calculation itself.

Once all the data has been entered, you can start the automatic processing by clicking the “Calculate” button.



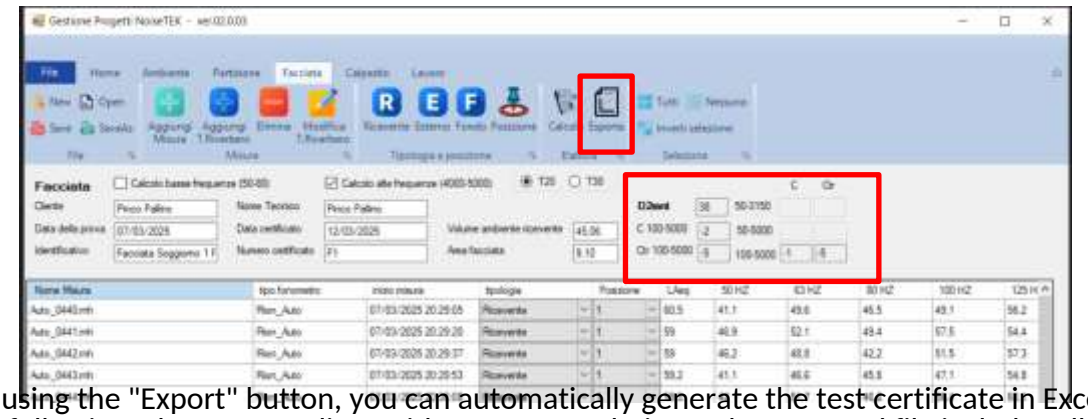
At this stage the software performs the following checks and operations:

- Verification of data completeness, in particular:
    - Presence of at least one External and one Receiving measurement for each position

source
- Presence of reverberation times for each necessary position
- Signalling of any lack of background level: in this case, the calculation is

performed without applying the correction for background noise
- Calculation of the index □2□ □□ □ and the correction coefficients □ and □□□
- Automatic display of the results in the appropriate fields of the window

Any missing or inconsistent data is highlighted and the calculation is blocked until it is corrected.



Finally, using the "Export" button, you can automatically generate the test certificate in Excel format, following a layout compliant with current regulations. The exported file includes all the technical data, calculation results, and descriptive information entered in the project.

Apparent sound reduction power in accordance with ISO 16283-3

On-site measurement of airborne sound insulation of facades

Client: Pinco Pallino

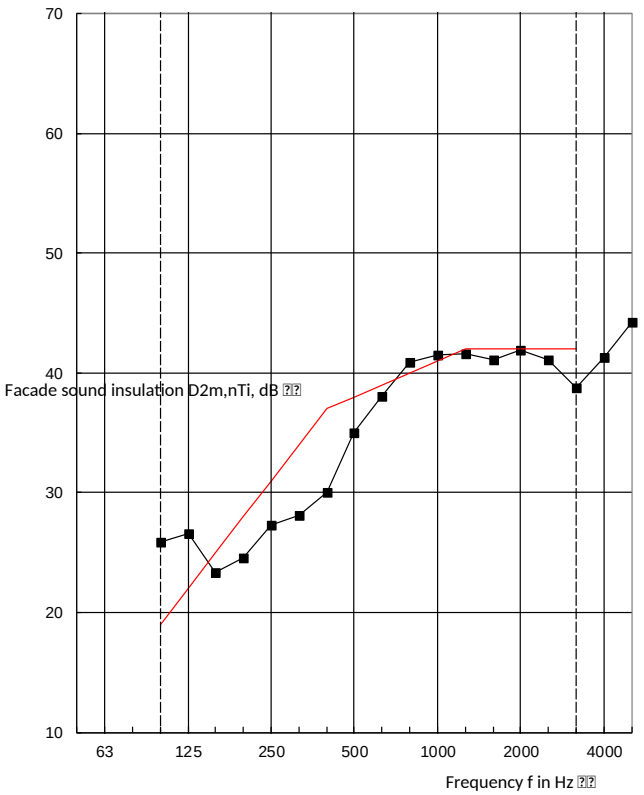
Test date: **07/03/2025**

Test ID: Living Room Facade 1 P. 1 Frequency range according to the reference value curve -------

Facade area m² 9 reference value curve (ISO 717-1)

Volume of the receiving room: m³ 45 curve of calculated values D2m,nT,i

Frequency D2m,nT,i	
Hz	dB
50	
63	
80	
100	25,9
125	26,6
160	23,3
200	24,6
250	27,3
315	28,1
400	30,0
500	35,0
630	38,1
800	40,9
1000	41,5
1250	41,6
1600	41,1
2000	41,9
2500	41,1
3150	38,8
4000	41,3
5000	44,2



Evaluation according to UNI EN ISO 717-1:

$D_{2m,nT,w}(C; C_{tr}) =$ *38 (-2;-5) dB* $C_{50-3150} =$ dB $C_{50-5000} =$ dB $C_{100-5000} =$ -1 dB

Evaluation based on results of on-site measurements obtained using a technical design method $C_{tr,50-3150} =$ dB $C_{tr,50-5000} =$ dB $C_{tr,100-5000} =$ -5 dB

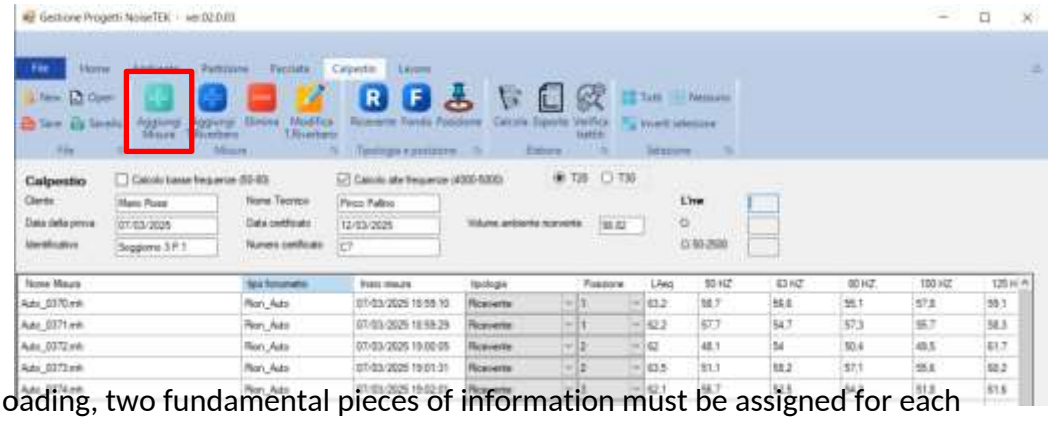
Test report number: F1 Technical name: Pinco Pallino

Date: Signature: **12/03/2025**

6.7 Trampling

The Impact Sound module is dedicated to verifying impact sound insulation between overlapping rooms, in accordance with the regulations for passive acoustic requirements. It allows you to manage measurements taken in the receiving room, the background room, and the reverberation times, necessary for calculating the □□□□ index and the correction coefficients □□ and □50–2500.

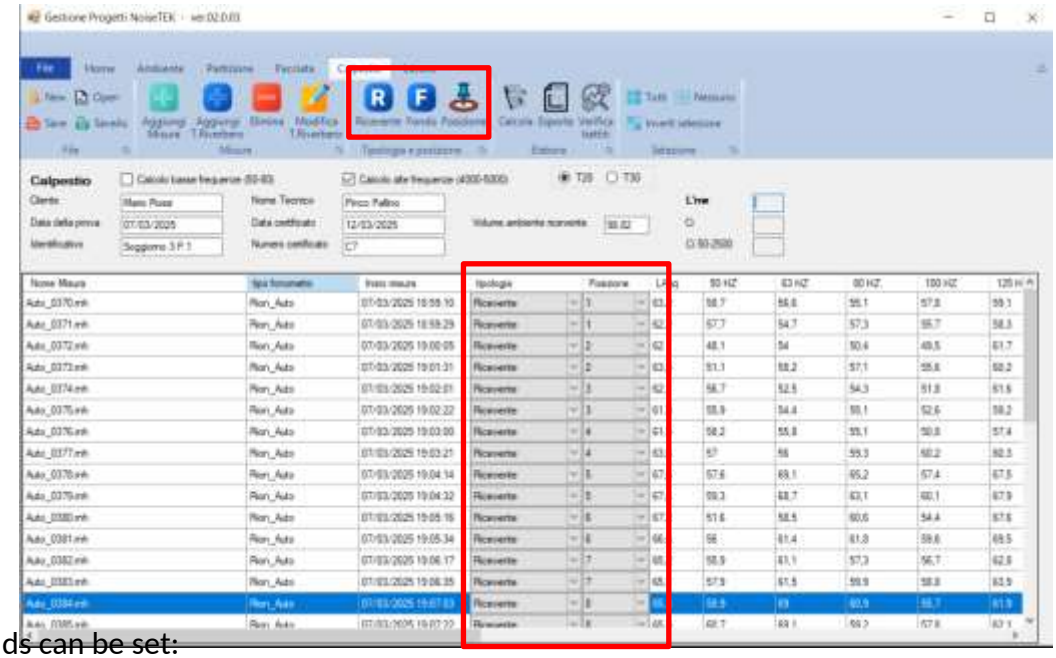
The measurements are inserted as usual using the "Add Measurement" button, selecting the files based on the type of sound level meter(s) used.



After uploading, two fundamental pieces of information must be assigned for each measurement:

- “Type”: Receiver, Background
- “Source position”: i.e. the position of the machine generating the noise

  trampling during the measurement or that of the source used to determine the reverberation time



Both fields can be set:

- directly on the single row of the grid
- massively, by selecting multiple rows and using the buttons:
  - R = Receiver
  - F = Bottom
  - Position = Source position

The “Source position” field is essential to indicate which position of the machine generating the footfall noise each measurement refers to.

It is used to allow, as required by the legislation, the partial results to be calculated separately for each machine position, which will then be averaged to obtain the final values.

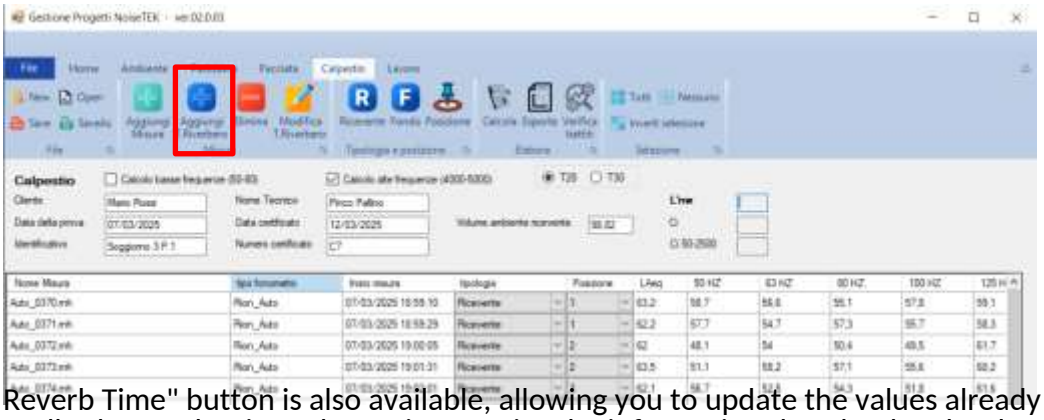
The software automatically reads for each measurement:

- Start date and time
- Sound level meter type
- Calculate average LAeq
- Calculate the average level value for frequency bands from 50 Hz to 5000 Hz

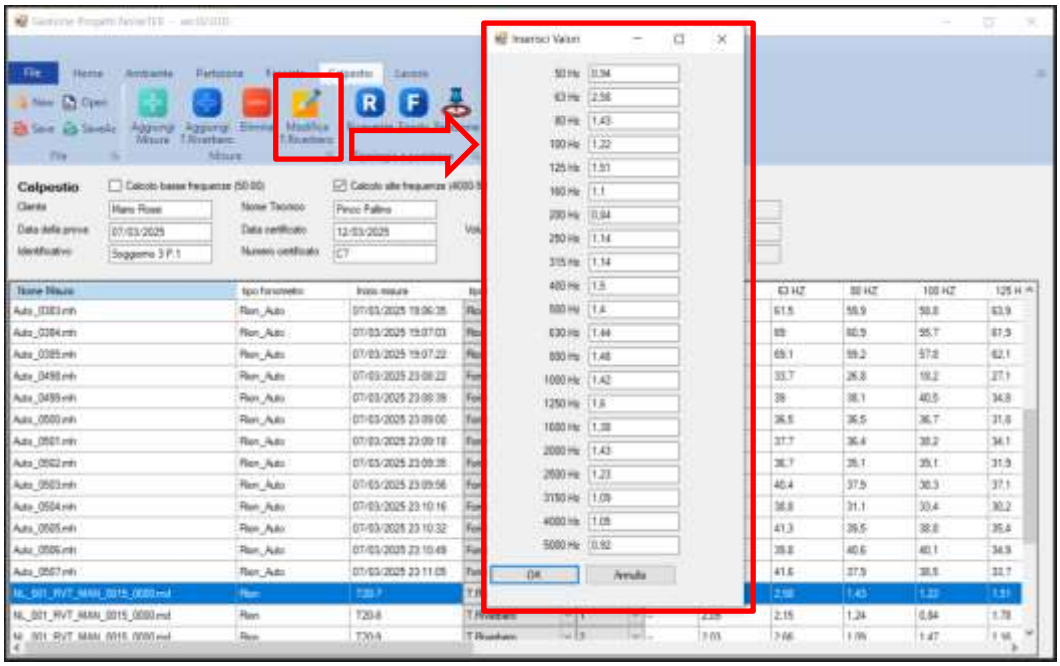
Reverb times are added using the “Reverb Time” button. Three methods are supported:

- Direct reading from a file produced by the sound level meter (e.g. Rion),
- Exporting from a measurement via the Measurement Management described in Chapter 5
- Manual insertion, via a dedicated window, useful if using other software (e.g.

  ARTA)

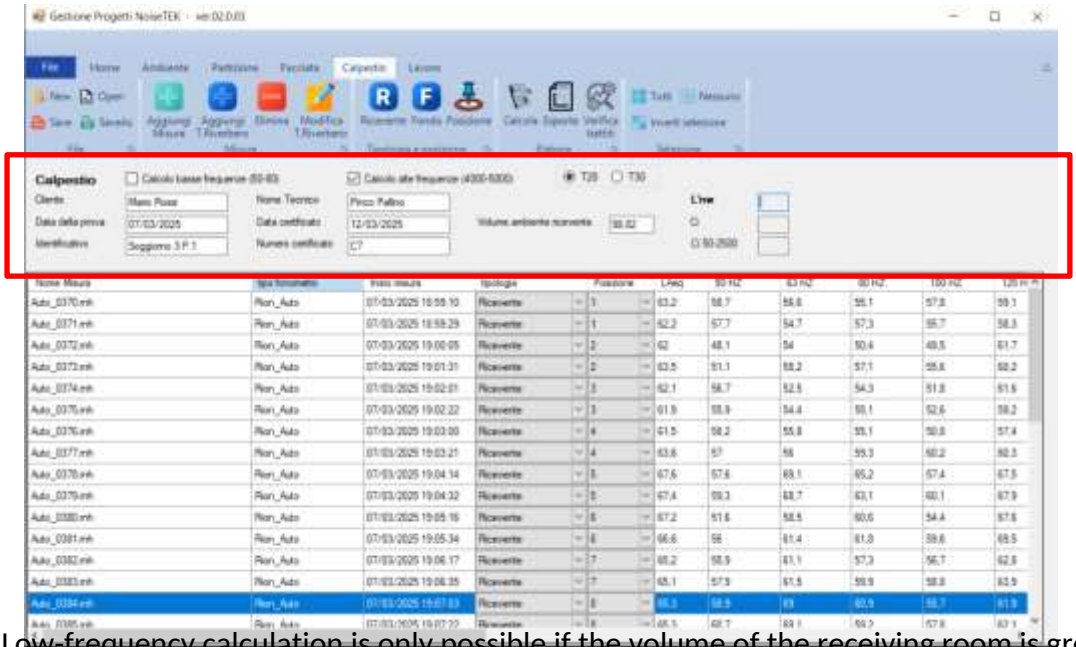


The "Edit Reverb Time" button is also available, allowing you to update the values already entered. If you manually change the time, the project retains the information that the data has been altered since the original import.



In the section between the command bar and the grid containing the measurements, the following additional data is requested, which is stored in the project:

- Customer
- Test ID
- Test date
- Certificate date
- Certificate number
- Technical name of the writer
- Volume of the receiving room, in m3
- Choice between calculation with T20 or T30 (default: T20, according to the UNI 12354-1 recommendation)
- Activation of low frequency calculation (50–80 Hz)
- Activation of high frequency calculation (4000–5000 Hz)

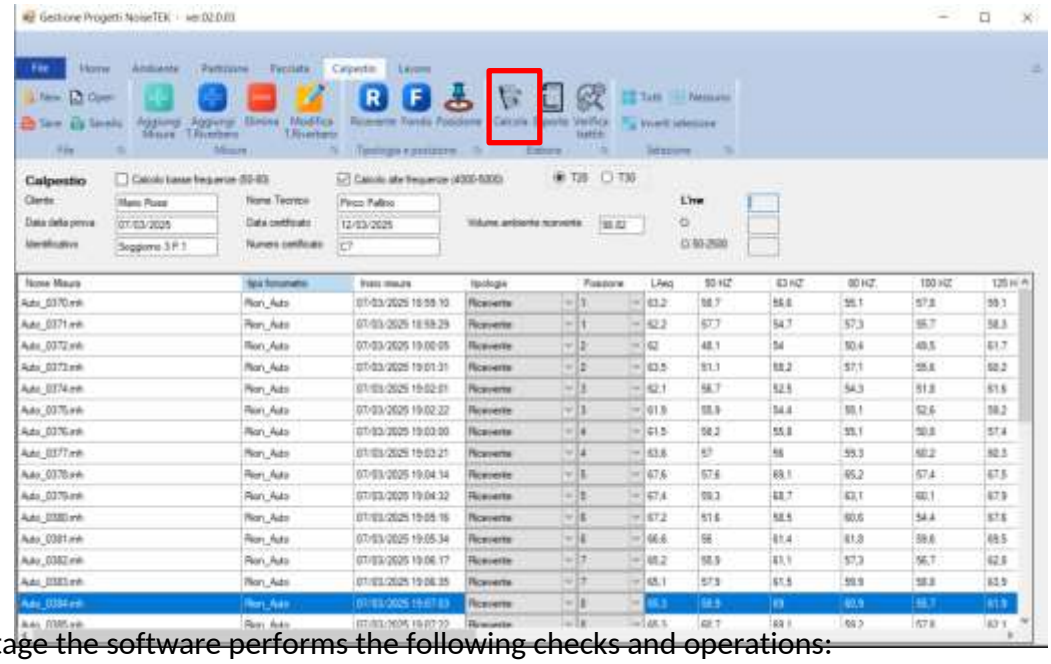


 Note: Low-frequency calculation is only possible if the volume of the receiving room is greater than 25 m^3. Low-frequency calculation is not currently supported for receiving rooms with a volume below this value.

 Note: The volume can be entered in numeric format (using either the dot or the comma as decimal separator) or via a mathematical formula with the symbols: +, −, *, /, ( ).

Some data is mandatory for the correct generation of the acoustic test certificate, which can then be exported in a predefined format; other data is necessary for the calculation itself.

Once all the data has been entered, you can start the automatic processing by clicking the “Calculate” button.

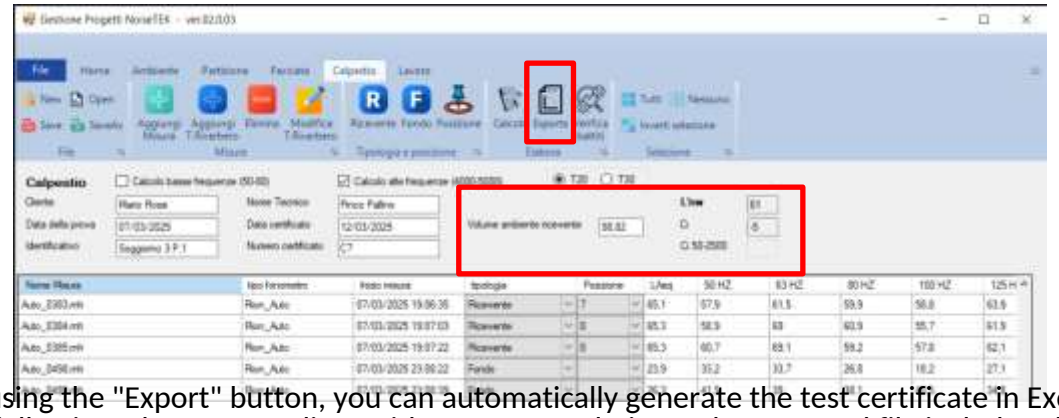


At this stage the software performs the following checks and operations:

- Verification of data completeness, in particular:
- Presence of at least one receiving measurement for each source position
- Presence of reverberation times for each required position
- Indication of any lack of background level: in this case, the calculation is

performed without applying the correction for background noise
- Calculation of the index ???? and the correction coefficients ??.e ?50–2500
- Automatic display of the results in the appropriate fields of the window

Any missing or inconsistent data is highlighted and the calculation is blocked until it is corrected.



Finally, using the "Export" button, you can automatically generate the test certificate in Excel format, following a layout compliant with current regulations. The exported file includes all the technical data, calculation results, and descriptive information entered in the project.

Impact sound pressure level normalized to sound absorption according to ISO 16283-2

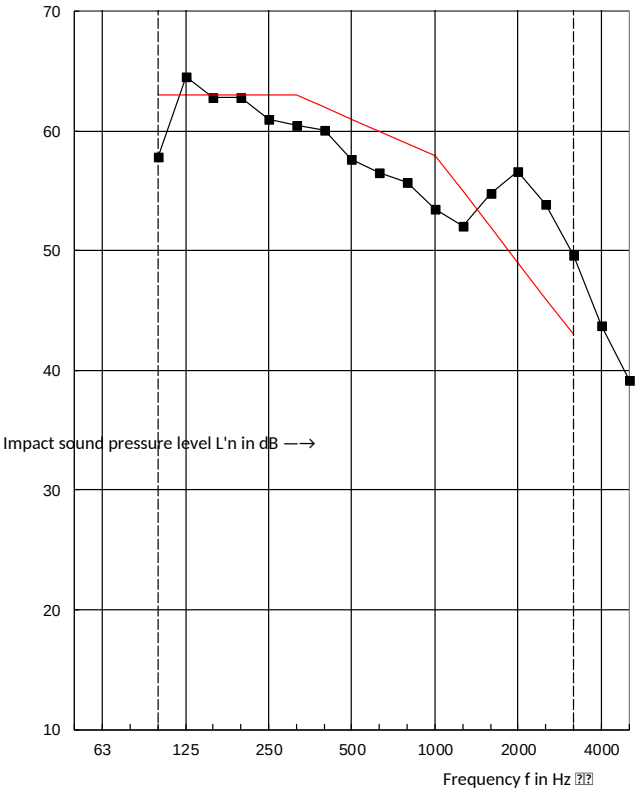
On-site measurement of impact sound insulation of floors using the impact sound generator

Customer: Mario Rossi Test date: 03/07/2025 Frequency range according to the reference value curve

Building and test identifier: Living room 3 P.1 reference value curve (ISO 717-2)

Volume of the receiving room: m³ 99 curve of calculated values L'n,i

Frequency L'ni Hz	dB
50	
63	
80	
100	57,8
125	64,5
160	62,8
200	62,8
250	61,0
315	60,5
400	60,1
500	57,6
630	56,5
800	55,7
1000	53,5
1250	52,1
1600	54,8
2000	56,6
2500	53,9
3150	49,6
4000	43,7
5000	39,2



Evaluation according to UNI EN ISO 717-2:

$L'_{n,w}(C_I) =$ *61 (-5) dB* $C_{I,50-2500} =$ dB

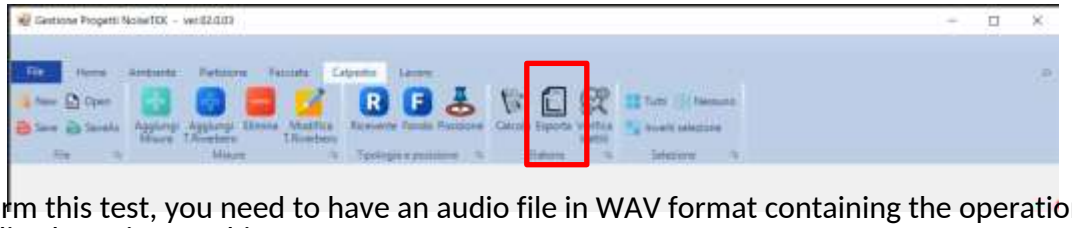
Evaluation based on results of on-site measurements obtained using a technical design method

Test report number: C7 Technical name: Pinco Pallino

Date: Signature: _____ 12/03/2025

6.7.1 Verification of the mean time between impacts generated by the trampling machine

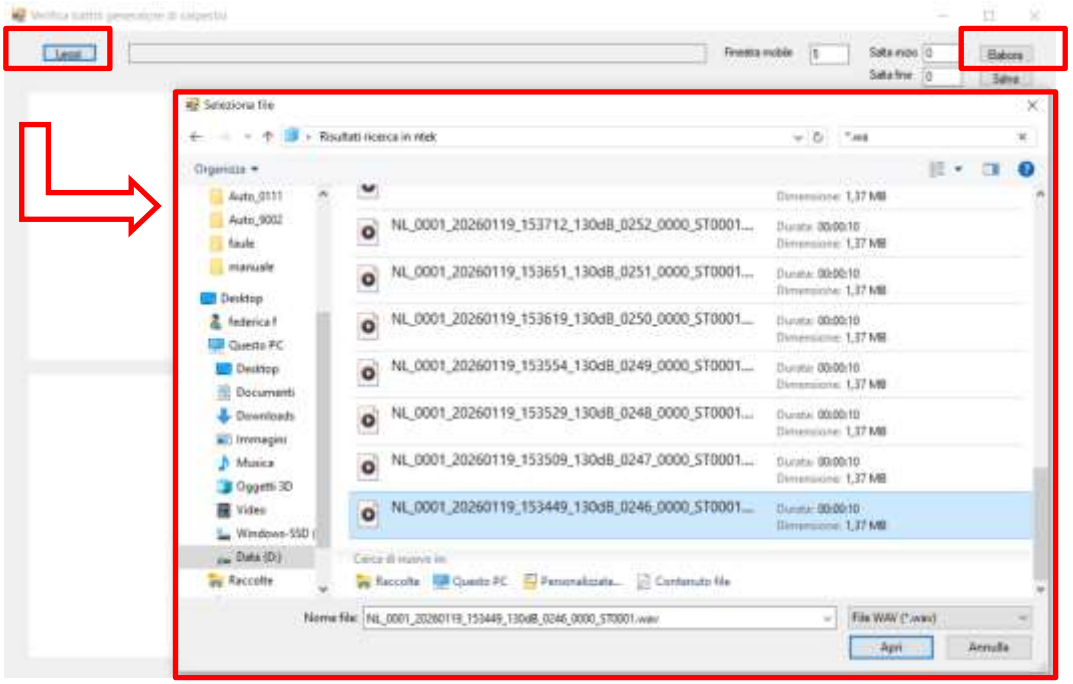
In the Tapping module, a function is available that allows you to check the average time between impacts generated by the standard tapping machine:



To perform this test, you need to have an audio file in WAV format containing the operation of the standardized tapping machine.

There are no recording length restrictions; however, recordings that are too short can reduce the statistical significance of the results. Therefore, a recording duration of between one and fifteen minutes is recommended, although longer files can also be analyzed.

Once this function is selected, the screen is initially empty and offers a “play” button to select the audio file.



and then the “Process” button, which starts the analysis of the impact generator.

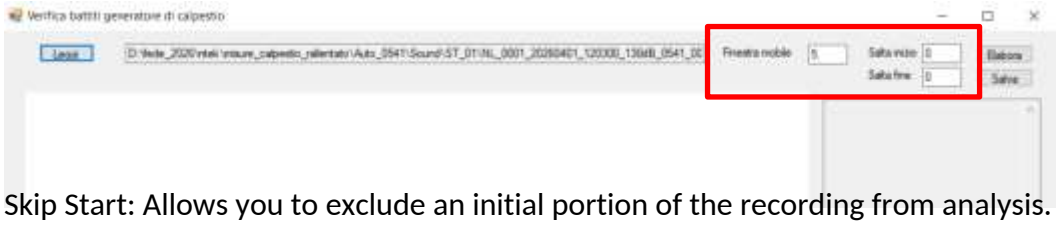
Before proceeding with the processing, it is possible to modify some configuration parameters:

Moving Window: Defines the time length of the window used to calculate the moving average of the intervals between successive impacts.

Since the UNI standard defines the required average value but does not specify the duration of the window to be used for checking stability over time, the software leaves the user the possibility of choosing this parameter.

By reducing the window length, control becomes more stringent, since any changes in the frequency of impacts have a greater impact on the moving average result. Conversely, wider windows tend to dampen instantaneous variations.

For normal operational checks, values between 6 and 15 seconds are recommended.



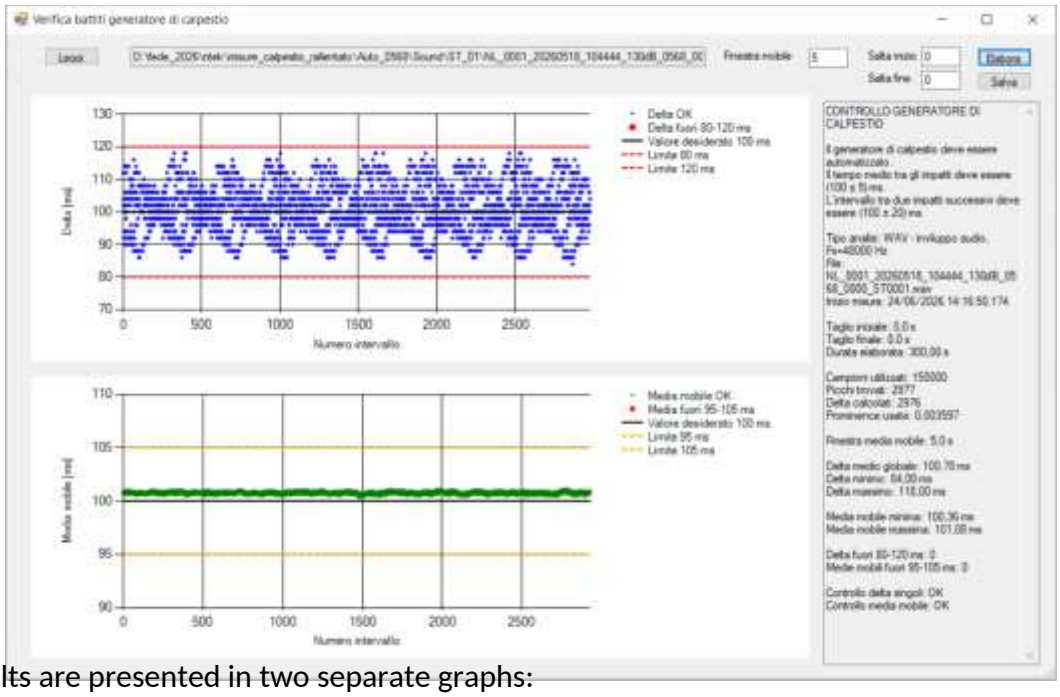
Skip Start: Allows you to exclude an initial portion of the recording from analysis.

This function is useful when recording is started before the machine reaches stable operating speed, preventing early impacts from influencing the final result.

Skip End: Allows you to exclude a final portion of the recording from analysis.

It is particularly useful when recording is stopped after the machine is turned off or when, in the final part of the file, there are conditions that are not representative of normal operation.

Once the desired parameters have been set, by pressing the “Process” button the software automatically identifies all the impacts present in the recording and calculates the time intervals between consecutive impacts.



The results are presented in two separate graphs:

Impact Interval Graph: Reports the value of each time interval calculated between two successive impacts. Also shown are:

- The time between two impacts
- the nominal value of 100 ms provided for by the standard;
- the lower limit of 80 ms;
- the upper limit of 120 ms.

Ranges between 80 ms and 120 ms are highlighted as compliant, while any values outside the limits are highlighted in red.

Moving Average Chart: Shows the performance of the moving average of intervals calculated on the time frame set by the user.

They are represented:

- the period average value;
- the nominal value of 100 ms;
- the lower limit of 95 ms;
- the upper limit of 105 ms.

Again, any values outside the limits are highlighted in red.

The right side section of the window also displays all the detailed information relating to the processing.

The first part summarises the requirements set by the UNI standard for the control of standardised tapping machinery.

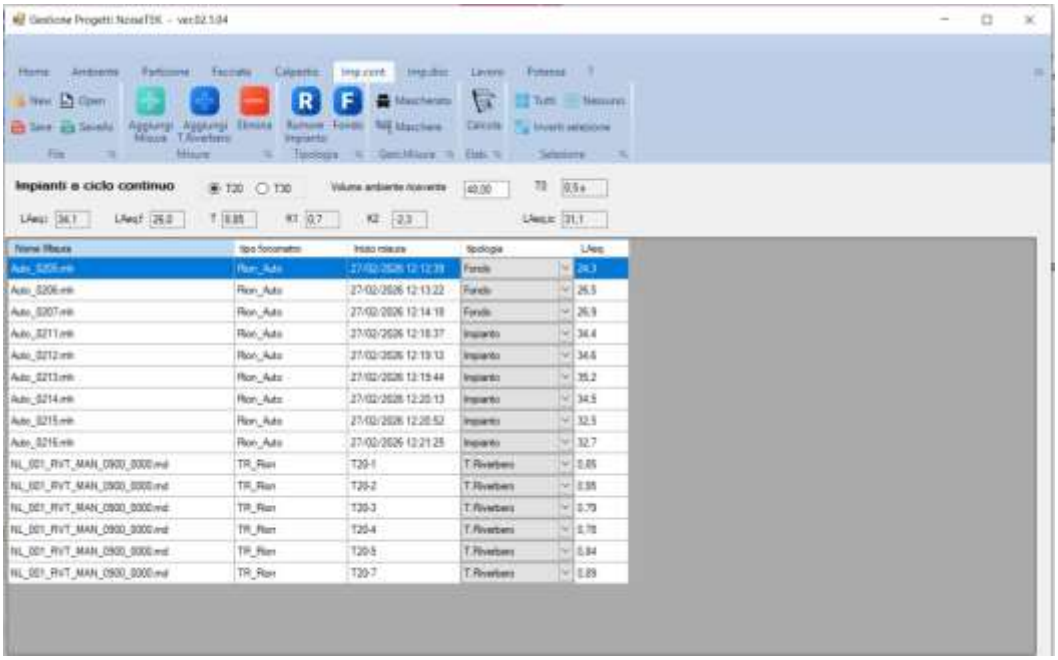
The following are:

- the name of the analyzed file;
- the sampling rate of the audio file;
- the parameters used for processing (moving window, initial and final exclusion);
- the number of impacts detected;
- the number of intervals calculated;
- the minimum, maximum and average values of the intervals;
- the minimum and maximum values of the moving average.

The final section reports the results of the checks performed by the software, indicating whether or not the individual intervals and the moving average comply with the limits set by the standard.

6.8 Continuous Plants

The Continuous Cycle Systems module is dedicated to managing measurements for assessing the noise produced by continuously operating technological systems.



Unlike the passive acoustic requirements modules described in the previous chapters, these calculations do not require frequency measurements. The acoustic parameter used for each measurement is the A-weighted equivalent level (LAeq).

Measurements are entered as usual using the "Add Measurement" button, selecting the files based on the type of sound level meter used. The software automatically reads the LAeq value for each measurement. Once the measurements have been entered, you must define whether they refer to background noise or system noise. If no background noise measurements are recorded, the K1 correction value is assumed to be 0 dB.

Reverberation times are entered using the "Reverberation Time" button, using the same methods as in the other modules. To calculate the K2 correction, the software uses the average reverberation time value in the bands between 100 Hz and 3150 Hz.

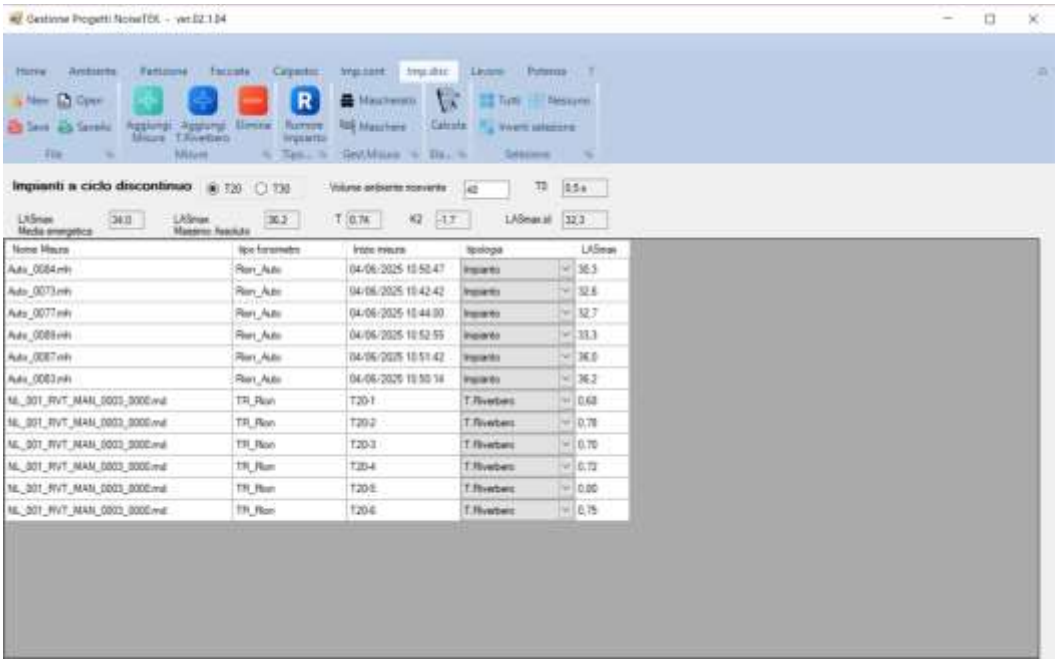
The resulting value is compared with the reference reverberation time T0, determined based on the room volume. The user enters the volume among the data required for the evaluation, allowing the software to automatically calculate T0 and, consequently, K2. If the data required for the calculation is not available, K2 is assumed to be 0 dB.

The UNI standard requires six measurements for the system and three for the substrate for the assessment. For each measurement, the actual LAeq must be determined. It is therefore important to verify the measurements individually and, if necessary, use masks to eliminate extraneous events that could result in an equivalent value that is not representative of the system's operation.

Once the necessary data has been entered, the software proceeds to calculate the correct level taking into account, where available, the K1 and K2 corrections.

6.9 Discontinuous Plants

The Discontinuous Cycle Systems module is dedicated to managing measurements for assessing the noise produced by discontinuous operation technological systems.



Again, frequency measurements are not necessary. The reference acoustic parameter is the maximum A-weighted level with a Slow time constant (LASmax).

Measurements are entered as usual using the "Add Measurement" button, selecting the files based on the type of sound level meter used. The software automatically reads the LASmax value for each measurement.

Even for discontinuous cycle systems, reverberation times can be acquired by reading directly from sound level meter files, exporting from Measurement Management, or entering them manually. To calculate the K2 correction, the software determines the average reverberation time value in the bands between 100 Hz and 3150 Hz.

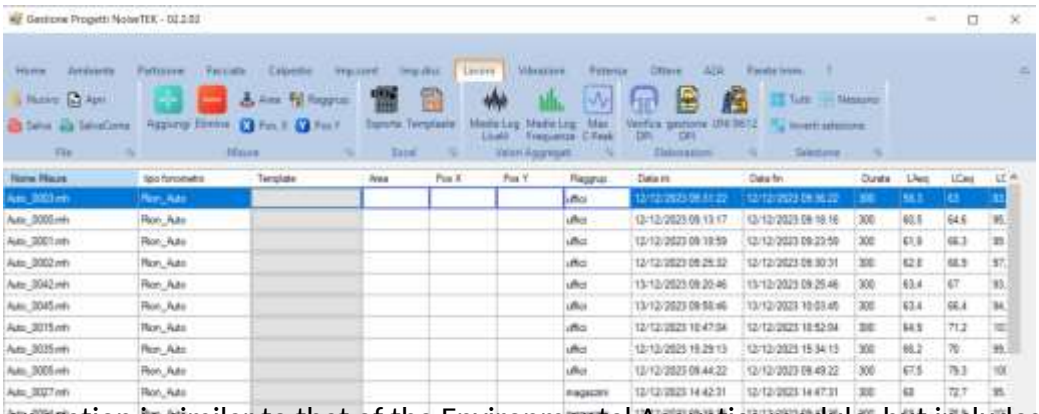
The resulting value is compared with the reference reverberation time T0, determined based on the room volume. The user enters the volume among the data required for the evaluation, allowing the software to automatically calculate T0 and, consequently, K2. If the data required for the calculation is not available, K2 is assumed to be 0 dB.

The UNI standard requires six measurements for the assessment. For each of these, it is necessary to identify the LASmax due to the system; it is therefore important to verify the measurements individually and, if necessary, use masks to eliminate extraneous events that could result in a maximum value that is not representative of the system's operation.

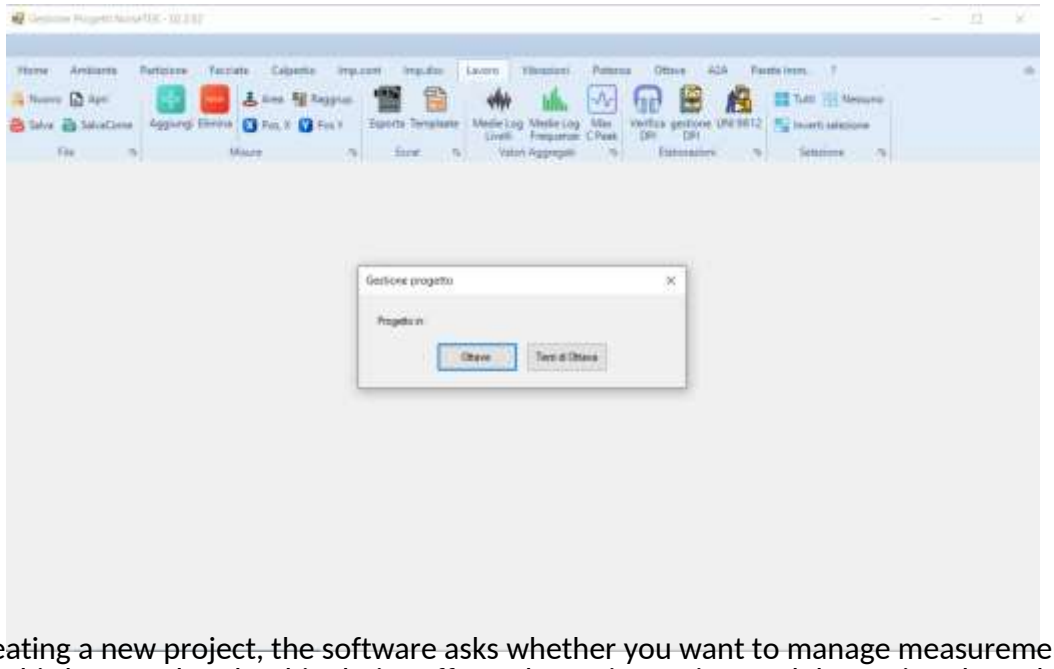
Once the LASmax values relating to the six measurements have been identified, the software proceeds to process the result taking into account, if available, the K2 correction.

6.10 Noise in Workplaces

The Work Environments module is dedicated to the management and processing of noise measurements taken in the workplace, according to the technical guidelines for assessing noise exposure.



The basic operation is similar to that of the Environmental Acoustics module, but includes specific functions aimed at analysis by area or grouping, the evaluation of PPE and the determination of personal exposure of workers according to the UNI 9612 standard.

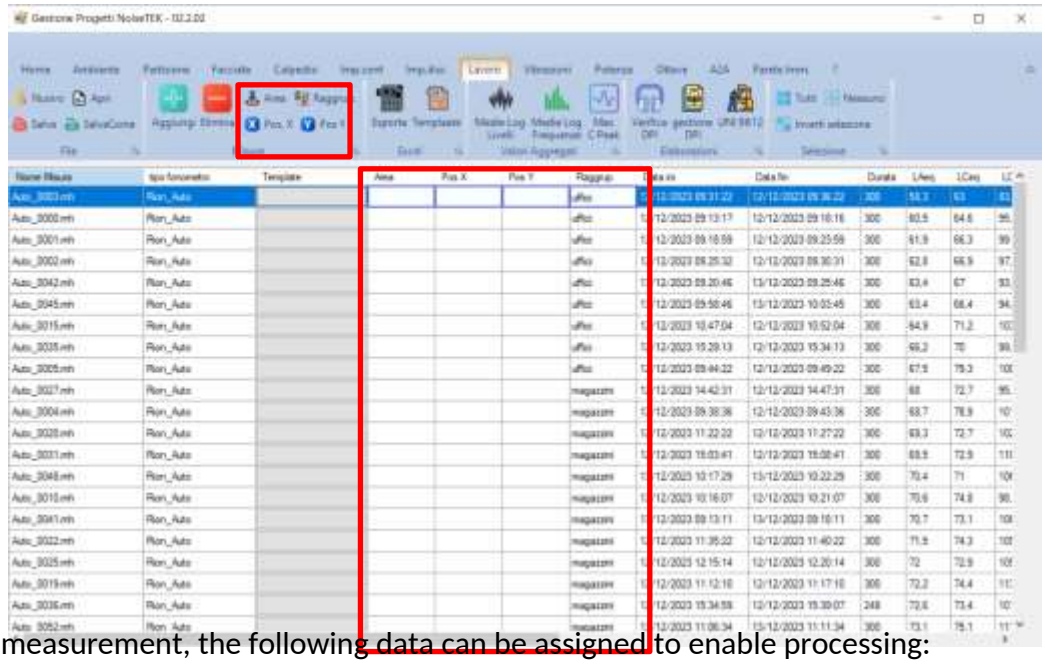


When creating a new project, the software asks whether you want to manage measurements in octave or third-octave bands. This choice affects the entire project and determines how the frequency bands are processed and displayed.

- If you select third octaves, the data in the files will be used directly (if available).
- If you select octaves, but the measures contain data in third octaves, the software will calculate automatically the values in the octave band, aggregating the corresponding thirds.

This operation is handled automatically by the program and guarantees the internal consistency of the data.

Measurements are added using the “Add Measurement” button, selecting the files after choosing the type of sound level meter used.



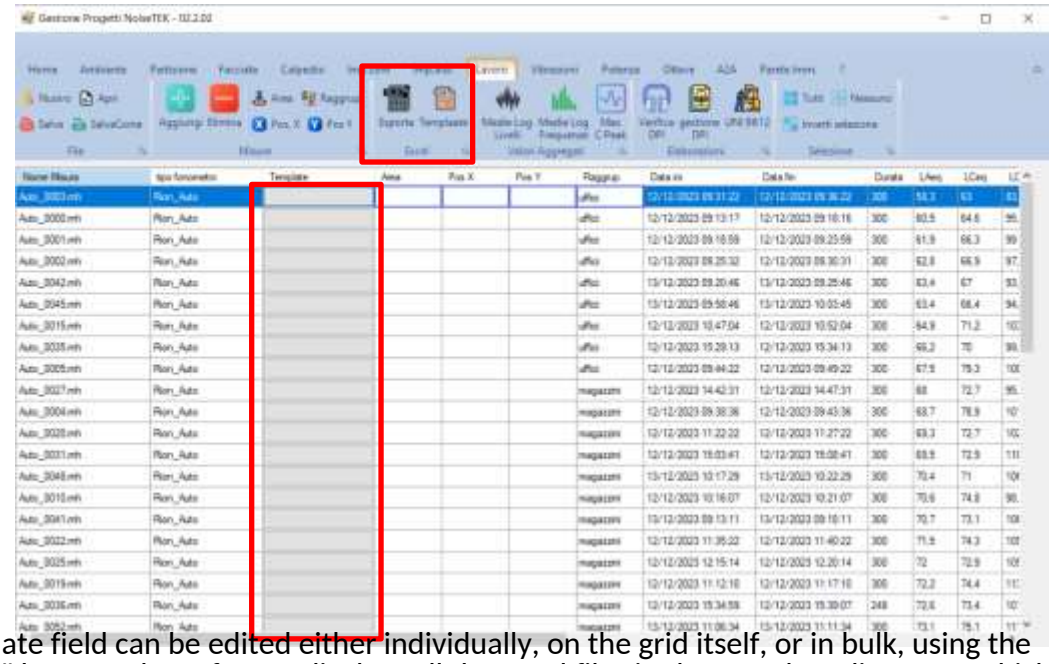
For each measurement, the following data can be assigned to enable processing:

- Area of relevance (editable in grid or via the "Area" button)
- Grouping (editable individually or massively via the "Grouping" button)
- X and Y coordinates, usable for generating isolevel maps (editable individually or massively via the "X" and "Y" buttons).

All fields can be filled in directly on the line or edited in bulk on multiple selected lines.

The project grid presents, for each measurement, additional data managed automatically:

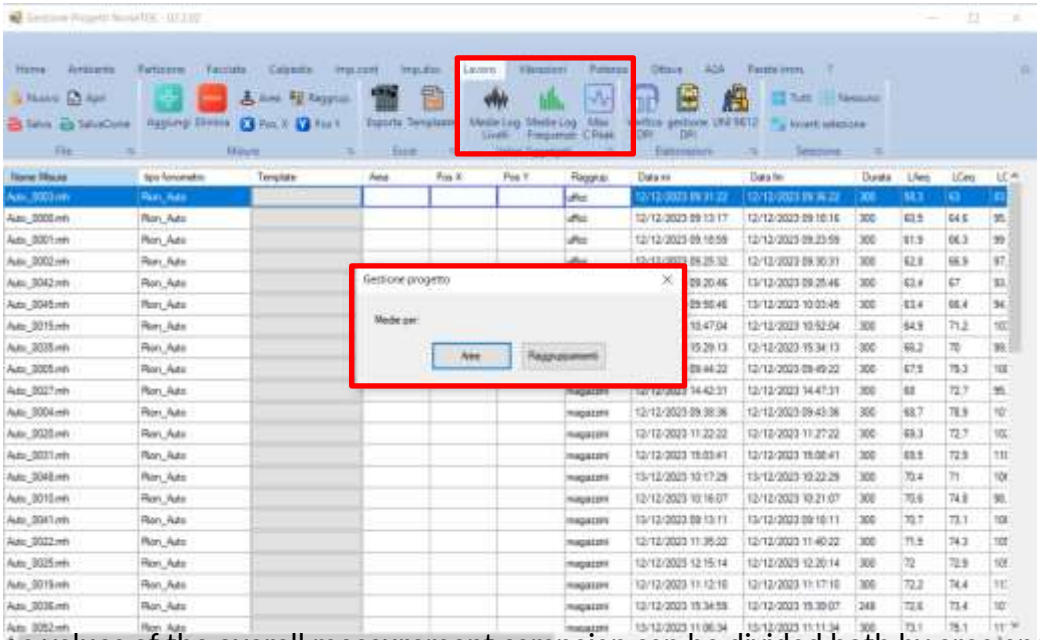
- Measurement name
- Sound level meter type
- Assigned template (editable)
- Start/end date and time
- Duration
- Average LAeq (if available)
- Average LCeq (if available)
- Maximum CPeak (if available)
- Average values for third-octave bands or for octaves according to the initial choices



The Template field can be edited either individually, on the grid itself, or in bulk, using the "Template" button. The software displays all the Excel files in the template directory, which is also accessible via a desktop shortcut created during installation. The user must select one to associate.

Using the "Export Excel" button, only the selected rows with an assigned template are exported. Unselected measurements or those without a template are ignored.

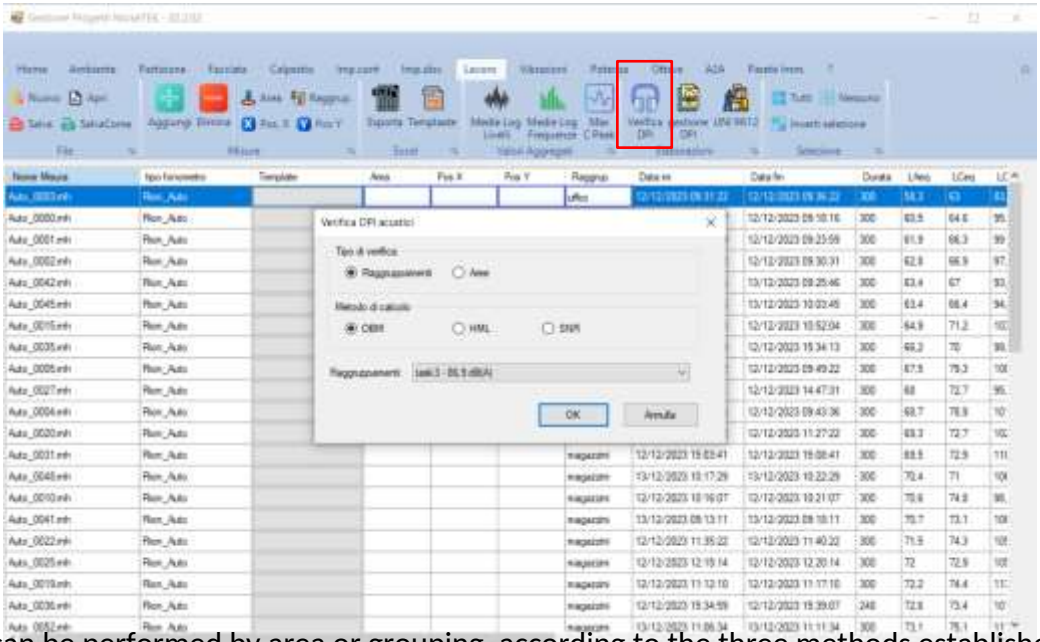
If there is a large number of measurements, processing may take some time: we recommend waiting for the completion message before proceeding with other operations.



The average values of the overall measurement campaign can be divided both by area and by grouping according to the analysis needs. In both cases, the “Average log levels” button calculates the average levels, the total measurement time and the number of measurements. The “Average log frequencies” button calculates the averages of the values of the various octave or third-octave bands. The “Max CPeak” button calculates the maximum peak value.

6.10.1 Verification of Personal Protective Equipment (PPE)

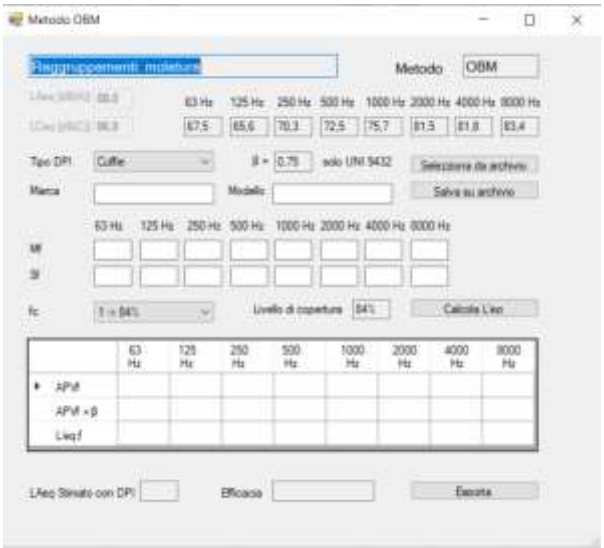
Management by areas or groupings allows you to verify the effectiveness of personal protective equipment (PPE).



The test can be performed by area or grouping, according to the three methods established by UNI standards: OBM, HML, and SNR. The defined areas or groupings are presented in order of noise level and accompanied by the corresponding LAeq value, thus facilitating the operator's selection.

Once the method and the area or grouping for which the check is to be carried out have been selected, a subsequent screen is displayed for defining the attenuation values provided by the PPE:

OBM Method:



The mask reports the data obtained from the measurements, in particular the levels in the octave bands between 63 Hz and 8000 Hz, regardless of whether the project was developed in octave bands or in third octaves.

Where available, LAeq and LCeq values are also displayed, but are provided for information purposes only and not used in the calculations.

The data relating to the requested device are therefore required, in particular the following are necessary:

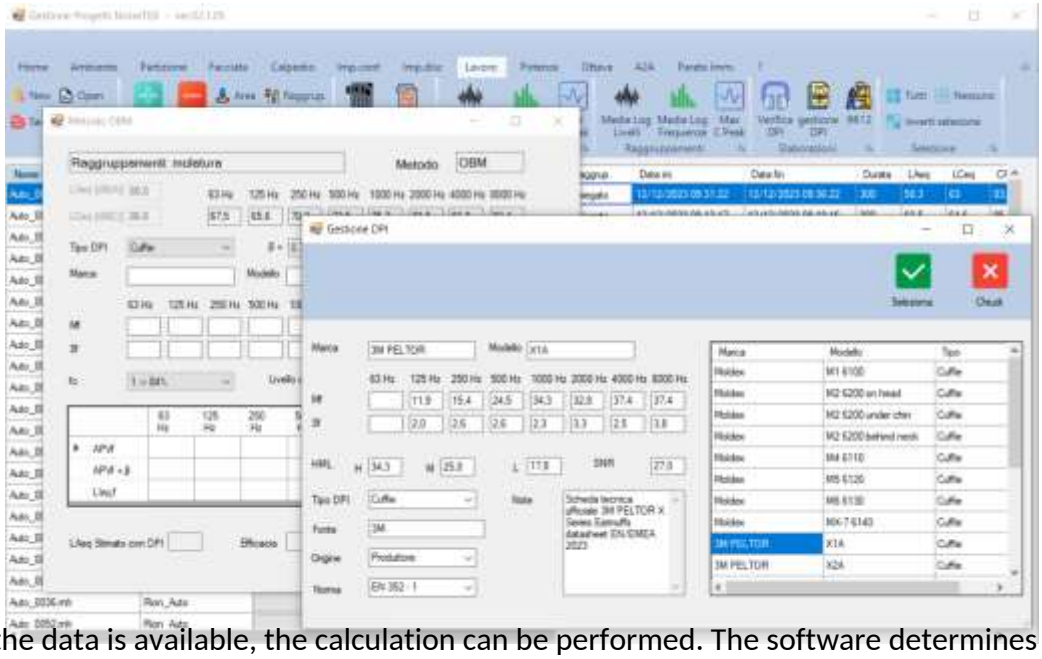
- type of PPE, necessary to define the value β according to the UNI 9432 standard;
- average attenuation values (Mf) at the various frequency bands;
- standard deviation values (Sf) relating to the average values.

You can enter the data directly into the table or select the hearing protector from the archive using the “Select from archive” button.

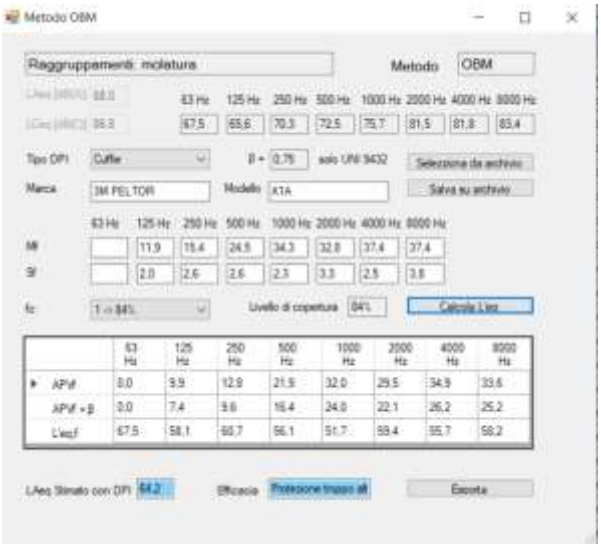
By pressing the “Select from archive” button, the list of PPE present in the archive and compatible with the selected calculation method is displayed.

By clicking on a DPI in the right grid, the related data is automatically reported in the appropriate fields of the form.

By pressing the “Select” button, the selected DPI is transferred to the calculation screen and made available for processing.



Once all the data is available, the calculation can be performed. The software determines the APV, APV × β, and LAeq values at various frequencies; it then applies A-weighting and calculates the LAeq value estimated with the PPE worn.



Finally, a judgment is expressed according to the five classes provided for by the legislation:

- Insufficient protection (red);
- Acceptable protection (yellow);
- Good protection (green);
- Acceptable protection (yellow);
- Too high protection (blue).

If the PPE data has been provided by entering it directly into the form, it is possible to copy it to the basic archive for future use by clicking the "Save to archive" button.

It is possible to export the data calculated using templates to Excel format.

HML Method:

The mask reports the data obtained from the measurements, in particular the LAeq and LCeq values, which are essential for applying the method.



In the absence of such values, the HML method cannot be used.

Where available, the levels in the different frequency bands are also displayed for information purposes only.

To carry out the check it is therefore necessary to enter the data relating to the personal protective equipment, in particular:

- the type of PPE, necessary to determine the β value according to the UNI 9432 standard;
- the attenuation values H, M and L.

In this case, you can also select the PPE from the archive using the "Select from archive" button. Only devices for which the H, M, and L values are available will be displayed. Once the PPE has been selected, you can proceed to verify its effectiveness.

It is possible to export the data calculated using templates to Excel format.

SNR Method:

The mask reports the data obtained from the measurements, in particular the LCeq value, which is essential for applying the method.



In the absence of such values, the SNR method cannot be used.

Where available, the levels in the different frequency bands and the LAeq value are also displayed for information purposes only.

To carry out the check it is therefore necessary to enter the data relating to the personal protective equipment, in particular:

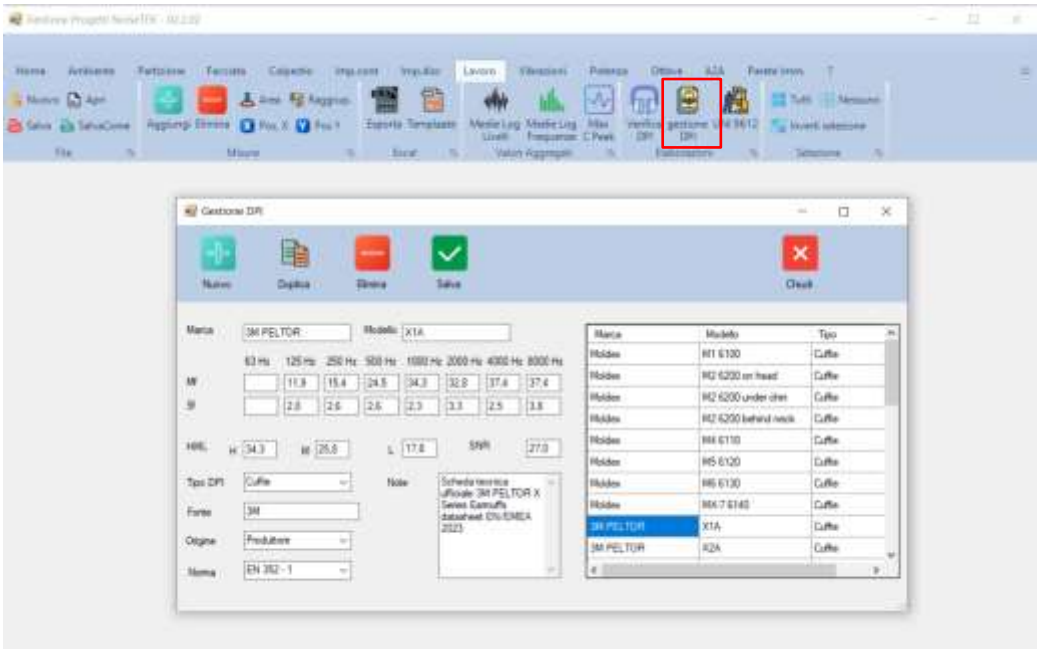
- the type of PPE, necessary to determine the β value according to the UNI 9432 standard;
- the SNR attenuation values.

Here too, you can select the PPE from the archive using the "Select from archive" button. Only devices for which SNR values are available will be displayed. Once the PPE has been selected, you can proceed to verify its effectiveness.

It is possible to export the data calculated using templates to Excel format.

6.10.2 Archive of Personal Protective Equipment (PPE)

To facilitate verification activities, a personal protective equipment (PPE) archive has been created, which can be freely modified and expanded by the operator. In addition to saving the data manually entered in the three verification procedures described above, the archive allows for the insertion of new PPE, modification of existing ones, duplication of a record to create a new one, and deletion of devices no longer required.



The management screen is similar to the one used for selecting DPI in the three calculation methods. On the right is the grid containing the list of archived devices, while on the left is the data for the selected DPI. The top bar contains the following commands:

- insert a new DPI;
- duplicate the displayed DPI to create an editable copy;
- delete the selected DPI (after prompting for confirmation);
- save the changes made.

For each PPE, the following data is requested or stored relating to the brand and model, type of PPE (ear muffs, pre-formed inserts, expandable inserts, headbands).

For use with the OBM method:
- mean attenuation values Mf in the frequency bands between 63 Hz and 8000 Hz;
- standard deviation values Sf relative to the previous averages.

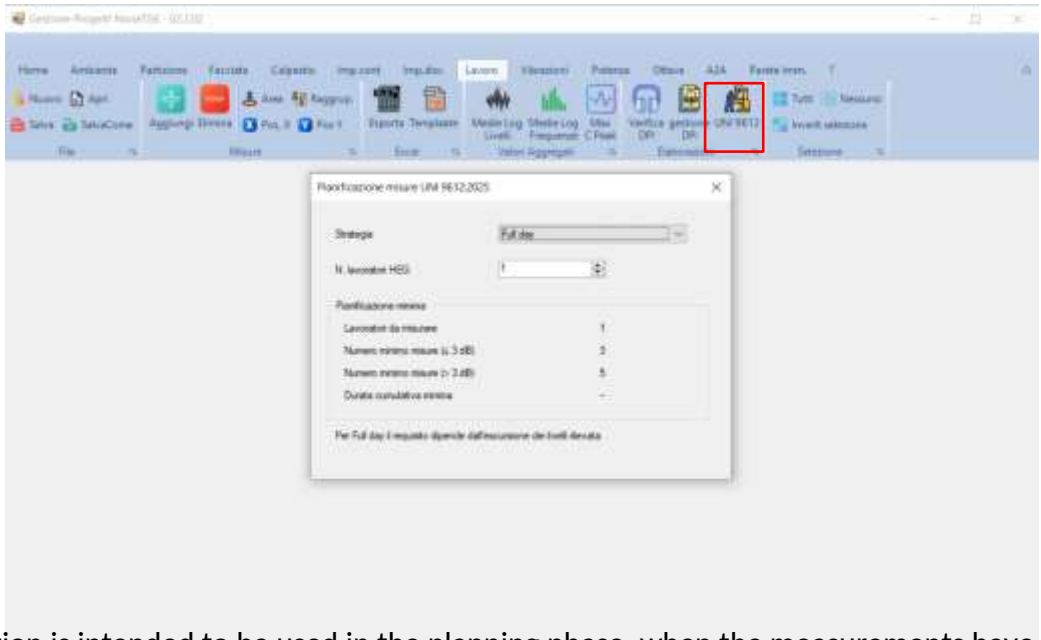
For use with the HML and SNR methods the H, M and L values and the SNR value respectively.

Additionally, some additional information is required to complete the form. This information is not used for calculations, but is useful for better managing the information.
- Data source.
- Data origin, where you specify whether the data comes from the manufacturer, has been entered.

by the user, was taken from the PAF (Physical Agents Portal) or must be verified
- Reference UNI standard used to determine the values.
- Freely fillable notes

6.10.3 Preventive planning of measures according to UNI 9612

Before carrying out the measurement campaign, the Competent Technician can use command 9612 to pre-check the minimum requirements associated with the chosen strategy and the size of the homogeneous exposure group.



The function is intended to be used in the planning phase, when the measurements have not yet been carried out, in order to know in advance the minimum requirements that the measurement campaign will have to meet: minimum number of measurements and minimum overall duration.

In the UNI 9612:2025 measurement planning window the following must be indicated:

Strategy: allows you to select the measurement mode expected for the group in question, choosing between Task, Job and Full day.

No. of HEG workers: indicates the size of the homogeneous exposure group for which the measurement campaign is being prepared.

Based on the data entered, NoiseTEK displays the minimum expected schedule, reporting:

Workers to be measured: minimum number of workers in the group on which acquisitions must be made;

Minimum number of measurements: minimum overall number of measurements required;

Minimum cumulative duration: minimum overall duration that must be achieved by acquisitions, when provided for by the selected strategy.

The function therefore allows the Competent Technician to prepare the measurement plan before the operational inspection, avoiding arriving at the end of the campaign with an insufficient number of acquisitions or with an inadequate overall duration.

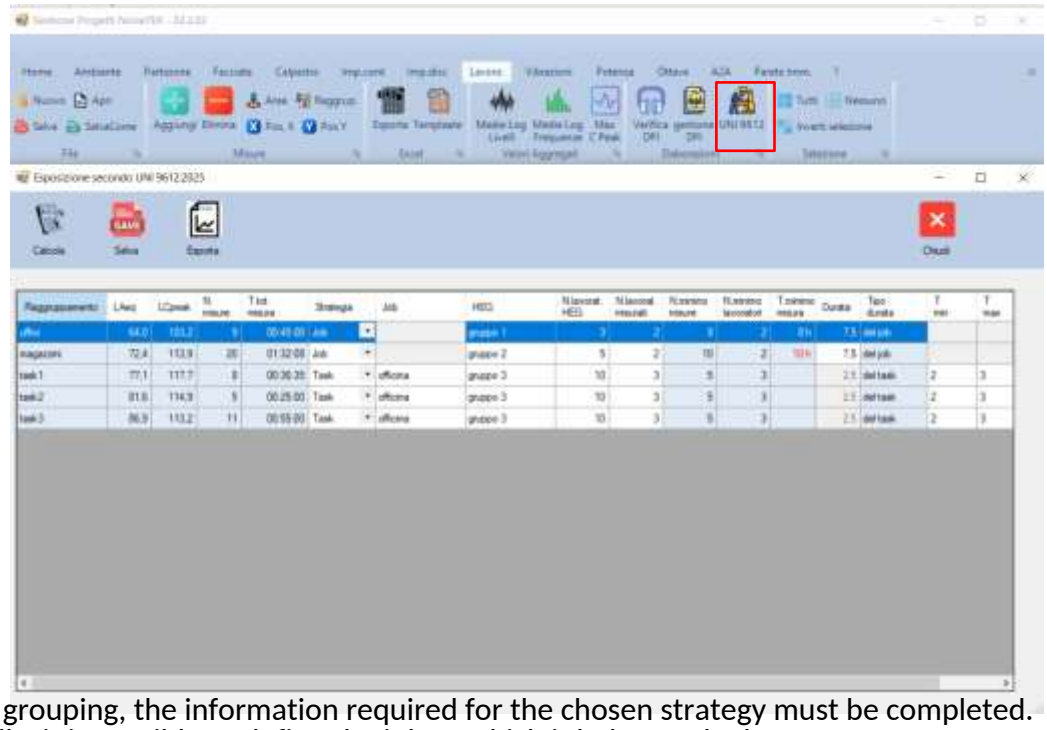
6.10.4 Personal exposure according to the UNI 9612 standard

The module allows you to use grouped measurements to determine personal noise exposure according to the UNI 9612 standard.

Exposure calculation does not start directly from individual measurements, but from the definition of the measurement strategy adopted for each grouping. Three strategies are envisaged:

- Task – task-based measurement;
- Job – work-based measurement;
- Full day – measurement of the entire day.

The function is called by button 9612. When opened, the software summarises the groupings present in the project and the data obtained from the available measurements.



For each grouping, the information required for the chosen strategy must be completed. Specifically, it is possible to define the job to which it belongs, the homogeneous exposure group (HEG), and the number of workers belonging to the HEG.

Depending on the selected strategy and the size of the HEG, the software determines the measurement campaign requirements, indicating the minimum number of workers to be measured, the minimum number of measurements and, when applicable, the minimum cumulative duration of the acquisitions.

The table therefore allows you to immediately verify whether the available measures are sufficient with respect to the adopted strategy, highlighting any conditions that require further acquisitions.

The data in the table are:

Grouping: Identifies the group of measures from which processing starts.

LAeq, LCeq and LCpeak levels: report the overall values available for the measurements belonging to the grouping.

N. measures and T. measures: Indicate respectively the number of available acquisitions and their overall duration.

Strategy: Allows you to choose between Task, Job, and Full Day. Your choice determines which information and requirements need to be verified.

Job: Allows you to associate the grouping with the job to which it belongs. It is used only in the Task strategy, in which multiple tasks combine to reconstruct the exposure for the same job.

HEG and Number of HEG Workers: These allow you to define the homogeneous exposure group and its relative size. In the Task strategy, tasks are combined only when they belong to the same Job and the same HEG.

Minimum number of measurements / Minimum number of workers / Minimum number of measurements: These are determined by the software based on the strategy adopted and the information entered and allow the adequacy of the measurement plan to be checked.

Duration: Indicates the duration of the activity to be used in calculating exposure. Depending on the selected strategy, this corresponds to the duration of the Task, Job, or workday.

In the Task strategy it cannot be inserted directly, but it is calculated automatically as the average between Tmin and Tmax: $\frac{T_{max}+T_{min}}{2}$.

2. The Tmin and Tmax fields are not available in the Job and Full day strategies.

Duration type: This is automatically defined based on the selected strategy and specifies which activity the entered duration refers to.

Instrument uncertainty: Select 0.7 dB for class 1 instruments or 1.5 dB for class 2 instruments. The default value is 0.7 dB.

If the number of measured workers, the number of available measurements, or the cumulative duration of acquisitions do not meet the requirements for the selected strategy, the relevant fields are highlighted in red.

The highlighting constitutes a warning for the operator and does not prevent the calculation from being performed: NoiseTEK still uses the available data, leaving the assessment of their adequacy and representativeness to the Competent Technician.

A measurement campaign that does not meet the required requirements may be less representative of actual exposure and make the exposure estimate and related uncertainty less reliable. Assessment of the adequacy of the data remains the responsibility of the Competent Technician.

Measurement strategies

Task: The task-based strategy is used when the work can be broken down into distinct and separately characterizable activities. Each grouping represents a Task and must be associated with the Job to which it belongs.

For each Task, the minimum duration Tmin and the maximum duration Tmax must be indicated, which will be used to calculate the average duration to be used in determining the exposure and the uncertainty contribution associated with the time variable.

Tasks with the same Job and HEG are combined, taking into account their respective levels and durations, to determine the overall exposure related to the job.

Job: The job-based strategy is used when exposure is characterized using measures representative of the job as a whole, without breaking it down into individual tasks. The software verifies the number and overall duration of measures against the expected requirements.

Full day: The full-day strategy is used when the acquisitions represent the entire working day. In this case, too, the software compares the available measurements with the strategy's requirements.

Available commands

At the top of the window are four controls:

Calculate: Calculates exposure based on the measurements and information entered. Before proceeding, the software checks for the presence of the required data and uses the procedure specified for the selected strategy.

Save: Saves the settings defined in the table, so that the assessment configuration remains associated with the project and can be retrieved or modified later.

Export: Exports the evaluation data and results to Excel, making them available for subsequent preparation of technical documentation.

Close: Closes the window and returns to project management without saving any changes.

Exposure calculation

By pressing the “Calculate” button, it first checks whether all the necessary information is present and then calculates the exposure.

Before displaying the results, the measurement campaign is also checked to ensure it complies with the sampling requirements set by UNI ISO 9612 for the selected strategy. The controls applied depend on the strategy adopted.

For the Task strategy, for each task the following are checked:

- the minimum number of measures, equal to at least five measures for each Task when the acquisitions are carried out on multiple workers or at least three measurements when the Task is carried out and sampled on a single worker;
- the minimum recommended number of workers on which to distribute the measurements, determined in function of the number of HEG
- the interval between the maximum and minimum value of the levels measured for the Task, which does not must be greater than 5 dB when the measurements are distributed across multiple workers or 3 dB when the Task is sampled on a single worker.

For the Job strategy, the following are checked:

- the minimum number of workers to be sampled, determined on the basis of the number of the HEG:
- the minimum cumulative duration of the measurements;
- the duration of the individual measurements, which must be between 15 minutes and 1 hour;
- the uniformity of the duration of the samples, which must all have the same duration;
- the contribution to the uncertainty c1u1 associated with the sampling of the sound levels, which must not be greater than 3.5 dB

For the Full day strategy: the following are checked:

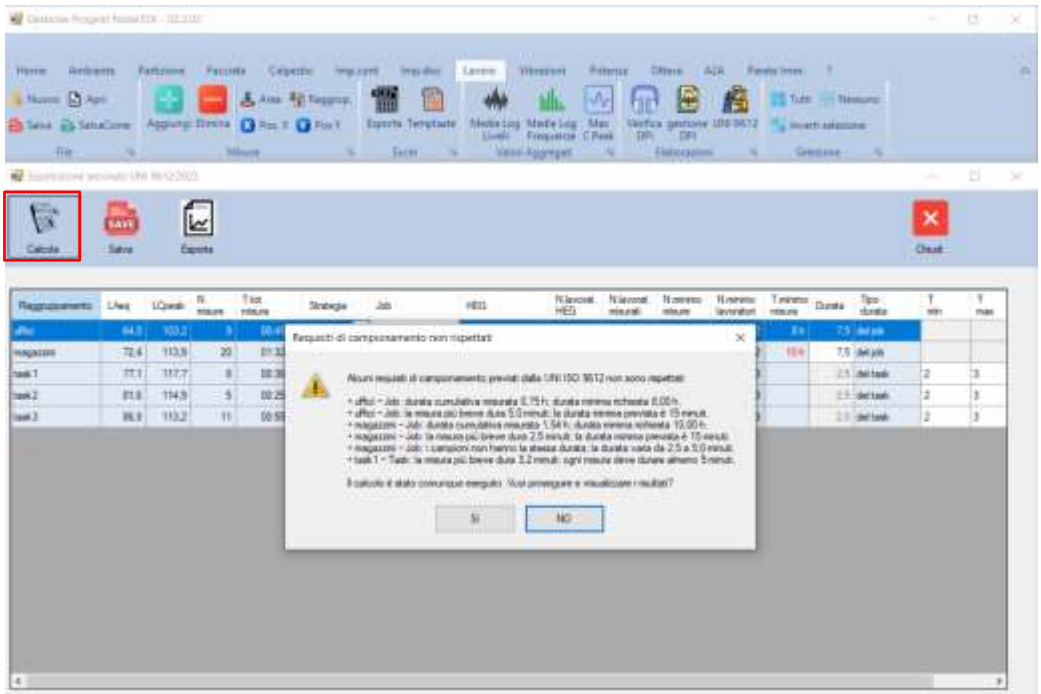
- the minimum number of workers to be sampled;
- the minimum number of measurements;
- the interval between the maximum and minimum value of the measured levels which must not be greater than 3 dB

- the contribution to the uncertainty c1u1 associated with the sampling of sound levels, which must not be greater than 3.5 dB

If one or more requirements are not met, the “Sampling requirements not met” window appears.

For each detected condition, the window indicates:

- the group involved;
- the strategy applied;
- the requirement not met;
- the value obtained from the available measurements;
- the limit value or condition required by the standard.

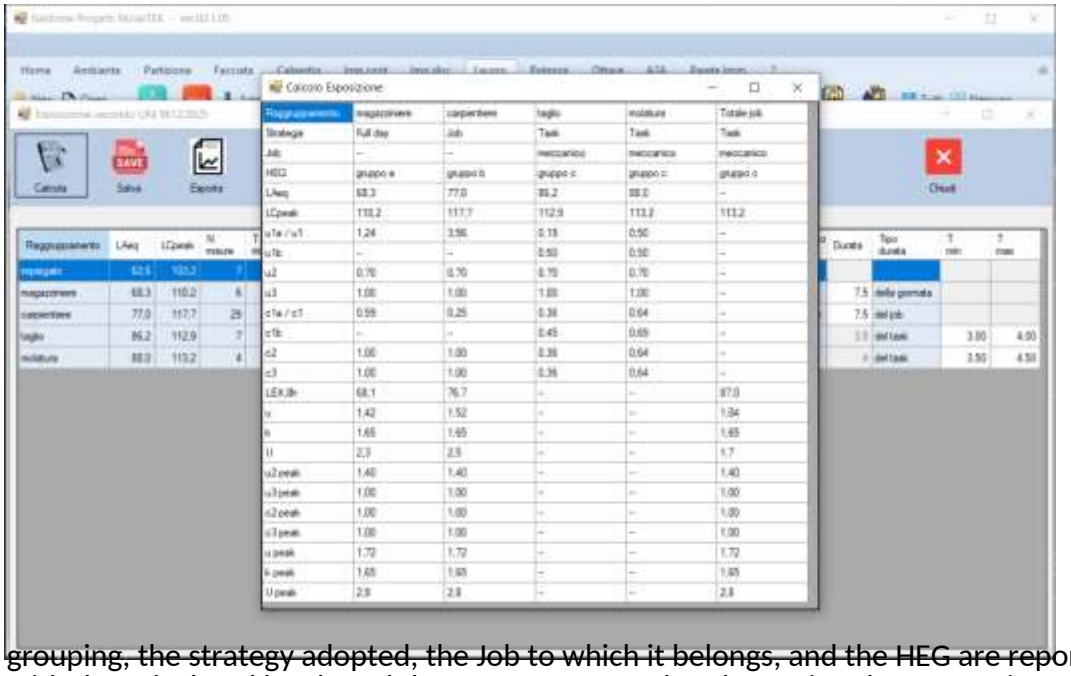


The report states that the available measurements do not fully meet the sampling requirements for the adopted strategy. The calculation was nevertheless performed, and it is up to the Competent Technician to determine whether the results obtained can be considered adequate and representative.

- choosing Yes, you continue with the display of the results;
- choosing No, you return to the initial table, where you can check the data, modify the information entered or integrate the measurement campaign.

The same check is performed before exporting to Excel. If any requirements are not met, the summary is displayed again and confirmation is requested before exporting the results.

If all the requirements are met, or if the operator decides to continue despite the warnings, the screen containing the processing results is displayed.



For each grouping, the strategy adopted, the Job to which it belongs, and the HEG are reported, together with the calculated levels and the parameters used to determine the uncertainty.

For the Job and Full day strategies, the exposure result refers directly to the group considered.

In the Task strategy, the contributions of the different tasks belonging to the same Job are combined taking into account their respective durations. The final exposure value therefore refers to the Job resulting from the combination of the Tasks that constitute it, and is reported in a summary column following the data for the individual tasks.

The results table shows:

LAeq: Equivalent level associated with the grouping and used for exposure calculation.

u1/u1a: uncertainty contribution associated with sound level sampling. It represents the variability found in the measurements used to characterize the cluster.

u1b: uncertainty contribution associated with the duration of the single Task, determined starting from the Tmin and Tmax values entered by the operator.

u2: uncertainty contribution associated with the instrumentation used for measurements. NoiseTEK currently only supports Class 1 sound level meters and therefore uses the value expected for that class (0.7 dB).

u3: uncertainty contribution associated with the measurement position equal to 1.0 dB as defined by the UNI 9612 standard

c1/c1a: sensitivity coefficient associated with the contribution u1/u1a.

c1b: sensitivity coefficient associated with the u1b contribution.

c2: sensitivity coefficient associated with the contribution u2.

c3: sensitivity coefficient associated with the contribution u3.

LEX,8h: Daily noise exposure level normalized to an 8-hour workday. In the Task strategy, it results from combining the contributions of the different tasks belonging to the same Job, taking into account their respective durations.

u: combined standard uncertainty associated with the exposure level, obtained by considering the different uncertainty contributions and the related sensitivity coefficients.

k: coverage factor used to determine the expanded uncertainty from the combined standard uncertainty.

U: expanded uncertainty associated with the exposure level, obtained by applying the coverage factor k to the combined standard uncertainty u: U = k u

LCpeak: C-weighted peak level associated with the cluster.

u2 peak: uncertainty contribution associated with the instrumentation equal to 1.4 dB as defined by the UNI 9612 standard

u3 peak: uncertainty contribution associated with the measurement position equal to 1.0 dB as defined by the UNI 9612 standard

c2 peak: sensitivity coefficient associated with the u2 peak contribution.

c3 peak: sensitivity coefficient associated with the u3 peak contribution.

u peak: combined standard uncertainty associated with the peak level, obtained by considering the different uncertainty contributions and their sensitivity coefficients.

k peak: coverage factor used to determine the expanded uncertainty from the combined standard uncertainty.

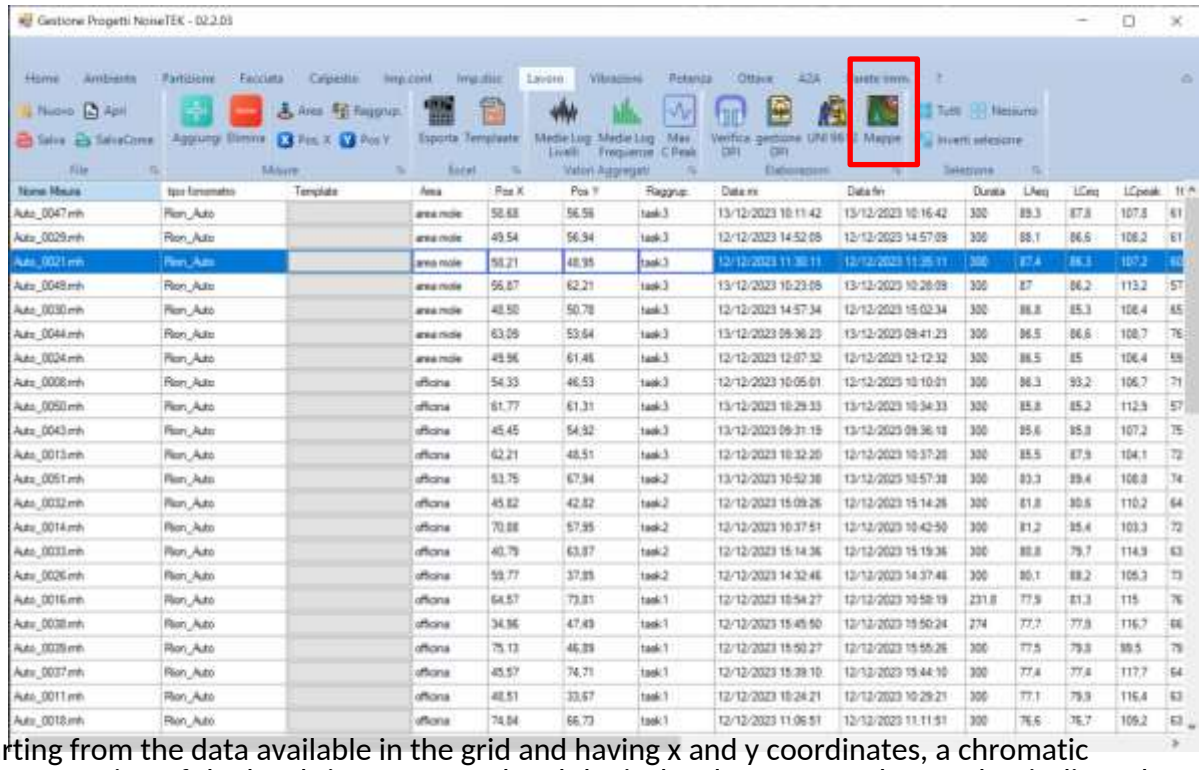
U peak: expanded uncertainty associated with the peak level, obtained by applying the coverage factor k peak to the combined standard uncertainty u: U peak = k peak u peak

Displaying the individual uncertainty contributions and their coefficients allows the operator to check not only the final exposure value, but also the elements used by the software to determine its uncertainty.

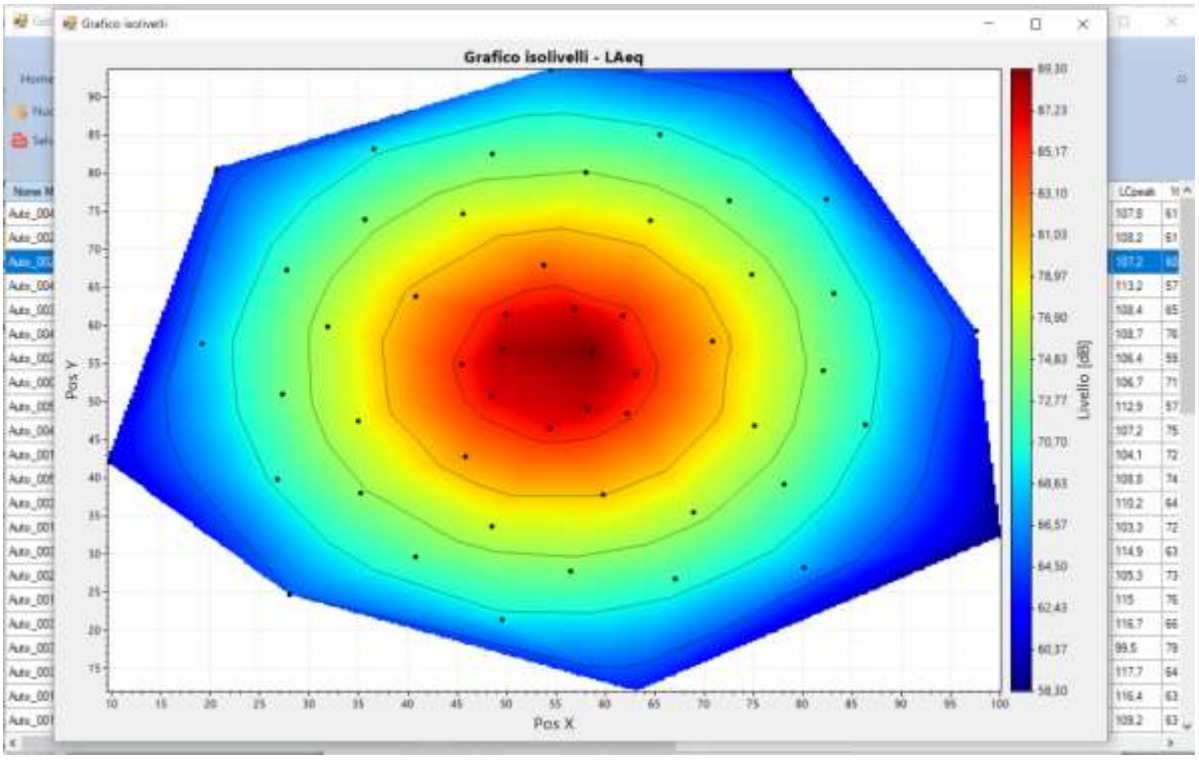
The calculation result must be interpreted by the Competent Technician as part of the overall assessment of noise exposure, taking into account the strategy adopted, the representativeness of the measures and information relating to the organisation of work.

6.10.5 Contour maps

The Level Maps function allows you to graphically represent the distribution of noise levels within a work environment, using the values detected at the different measurement points and the respective X and Y spatial coordinates.



Starting from the data available in the grid and having x and y coordinates, a chromatic representation of the levels is constructed and the isolevel curves are drawn, that is, lines that connect points characterised by the same sound level.

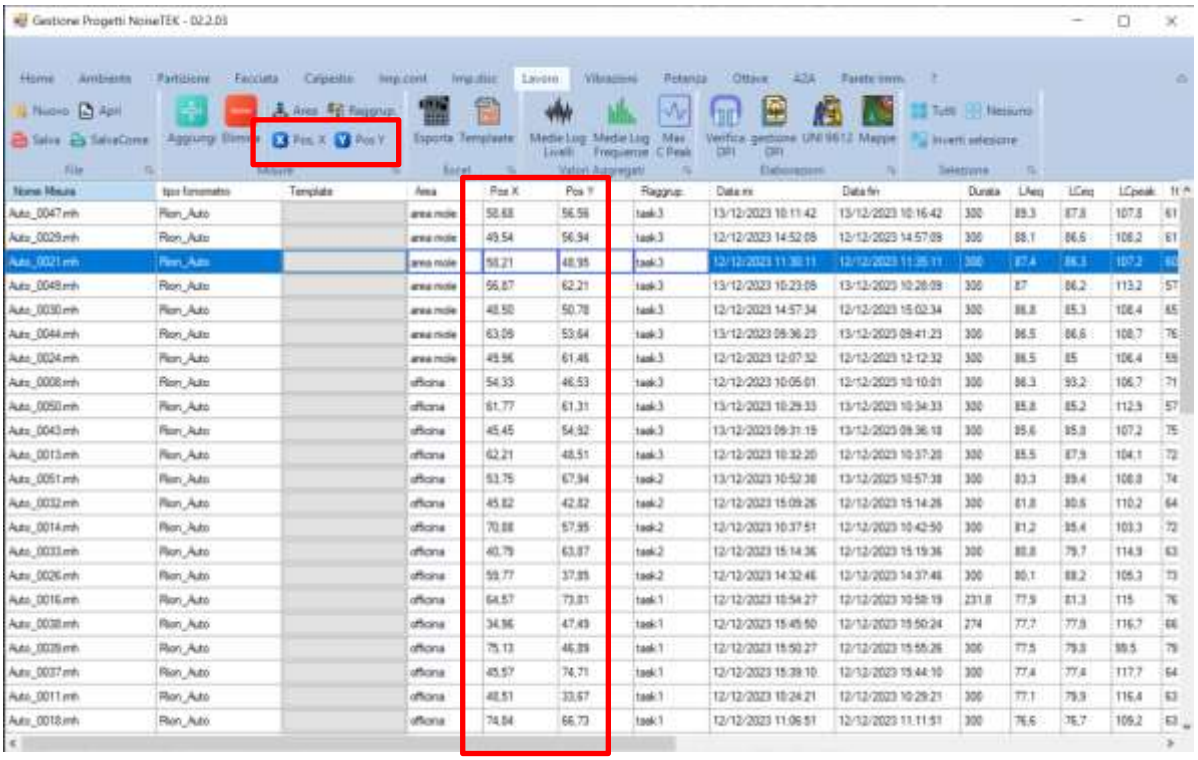


The map allows you to identify the noisiest areas, observe how the level varies as you move away from the sources, and evaluate the spatial distribution of the noise in the area examined.

The values represented between the measured points are obtained through interpolation. The map is therefore a representation of the collected data and does not replace actual measurements.

Map preparation and visualization

To generate the map, the measurement points must be associated with their respective X and Y coordinates, referred to a common reference system.



Coordinates can be entered or edited in the measurement grid, also using the commands dedicated to editing coordinates.

The map shows:

- X-axis and Y-axis: identify the spatial position of the measurement points.
- Coloring: represents the distribution of sound levels, according to the chromatic scale.

shown on the right.
- Isolevel curves: they delimit areas characterized by equivalent values of the parameter

represented.
- Measured points: can be displayed on the map to locate the positions in the

  which data were actually acquired.

The color scale allows you to immediately recognize areas with higher or lower levels.

Interactive tooltip

Moving the mouse over the 2D map displays an information window containing:

- X and Y coordinates of the point.
- Name of the displayed parameter.
- Level value, expressed in dB.
- Origin of the value, distinguished between:

    o Level at the measured point: when the cursor is near a point of

    measurement, the value associated with that position is shown. o Interpolated level: when the cursor is between the measurement points, the value is shown

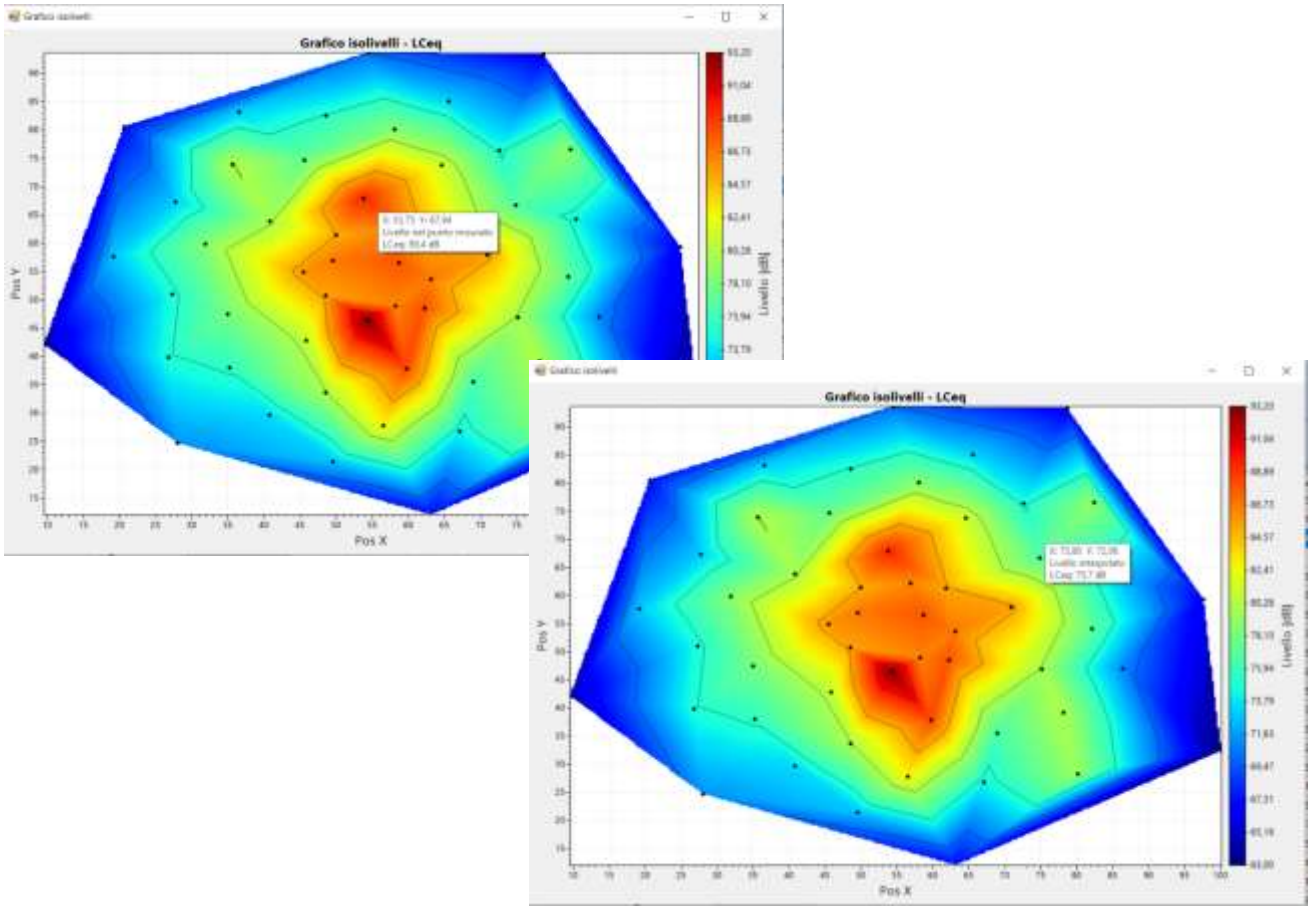
        level calculated by spatial interpolation.

Measured points are automatically recognized when the cursor is within approximately 8 pixels of the corresponding indicator, provided that the Show measured points option is active.

In the case of multiple measurements taken at the same X and Y coordinates, the level associated with the point is calculated by means of an energy average weighted on the duration of the individual measurements.

The displayed value may then represent the result of aggregating multiple measurements, rather than that of a single recording.

No interpolated values are displayed outside the area delimited by the triangulation.

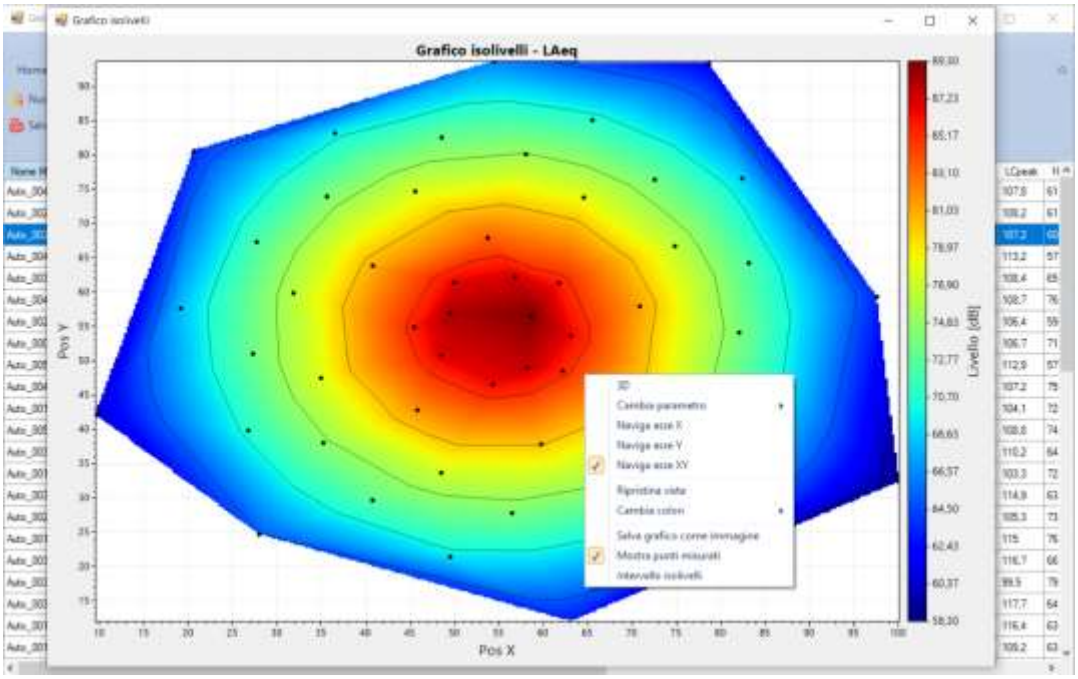


2D map navigation

The map can be zoomed and moved using the mouse, selecting the desired navigation mode from the context menu.

- Navigate X: Limits zooming and panning to the horizontal direction.
- Navigate Y: Limits zooming and panning to the vertical direction.
- Navigate XY: Allows you to operate in both directions simultaneously.

The mouse wheel allows you to change the zoom, while dragging allows you to move the view along the enabled axes. The active mode is identified by a check mark in the menu.



Context menu

Right-clicking on the map displays a menu with the following commands:

- 3D: allows you to enable the 3D view of the level distribution
- “Change parameter”: opens a submenu from which you can choose the parameter

acoustic to be represented, among those available in the measure
- Navigate X / Navigate Y / Navigate XY: select the map navigation mode.
- “Restore view”: restores the initial representation, cancelling the zoom and

movement.
- “Change colors”: allows you to choose between the predefined color combinations,

by selecting the desired one from the submenu.
- “Save graph as image”: exports the current view to an image file,

usable in technical documentation.

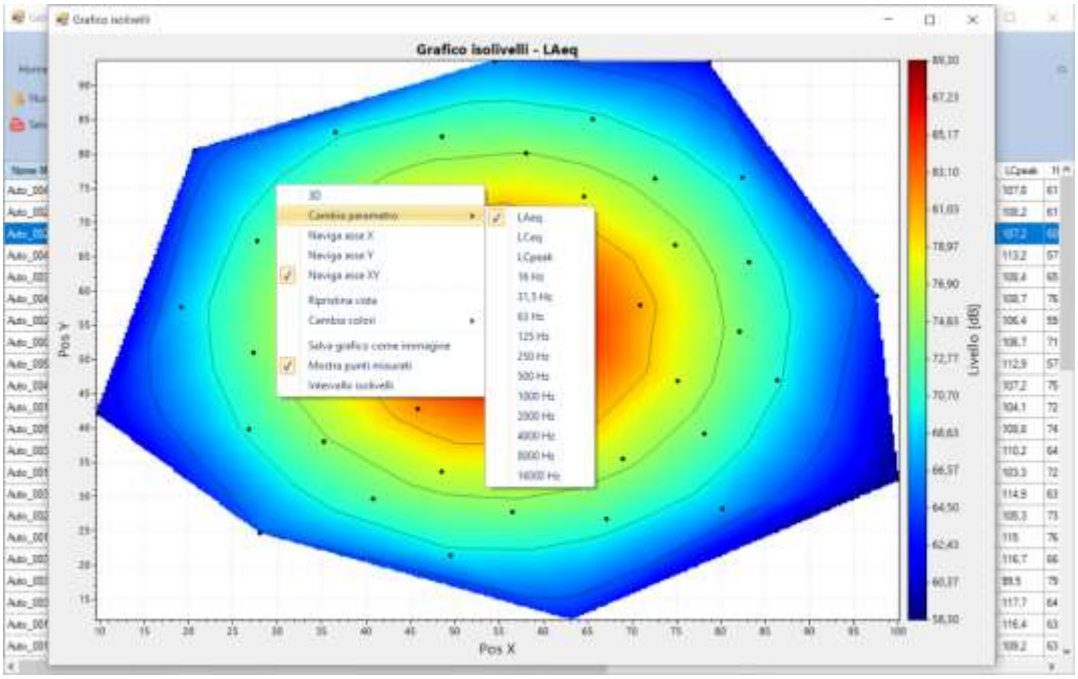
- Show measured points: enables or disables the display of points where measurements have been made.

Take the measurements. The function's status is indicated by a check mark.

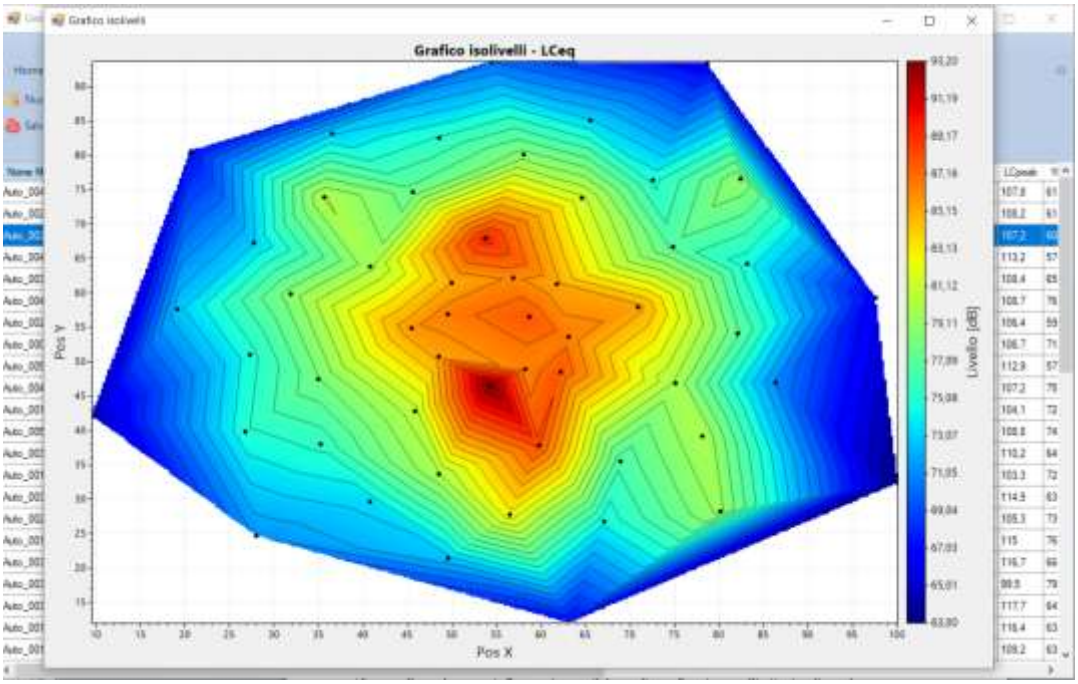
- Level range: allows you to set the level difference between two consecutive curves,

by changing the detail of the representation.

The possibility of changing parameters allows you to create, on the same spatial distribution of the points, the maps referring to the different quantities detected and reported in the grid.



The interval between the curves influences the graphic detail: smaller intervals produce a denser representation, while larger intervals highlight the main variations in the levels.

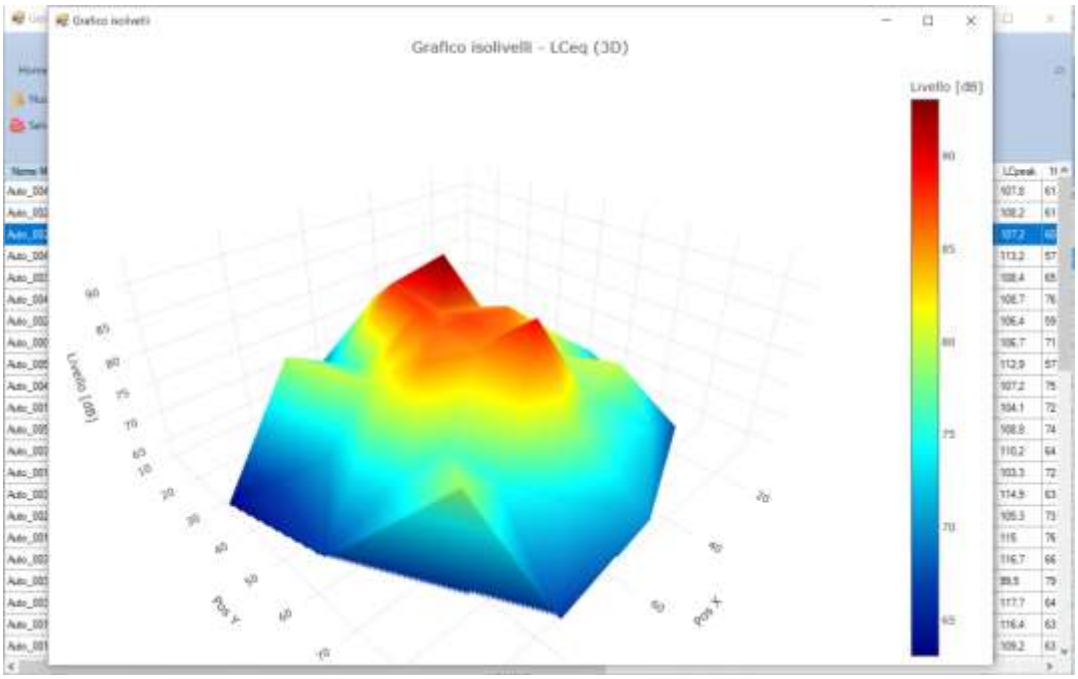


Three-dimensional visualization

The 3D representation allows you to observe the spatial distribution of the levels even through a three-dimensional surface.

The X and Y coordinates identify the positions in the environment, while the surface height represents the level of the selected parameter. The coloring allows you to recognize the areas characterized by the highest and lowest levels.

The surface is generated by interpolating the values detected at the measurement points, limited to the area delimited by the triangulation. The lateral color scale indicates the correspondence between colors and levels expressed in dB.



3D Chart Navigation

The view can be changed interactively using the mouse:

- Rotation: dragging with the left button changes the angle of the surface,

allowing you to observe it from different perspectives.
- Zoom: using the mouse wheel you can enlarge or reduce the view.
- Moving the view: dragging with the right button moves the representation

maintaining the current orientation.

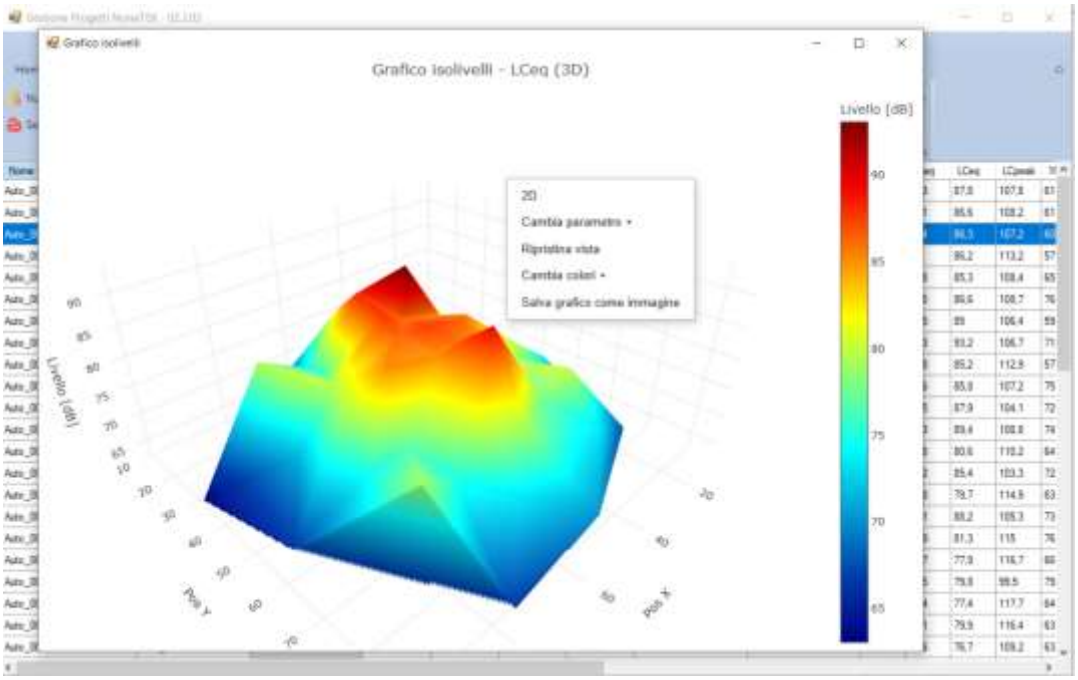
Interactive tooltip

Moving the mouse over the three-dimensional surface displays an information window containing:

- X coordinate of the point.
- Y coordinate of the point.
- Interpolated value of the selected parameter, expressed in dB.

Context menu

Right-clicking, without dragging, opens a menu with the following functions:



2D: Returns to a two-dimensional representation of the map.

• “Change parameter”: allows you to select another available parameter, maintaining the

three-dimensional representation. The active parameter is identified by a check mark. Orientation, zoom, and color palette are maintained during the change.
• “Reset view”: returns the graph to the initial orientation and display scale.
• “Change colors”: allows you to select a different color palette for the

representation of levels.
• “Save graph as image”: exports the current three-dimensional view in

PNG, maintaining the orientation and coloring set.

Switching between 2D and 3D view does not change the selected parameter

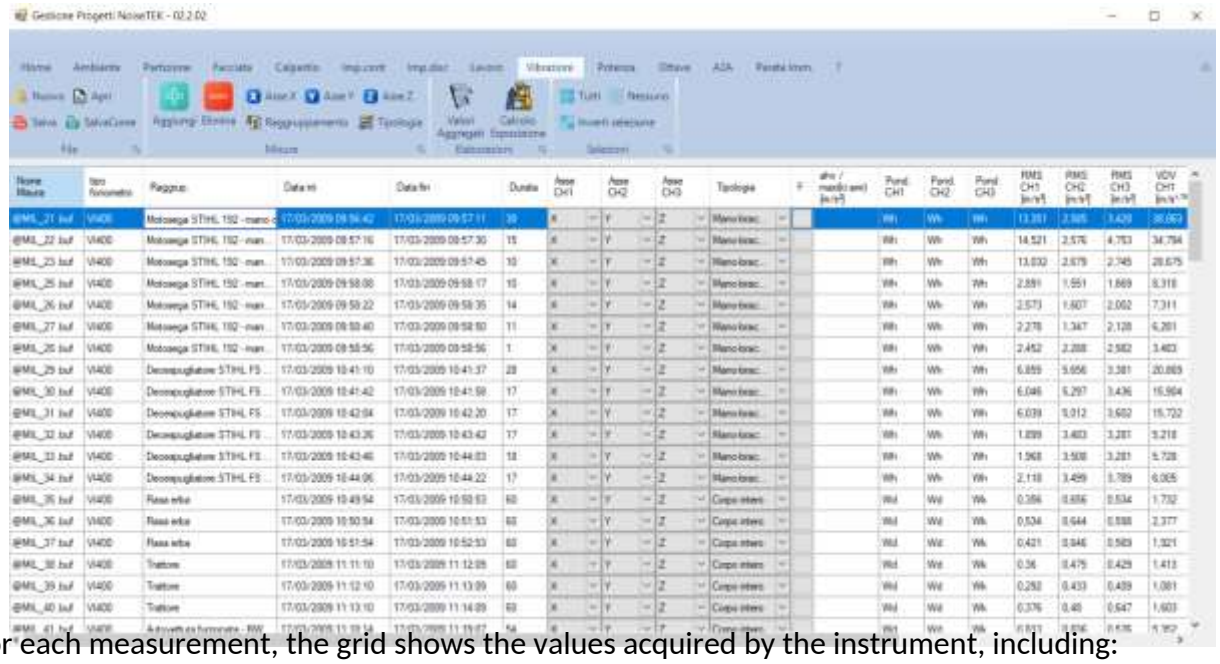
6.11 Vibrations in the workplace

The Vibrations module is dedicated to the management of measurements carried out in workplaces to assess exposure to transmitted vibrations:

- to the hand-arm system;
- to the entire body.

The module allows you to collect multiple measurements, assign channels to measurement axes, classify acquisitions, create homogeneous groupings and calculate the values needed for the subsequent determination of daily exposure.

Measurements are added using the “Add” button after selecting the type of accelerometer used.



For each measurement, the grid shows the values acquired by the instrument, including:

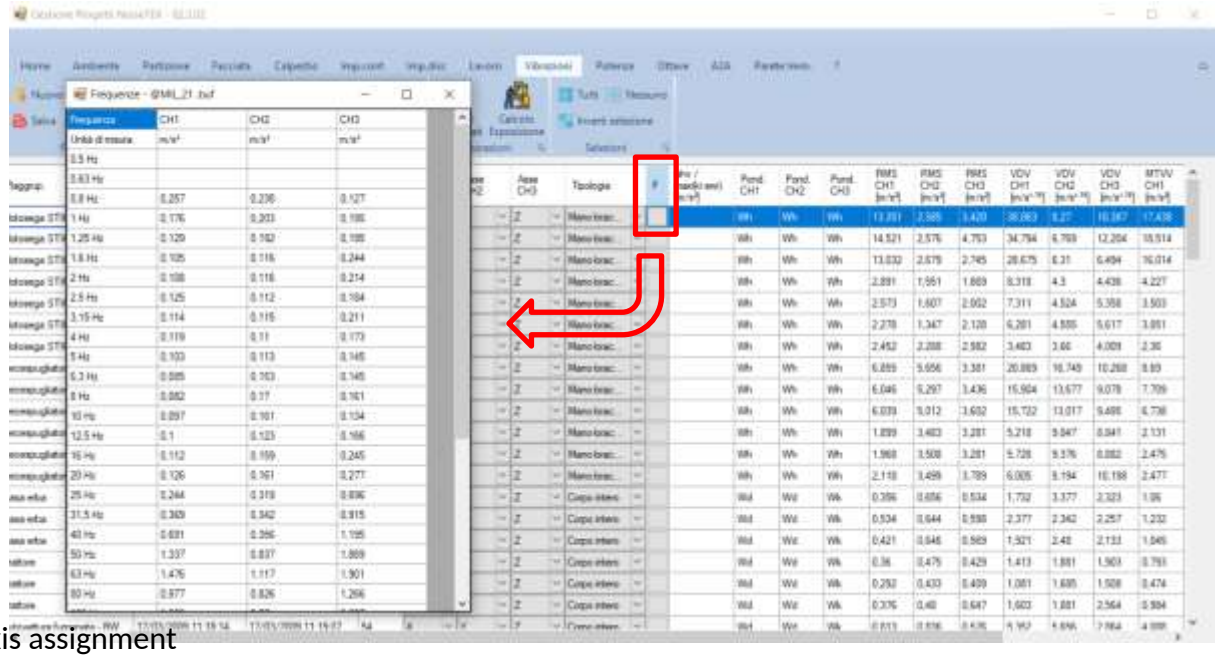
- measurement name;
- accelerometer type;
- start and end date and time;
- measurement duration;
- frequency weightings associated with the channels;
- RMS, VDV values and other available parameters.

The following identification data are required from the user:

- grouping;
- channels associated with the X, Y and Z axes;
- exposure type;

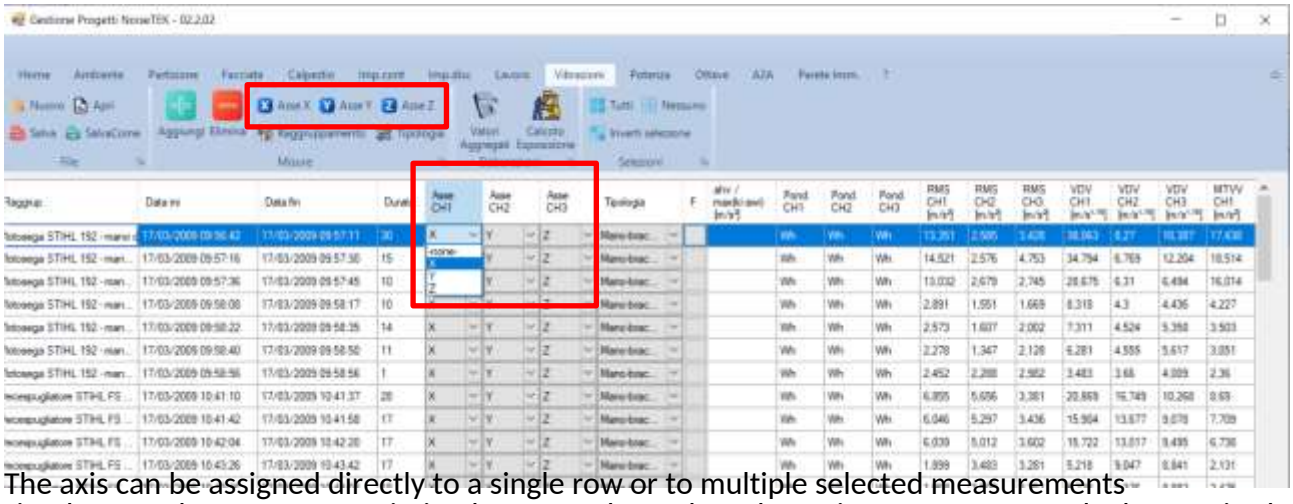
The values used in the calculations are the weighted global values provided by the tool, presented and used using the physical unit of measurement.

A special “F” button allows you to view the measurement frequency data:



Axis assignment

The X-Axis, Y-Axis and Z-Axis buttons allow you to associate the channels used during acquisition with the three Cartesian axes.



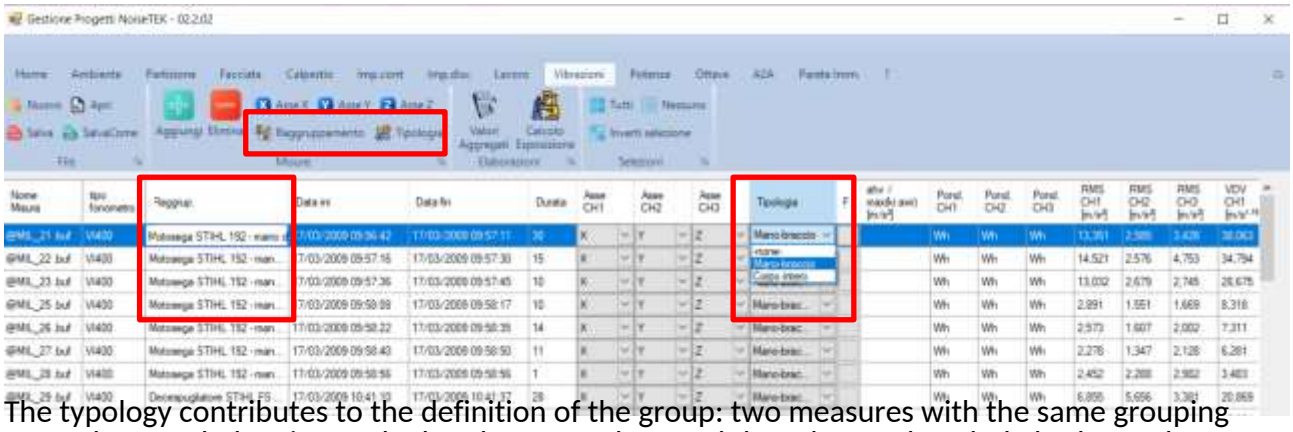
The axis can be assigned directly to a single row or to multiple selected measurements simultaneously. Correct association between channels and axes is necessary to apply the required multiplication factors and determine the resulting vibration value.

Typology and grouping

The “Type” button allows you to classify the selected measures as:

- Hand-arm;
- Whole body.

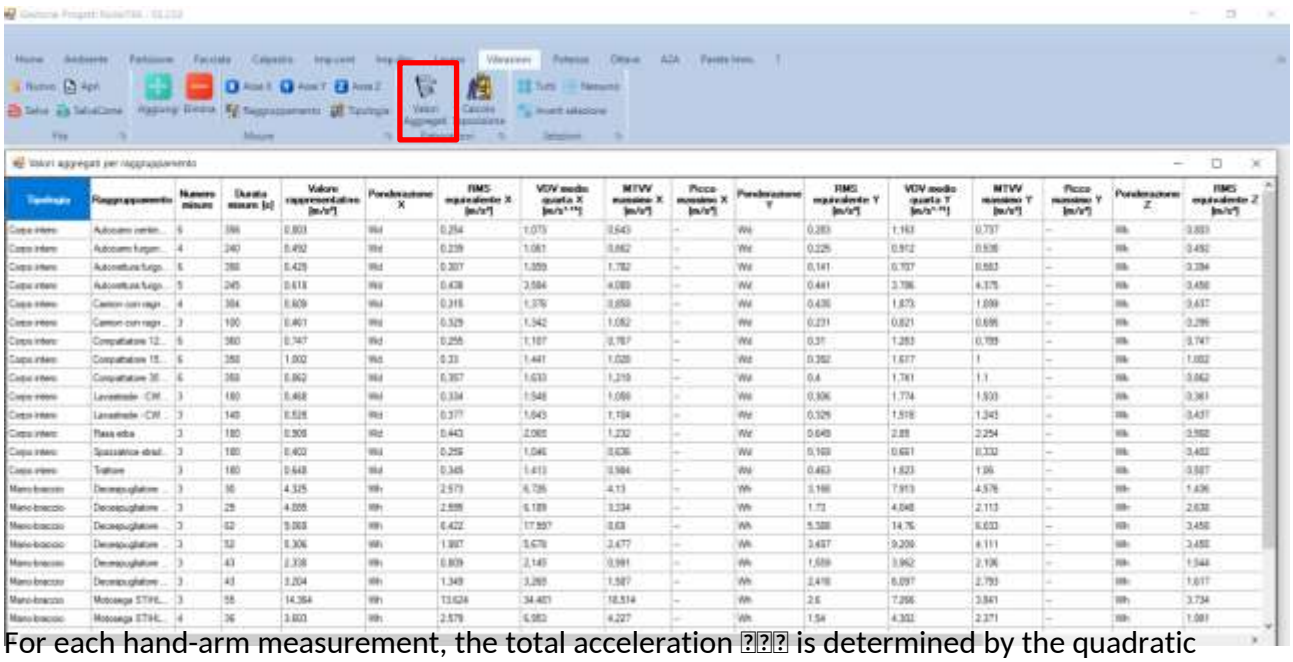
The “Grouping” button allows you to assign the same description to one or more measures that represent the same activity, machine or operating condition.



The typology contributes to the definition of the group: two measures with the same grouping name, but one belonging to the hand-arm typology and the other to the whole body typology, are processed as distinct groups.

Aggregate values

The Aggregate Values button performs preliminary processing on measures belonging to the same grouping. The results are presented in a summary window with one row for each grouping.



For each hand-arm measurement, the total acceleration ??? is determined by the quadratic combination of the three weighted axial components:

$$a_{hv} = \sqrt{{a_{hwx}}^2 + {a_{hwy}}^2 + {a_{hwz}}^2}$$

For vibrations transmitted to the whole body, the multiplication factors foreseen for the different axes are applied:

$$k_x = 1{,}4 \qquad k_y = 1{,}4 \qquad k_z = 1$$

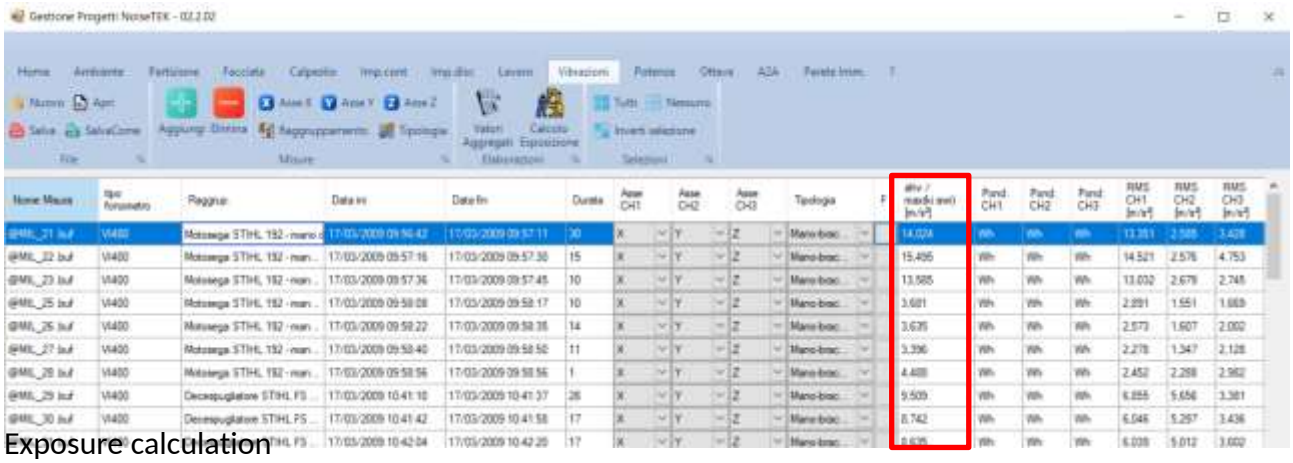
and the determining axial value is identified:

$$a_w = \max\left(k_x a_{wx}, k_y a_{wy}, k_z a_{wz}\right)$$

For each grouping, the program calculates the aggregate values of the available quantities using the procedure appropriate to their nature:

· root mean square for RMS values; · aggregation to the fourth power for VDV values; · maximum values for quantities that require the conservation of the detected maximum.

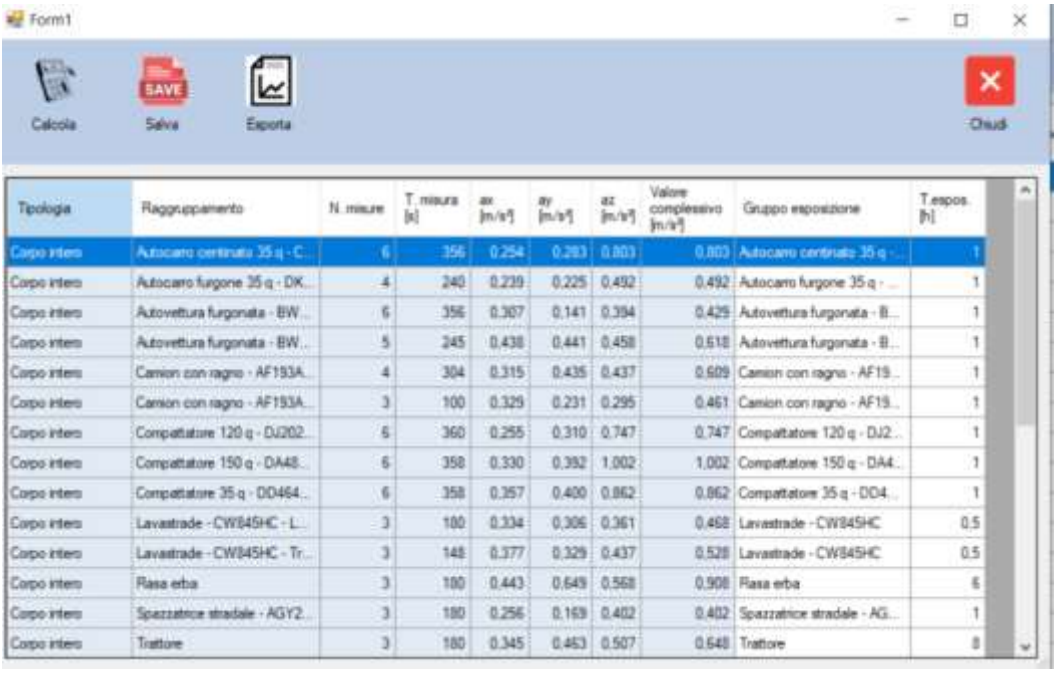
The value resulting from the combination of the axial components □□□ or max□(□□□□□) is also added to the main grid for each measurement.



Exposure calculation

The “Exposure Calculation” button opens the window dedicated to determining daily exposure.

Before accessing the function, the project must be saved. This ensures that the measurements, typologies, axes, and groupings used in the calculation are consistent with the saved project.



The initial table reports, for each grouping:

- typology;
- name of the grouping;
- number and overall duration of the measurements;
- aggregated values on the three axes;
- resulting acceleration;
- exposure group;
- exposure time.

The user must complete the information regarding the exposure group and the daily duration of the activity. Multiple activities may contribute to determining the exposure of the same group.

For the hand-arm system, the 8-hour normalized daily exposure is calculated using:

$$A(8) = \sqrt{\sum_{i=1}^{n} {a_{hv,i}}^2 \cdot \frac{T_i}{8}}$$

where □□□ □ is the total acceleration related to activity □ and □□ is the corresponding exposure duration expressed in hours.

For the whole body, the normalized contributions for the three axes are determined separately.

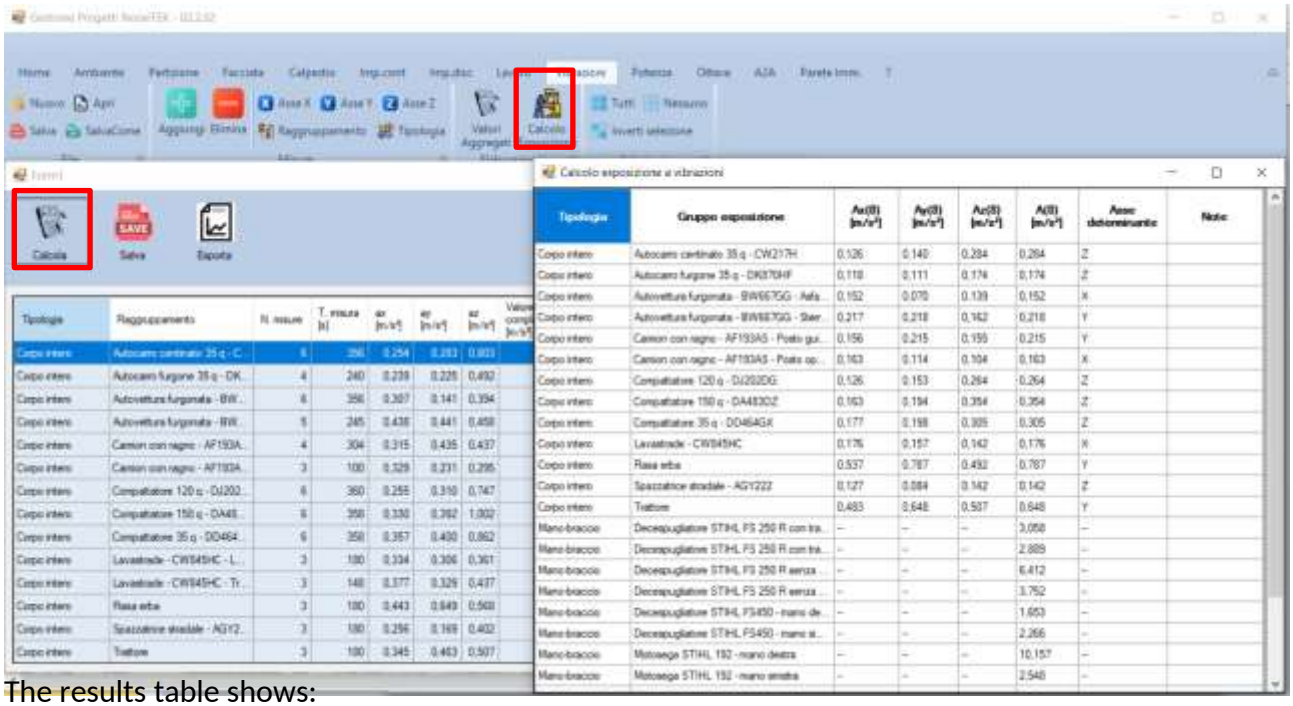
$$A_x(8) = \sqrt{\sum_{i=1}^{n} \left(k_x a_{wx,i}\right)^2 \cdot \frac{T_i}{8}}$$

$$A_y(8) = \sqrt{\sum_{i=1}^{n} \left(k_y a_{wy,i}\right)^2 \cdot \frac{T_i}{8}}$$

$$A_z(8) = \sqrt{\sum_{i=1}^{n} \left(k_z a_{wz,i}\right)^2 \cdot \frac{T_i}{8}}$$

The resulting value is the greater of □□(8), □□(8), and □□(8):

$$A(8) = \max\left(A_x(8), A_y(8), A_z(8)\right)$$



The results table shows:

- the type of exposure;
- the exposure group;
- the values □□(8), □□(8), and □□(8), when applicable;
- the value □(8);
- the determining axis for whole-body vibrations;
- any notes relating to missing or inconsistent data.

The "Notes" column is only populated when the program detects a condition that needs to be reported. Its absence does not constitute a comparison with regulatory limits.

The program returns the calculated values without comparing them with action values or limit values; the evaluation of the results remains the responsibility of the technician.

Available commands

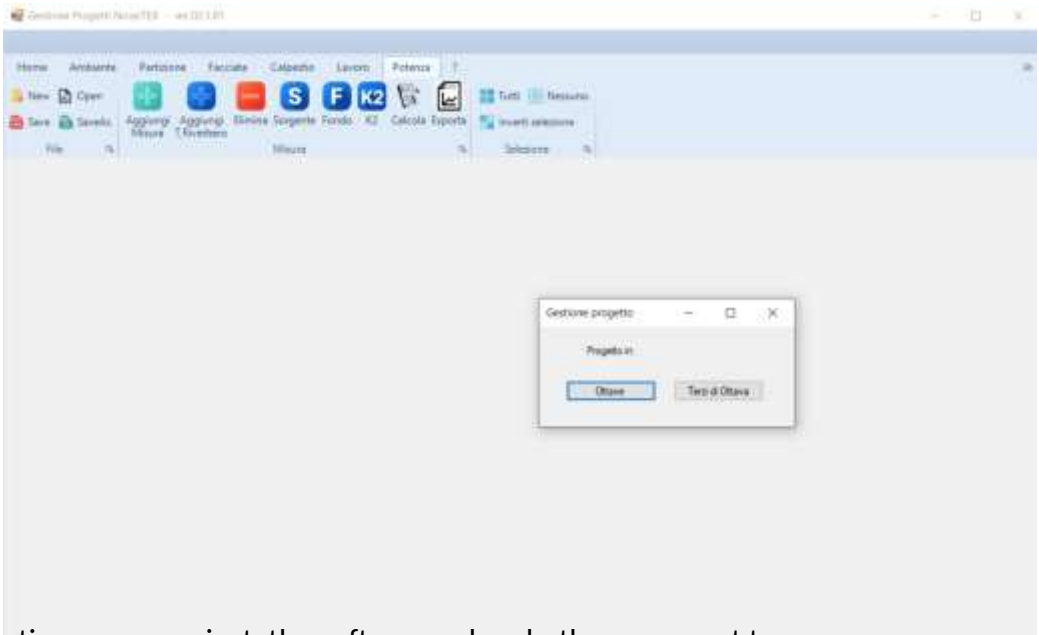
The following controls are available at the top of the window:

- Calculate: performs the exposure calculation using the values and durations present in the table.
- Save: stores the data added by the user, allowing them to be retrieved at the next opening the function.
- Export: generates an Excel file containing the results, activities, and measurements used.
- Close: closes the window and returns to project management.

6.12 Sound power

The Sound Power module allows the calculation of the sound power level of a source starting from sound pressure level measurements performed according to the UNI EN ISO 3744 and UNI EN ISO 3746 standards.

The module's interface is designed to guide the user through entering the measurements and parameters required for the calculation, graphically highlighting the configurations required by the standards and providing automatic checks on the completeness of the entered data.



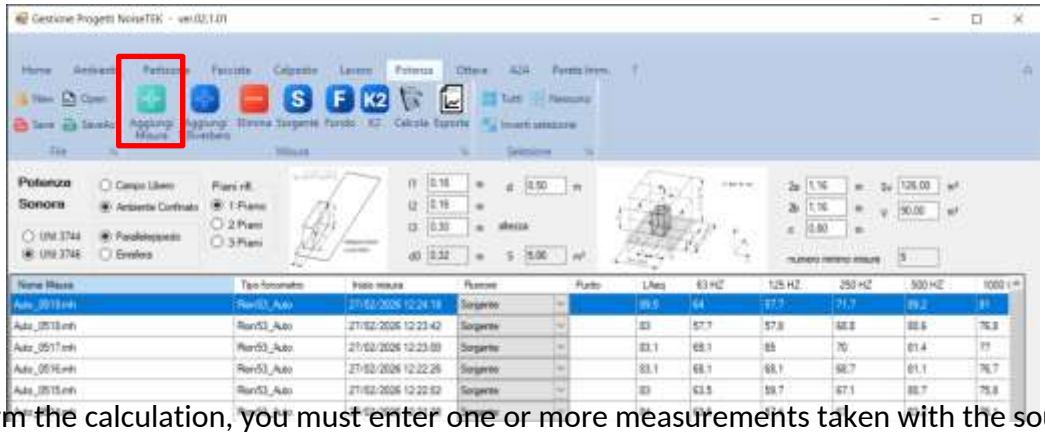
When creating a new project, the software asks whether you want to manage measurements in octave or third-octave bands. This choice affects the entire project and determines how the frequency bands are processed and displayed.

- If you select third octaves, the data in the files will be used directly (if available).
- If you select octaves, but the measures contain data in third octaves, the software will calculate automatically the values in the octave band, aggregating the corresponding thirds.

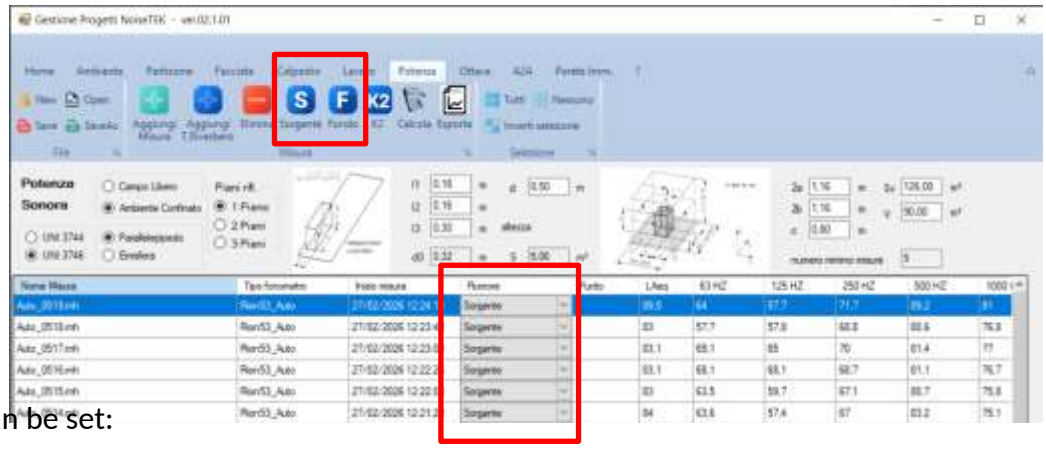
This operation is handled automatically by the program and guarantees the internal consistency of the data.

The module consists of an upper section dedicated to entering the calculation parameters and a grid containing the measurements and processed results.

Measurements are added using the “Add Measurement” button, selecting the files after choosing the type of sound level meter used.



To perform the calculation, you must enter one or more measurements taken with the source turned on. You can also enter one or more residual noise measurements, taken with the source turned off, which are necessary for calculating the K1 correction. After loading the measurements, you must therefore establish their type:



Which can be set:

- directly on the single row of the grid
- massively, by selecting multiple rows and using the buttons:
    - S = Source noise
    - F = Background noise

The K1 correction which takes into account the influence of the background noise present in the measurement environment, is automatically calculated both on the global A-weighted value (K1A) and on the individual bands.

If there are no residual noise measurements, the software informs the user and asks for confirmation before proceeding without applying the K1 correction.

In this case the calculation is still performed, assuming K1 equal to zero.

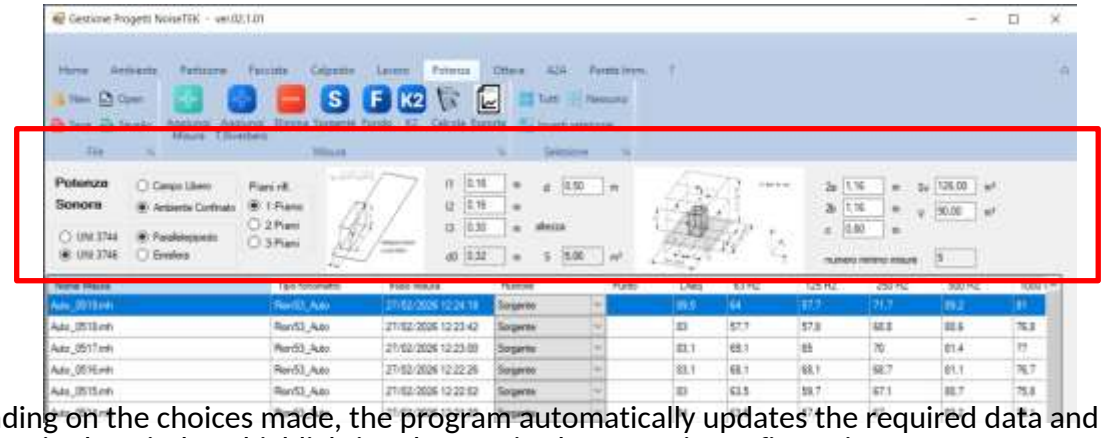
The software automatically reads for each measurement:

- Start date and time
- Sound level meter type
- Calculate average LAeq
- Calculate the average level value for frequency bands from 50 Hz to 10000 Hz

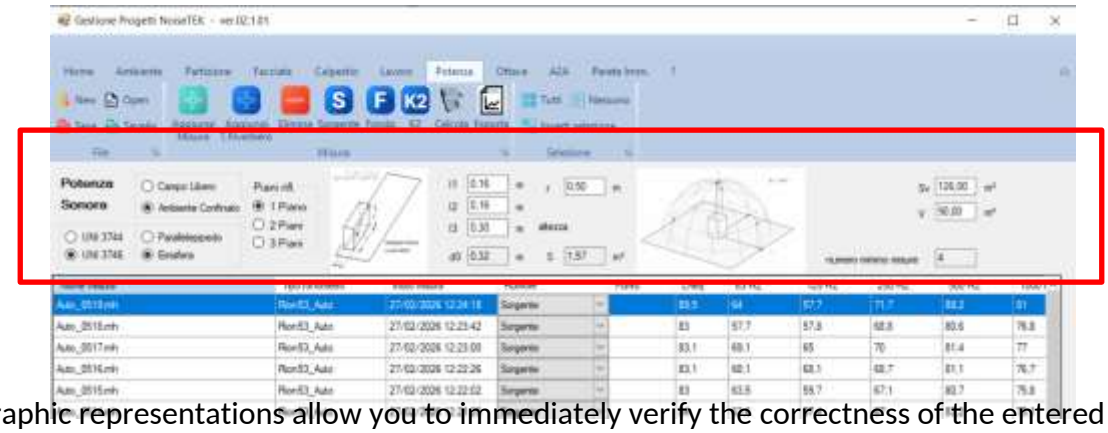
In the section between the command bar and the grid containing the measurements, the parameters required by the standard must be specified:

- Standard to be used;
- Type of measuring surface;
- Number of reflecting planes;
- Characteristic dimensions of the sound source;
- Distance of the measuring surface from the source in the case of a parallelepiped surface,

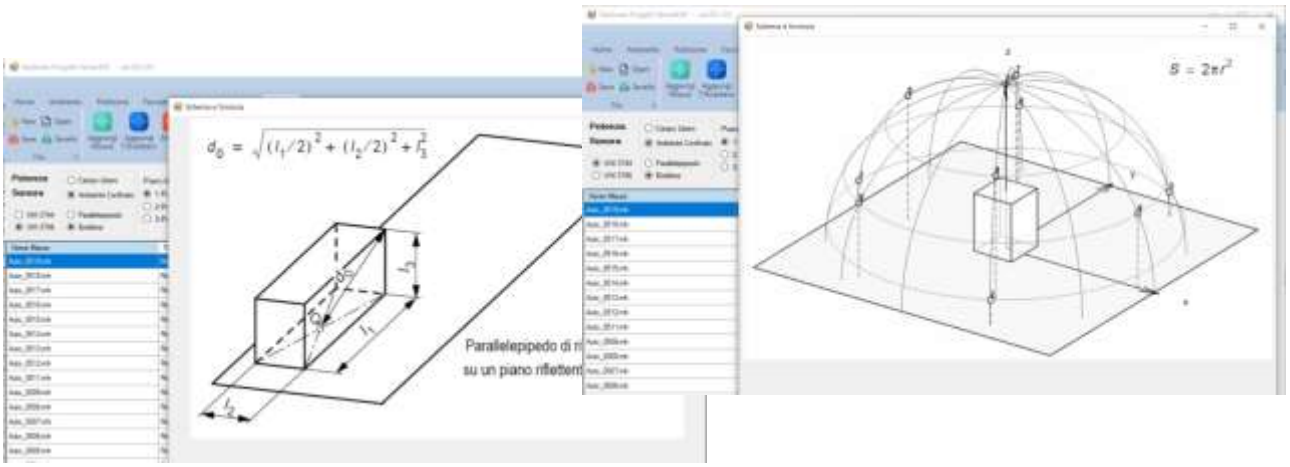
radius in case of spherical surface;
- Measurement in free field or in confined environment



Depending on the choices made, the program automatically updates the required data and drawings in the window, highlighting the required geometric configuration.

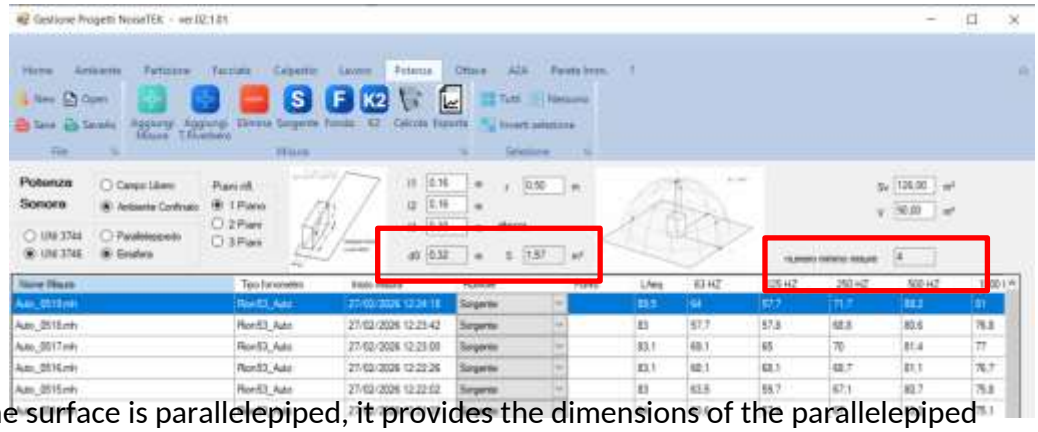


The graphic representations allow you to immediately verify the correctness of the entered data and to precisely identify the quantities required by the standard. By double-clicking on them, they can be enlarged:

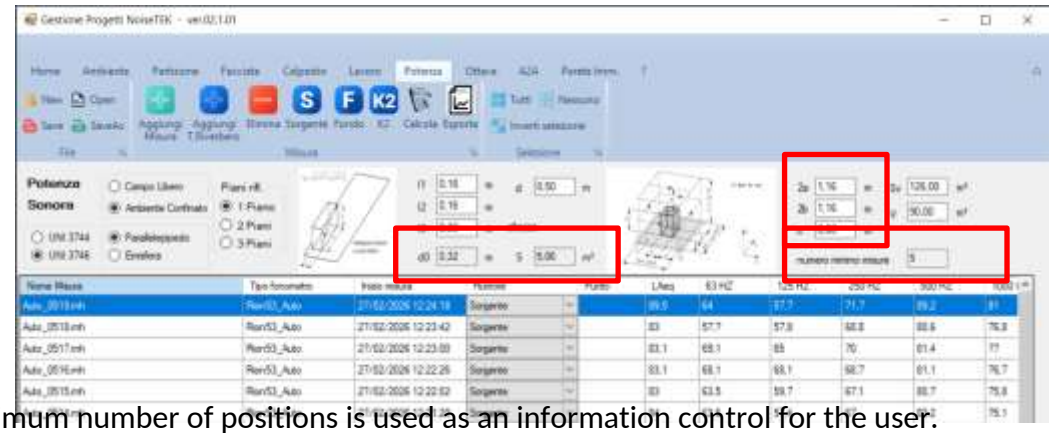


Once the geometric configuration is completed, the program automatically determines:

- The characteristic size of the source (d0)
- The measuring surface S;
- The minimum number of microphone positions required by the standard.



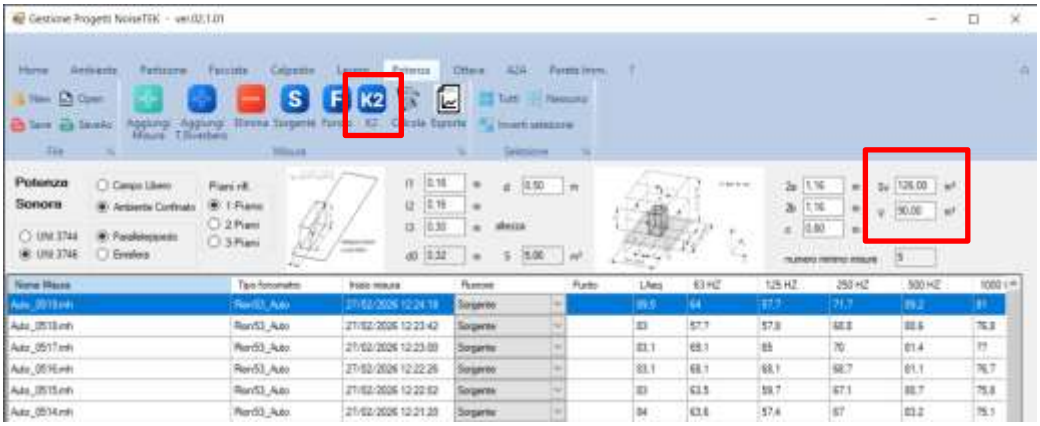
- If the surface is parallelepiped, it provides the dimensions of the parallelepiped



The minimum number of positions is used as an information control for the user.

If the number of measurements entered is less than that required by the selected standard, the program highlights the situation but still allows you to proceed with the calculation.

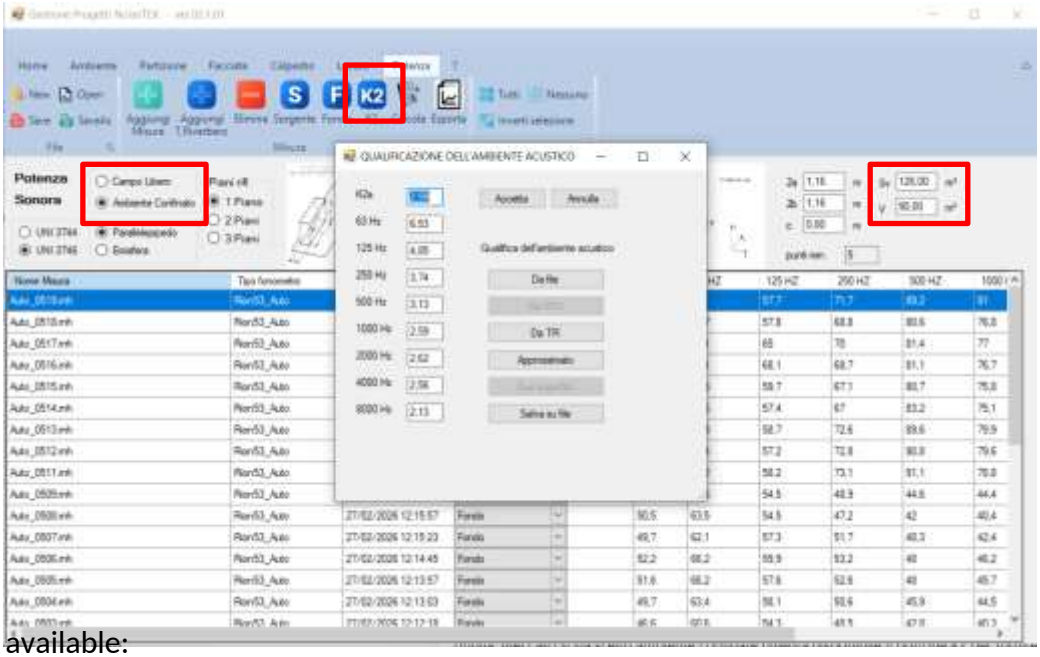
When the “Confined environment” configuration is selected, the “K2” button becomes available to allow management of the environment qualification and the dimensional data (volume V and total surface area Sv) of the environment are also requested.



The K2 correction must be defined:

- For the overall K2A value;
- For all frequency bands used in the calculation.

Pressing the K2 button opens a dedicated window that allows you to determine the correction using different modes.



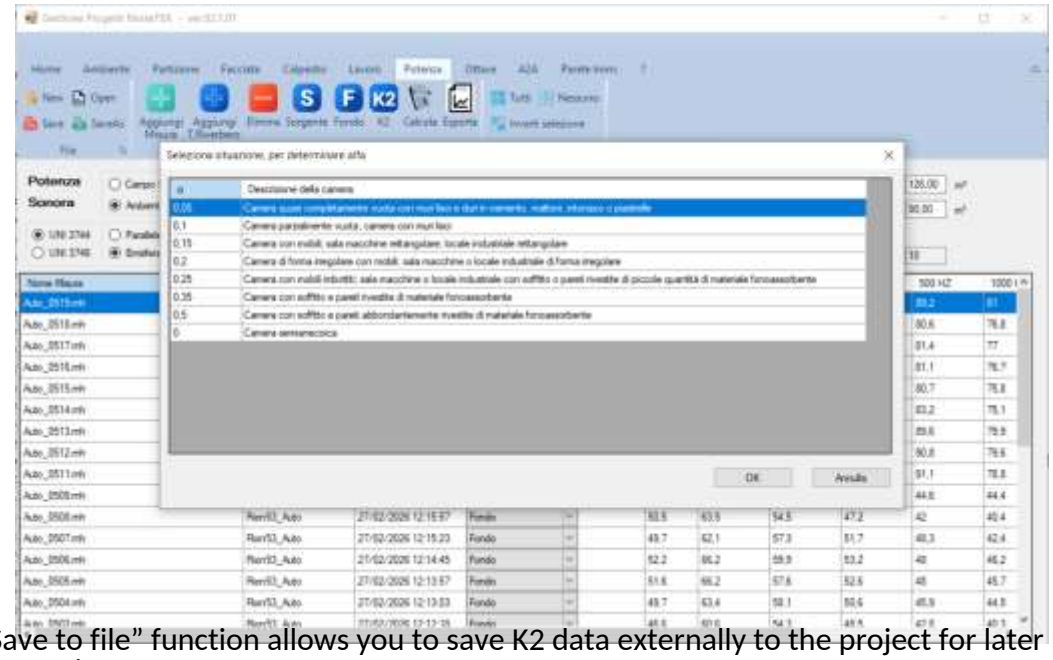
Currently available:

- Manual entry: the user can directly enter the values of K2A and the individual frequency bands.
- Reading from file: it is possible to recall a previously saved file containing the values of the K2 correction. This function is particularly useful when several measurements are performed in the same environment and with the same measuring surface.
- Calculation using the reverberation time: the K2 correction can be determined starting from from the geometric characteristics of the room and the measured reverberation times, in which case the data relating to the reverberation time must be entered in the measurement grid.



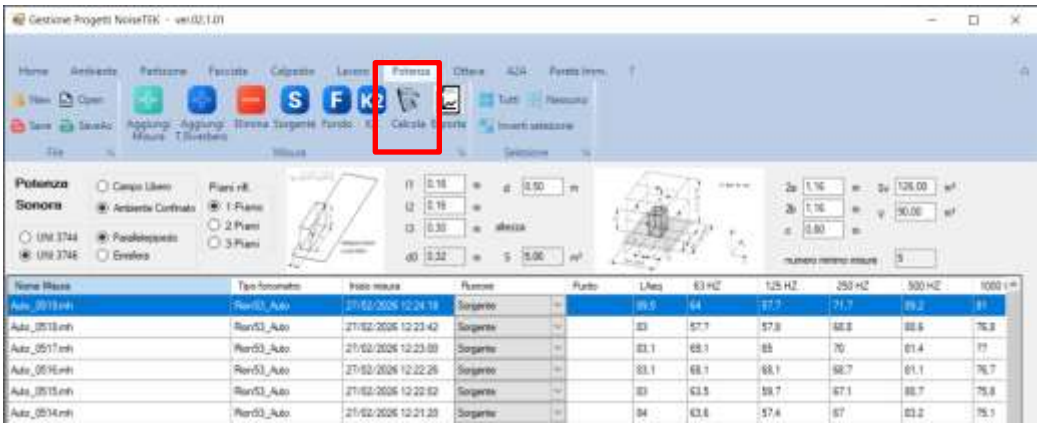
Reverb times are added using the "Reverb Time" button on the measurement grid. (See chapter 6.5.)

- Simplified method: The K2 correction is determined using the simplified method required by law, presenting the list of average α and allowing the operator to make the desired choice:



The “Save to file” function allows you to save K2 data externally to the project for later rereading in another project.

Once all the data has been entered, you can start the automatic processing by clicking the “Calculate” button.

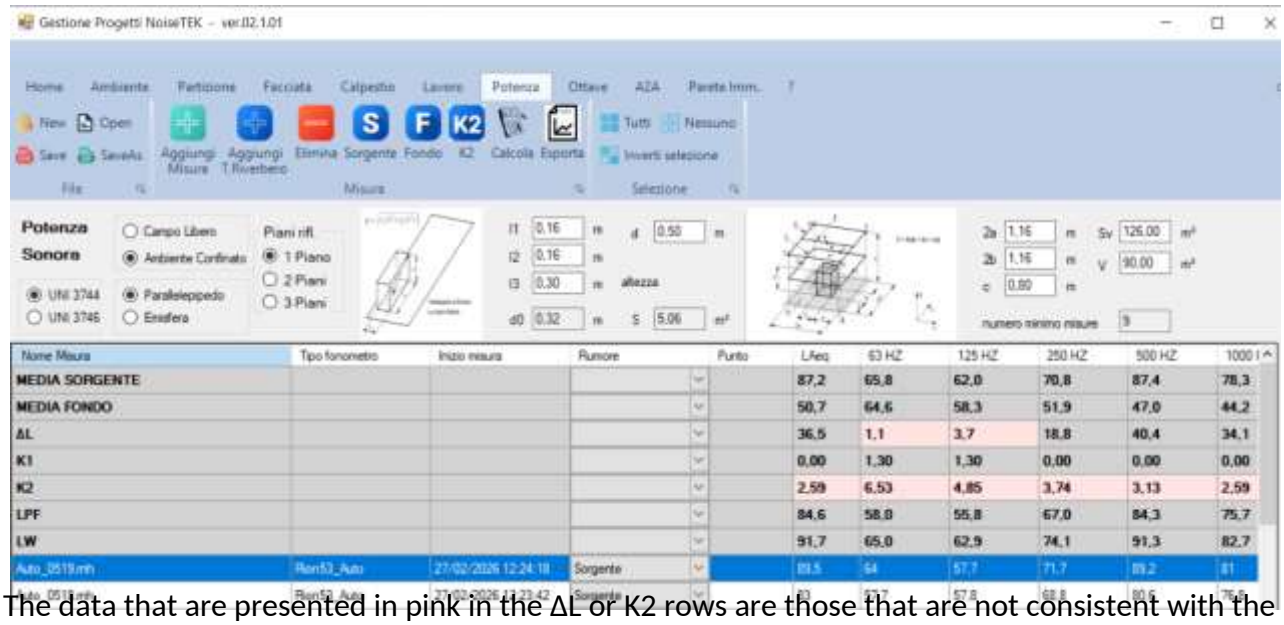


At this stage the software performs the following checks and operations:

- Check the completeness of the data, in particular the data that must be present

  I allow you to calculate the surface S: the dimensions l1, l2, l3 and the distance d in the case of a parallelepiped surface or the radius r if a spherical surface and the measurements marked as source
- Check for any lack of background level with the request and continue: in this case

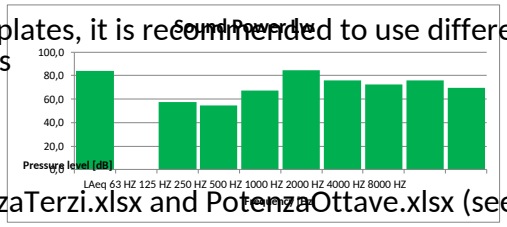
  case, the calculation is performed without applying the correction for background noise
- Verification of the minimum number of measurements, if not sufficient, you are asked whether to continue
- Calculation of the average pressure levels
- Calculation of the possible K1 correction
- Calculation of the global and frequency band sound power levels
- Automatic display of the results in the first rows of the grid



The data that are presented in pink in the ΔL or K2 rows are those that are not consistent with the limits of the chosen regulation

source dimensions measuring surface			characteristic dimension		
l1 l2 l3 d0 distance d Surface S					
m	m	m	m	m	m^2
0,16	0,16	0,30	0,32	0,50	5,06

The results can then be exported via Excel templates, it is recommended to use different templates for octave measures and third-octave measures



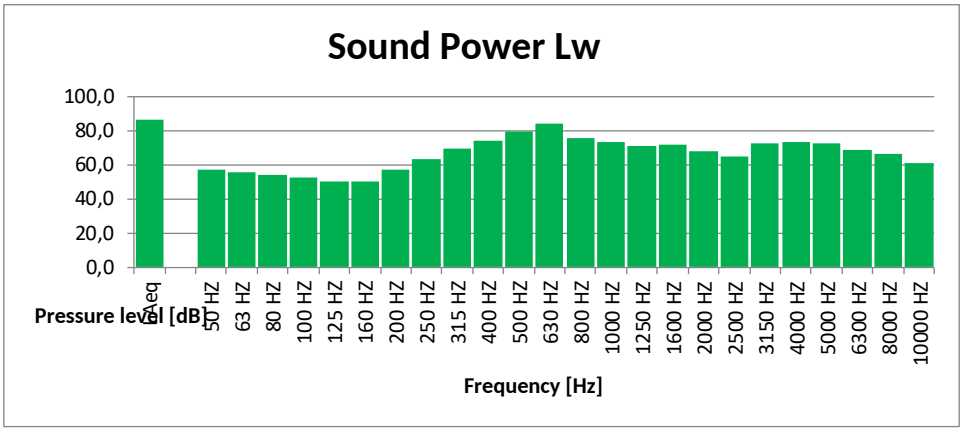
The procedure proposes two templates: PotenzaTerzi.xlsx and PotenzaOttave.xlsx (see Chapter 7.x)

L'	L''	Ka1	Ka2	LApf	LAw	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	LAeq	87.2	50.7	36.5	0.0	3.3	83.9	90.9

Frequency	L'	L''	ΔL	K1	K2	Lpf	Lw	Hz	dB	dB	dB	dB	dB	dB	dB	63 HZ	65.8	64.6	1.1	3.0	5.1	57.7	64.8	125 HZ	62.0	58.3	3.7	2.4	4.9	54.7	61.7	250 HZ
70.8	51.9	18.8	0.0	1.5	6.7	37.3	74.3	500 HZ	87.4	47.0	40.4	0.0	3.1	84.3	81.3	1000 HZ	78.3	44.2	34.1	0.0	2.6	75.7	82.7	2000 HZ	74.8	42.2	32.6	0.0				

In the proposed templates, values that are not compatible with the legislation are highlighted using conditionally formatted boxes.

source dimensions measuring surface			characteristic dimension		
l1 l2 l3 d0 distance d Surface S					
m	m	m	m	m	m^2
0,16	0,16	0,30	0,32	1,00	15,90



L' L'' ΔL Ka1 Ka2 LApf LAw dB(A) dB(A) dB(A) dB(A) dB(A) dB(A) LAeq 86.9 50.0 36.9 0.0 1.0 85.9 97.9							

Frequency L' L'' ΔL K1 K2 Lpf Lw Hz dB dB dB dB dB dB 50 HZ 61.4 58.5 2.9 1.3 3.0 57.1 69.1 63 HZ 59.6 59.9 -0.3 1.3 3.0 55.3 67.3 80 HZ 58.3 57.5 0.8 1.3 3.0 54.0 66.0 100 HZ 55.5 54.0 1.5 1.3 2.0 52.2 64.2 125 HZ 53.1 53.6 -0.5 1.3 2.0 49.8 61.8 160 HZ 53.7 53.5 0.2 1.3 2.0 50.4 62.4 200 HZ 58.5 48.4 10.1 0.5 1.0 57.1 69.1 250 HZ 64.0 45.9 18.1 0.0 1.0 63.0 75.0 315 HZ 70.2 43.5 26.6 0.0 1.0 69.2 81.2 400 HZ 75.3 41.4 33.9 0.0 1.0 74.3 86.3 500 HZ 80.0 40.7 39.3 0.0 1.0 79.0 91.0 630 HZ 85.1 40.7 44.4 0.0 1.0 84.1 96.1 800 HZ 76.3 40.1 36.2 0.0 1.0 75.3 87.3 1000 HZ 74.1 39.2 34.9 0.0 1.0 73.1 85.1 1250 HZ 71.8 38.3 33.5 0.0 1.0 70.8 82.8 1600 HZ 72.3 37.1 35.2 0.0 1.0 71.3 83.3 2000 HZ 68.8 35.4 33.3 0.0 1.0 67.8 79.8 2500 HZ 65.7 32.3 33.4 0.0 1.0 64.7 76.7 3150HZ 73.7 29.9 43.8 0.0 1.0 72.7 84.7 4000 HZ 74.4 29.6 44.8 0.0 1.0 73.4 85.4 5000 HZ 73.3 27.4 45.9 0.0 1.0 72.3 84.3 6300 HZ 69.7 24.6 45.1 0.0 1.0 68.7 80.8 8000 HZ 67.0 23.5 43.5 0.0 1.0 66.0 78.0 10000 HZ 61.8 24.5 37.3 0.0 1.0 60.8 72.8

7 Template Management

The software uses Excel templates to generate reports, spreadsheets, and certificates. The templates are pre-prepared Excel files for organizing and presenting data using tables, graphs, and layouts.

The templates are located in the directory: %APPDATA%\NoiseTEK\template.

During installation, a link to this directory is automatically created on your desktop.

NoiseTEK templates fall into two categories.

Fixed Templates: used for the automatic generation of certificates according to the UNI EN ISO 717 part 1 standards, relating to facade insulation and insulation between rooms, and UNI EN ISO 717 part 2, relating to impact noise.

The program automatically selects the correct template based on the type of calculation and the activated options, including any low and/or high frequency extensions.

These templates are part of the program's functionality and should not be modified or renamed.

Customizable Templates: Used for presenting measurements and calculation results.

NoiseTEK provides some predefined templates, but the user can modify them or create new ones and save them in the templates directory.

For all exports the operation is the same:

- if the user chooses a template, the selected file is copied to the path and with the name indicated by the user; the program then opens the copy and generates or rewrites the sheets containing the export data inside it, leaving the presentation sheet unchanged which automatically recovers the export data
- if the user chooses not to use any template, the program directly creates a new Excel file in the indicated path and generates within it only the sheets necessary for the export.

Choosing a template does not modify the exported data, but allows you to prepare its presentation.

The templates provided with NoiseTEK generally include a sheet called Print, in which the exported data is used to build pre-built tables, graphs, and other forms of representation.

The data sheets, however, are generated or rewritten by the program during each export. Therefore, they may be present, empty, or even absent in the original template.

The user can freely customize the Print sheet, using the data made available in the sheets generated by the program.

It is important, however:

- do not modify the fixed templates, as they are necessary for generating the certificates according to UNI EN ISO 717 part 1 and part 2;
- save customized templates with names different from those installed with NoiseTEK, since during updates the original templates may be overwritten;
- make backup copies of custom templates, especially before of installing updates.

If the user wishes to customize a template but lacks the necessary skills, the support center can make the required changes, subject to prior financial and technical agreement.

Customizable templates provided with NoiseTEK

Some pre-built templates are provided with the installation. This list may be updated over time as the program evolves and user needs change.

File name	Description
Ambiente.xlsx	Environmental measurements sheet with time history, frequency analysis, percentiles, distribution curves, diagram of minima with isophonics
Ambiente_basse.xlsx	Like the previous one but for very low environmental noise levels
Ambiente_alte.xlsx	Like the previous one but for very high environmental noise levels
Ambiente_mascherato.xlsx	Environmental measurements sheet with highlighting of masks in the time history, frequency values and percentiles relating to masked and unmasked data and list of masked events with levels and times
Lavoro.xlsx	Sheet of measurements carried out in work environments with time history and analysis in third-octave and octave bands
TR.xlsx	Results of reverberation time measurements with related values and acceptability indices
PotenzaOttave.xlsx	Results of the calculation of sound power in octave bands
PotenzaTerzi.xlsx	Results of the calculation of sound power in third-octave bands
UNI9612.xlsx	Results of the calculation of workers' noise exposure
OBM.xlsx	Results of the verification of PPE with the OBM method
HML.xlsx	Results of the verification of PPE with the HML method
SNR.xlsx	Results of the verification of PPE with the SNR method
EsposizioniVibrazioni.xlsx	Results of the calculation of workers' vibration exposure

The user can add other custom templates to the directory, which can be used as an alternative to those provided with the program.

Fixed templates

NoiseTEK also includes a set of templates that are automatically used to generate certificates for passive acoustic requirements.

These files are located in the same directory as the templates, but, unlike the previous ones, they are automatically recognized and selected by the program based on the type of calculation and the activated options.

File name	Function
Calpestio.xlsx	Basic certificate for impact noise
CalpestioMax.xlsx	Impact noise with high frequency extension (4000–5000 Hz)
CalpestioMin.xlsx	Impact noise with low frequency extension (50–80 Hz)
CalpestioMinMax.xlsx	Impact noise with low and high frequency extension
Facciata.xlsx	Basic certificate for facade insulation
FacciataMax.xlsx	Facade with high frequency extension
FacciataMin.xlsx	Facade with low frequency extension
FacciataMinMax.xlsx	Facade with low and high frequency extension
Partizione.xlsx	Basic certificate for insulation between rooms
PartizioneMax.xlsx	Partition with high frequency extension
PartizioneMin.xlsx	Partition with low frequency extension
PartizioneMinMax.xlsx	Partition with low and high frequency extension

These files do not need to be renamed, as the program identifies them by name.

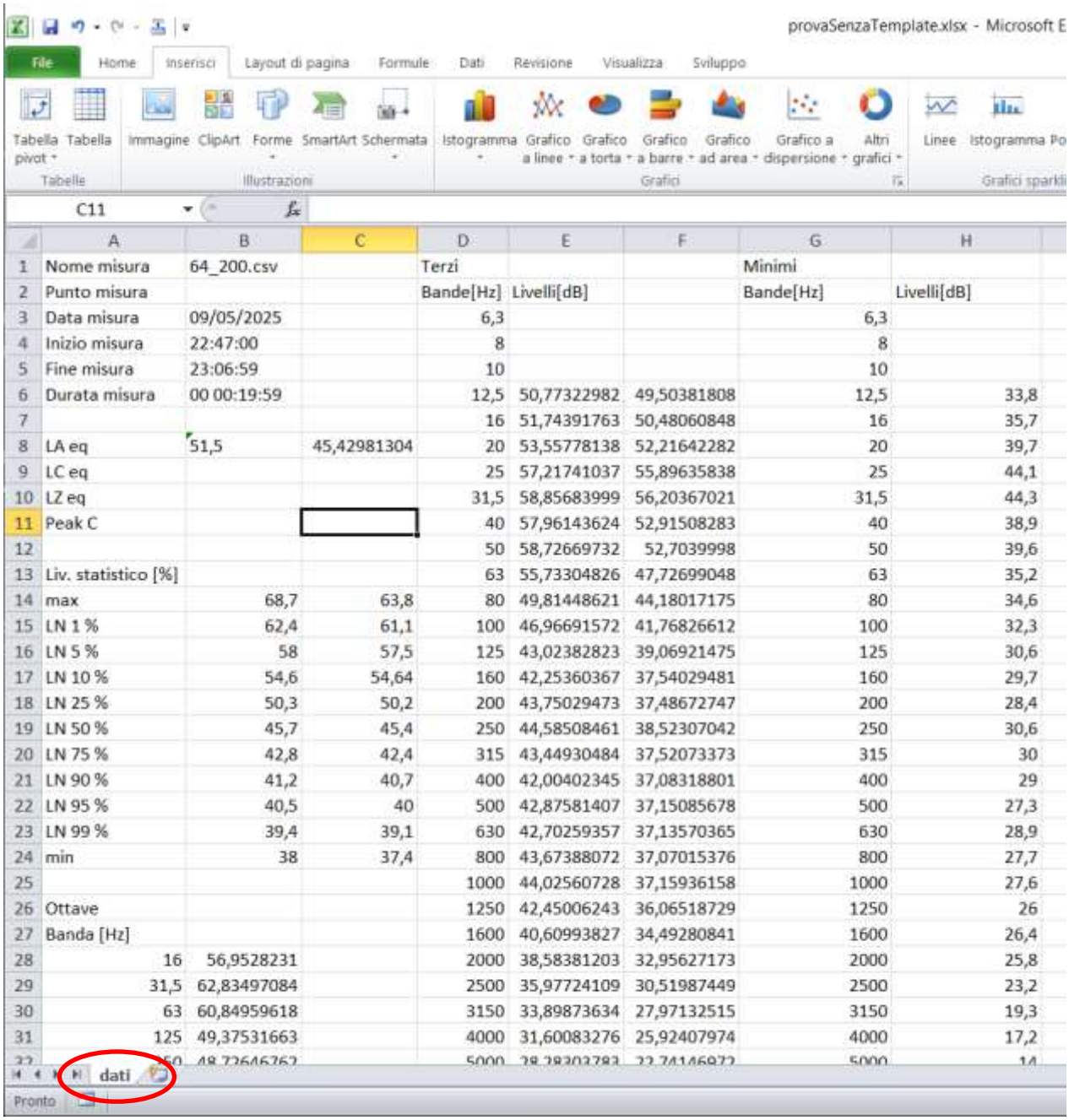
It is also not recommended to modify its contents: any changes could compromise the correct generation of certificates and would be lost if the file were replaced by a subsequent program update.

7.1 Structure of the “DATA” sheet for measurement cards

When exporting measurement cards, the program generates or rewrites an Excel spreadsheet called Data. The structure of the spreadsheet is the same whether the export is performed using a template or when a new Excel file is created without a template.

In the templates provided with NoiseTEK, the Print sheet uses the information in the Data sheet to generate tables, graphs, and other elements for presenting the results.

Knowledge of the Data sheet structure also allows the user to create their own templates and use the information exported from the program in the Print sheet.



	A	B	C	D	E	F	G	H
1	Nome misura	64_200.csv		Terzi			Minimi	
2	Punto misura			Bande[Hz]	Livelli[dB]		Bande[Hz]	Livelli[dB]
3	Data misura	09/05/2025		6,3			6,3	
4	Inizio misura	22:47:00		8			8	
5	Fine misura	23:06:59		10			10	
6	Durata misura	00 00:19:59		12,5	50,77322982	49,50381808	12,5	33,8
7				16	51,74391763	50,48060848	16	35,7
8	LA eq	51,5	45,42981304	20	53,55778138	52,21642282	20	39,7
9	LC eq			25	57,21741037	55,89635838	25	44,1
10	LZ eq			31,5	58,85683999	56,20367021	31,5	44,3
11	Peak C			40	57,96143624	52,91508283	40	38,9
12				50	58,72669732	52,7039998	50	39,6
13	Liv. statistico [%]			63	55,73304826	47,72699048	63	35,2
14	max	68,7	63,8	80	49,81448621	44,18017175	80	34,6
15	LN 1 %	62,4	61,1	100	46,96691572	41,76826612	100	32,3
16	LN 5 %	58	57,5	125	43,02382823	39,06921475	125	30,6
17	LN 10 %	54,6	54,64	160	42,25360367	37,54029481	160	29,7
18	LN 25 %	50,3	50,2	200	43,75029473	37,48672747	200	28,4
19	LN 50 %	45,7	45,4	250	44,58508461	38,52307042	250	30,6
20	LN 75 %	42,8	42,4	315	43,44930484	37,52073373	315	30
21	LN 90 %	41,2	40,7	400	42,00402345	37,08318801	400	29
22	LN 95 %	40,5	40	500	42,87581407	37,15085678	500	27,3
23	LN 99 %	39,4	39,1	630	42,70259357	37,13570365	630	28,9
24	min	38	37,4	800	43,67388072	37,07015376	800	27,7
25				1000	44,02560728	37,15936158	1000	27,6
26	Ottave			1250	42,45006243	36,06518729	1250	26
27	Banda [Hz]			1600	40,60993827	34,49280841	1600	26,4
28	16	56,9528231		2000	38,58381203	32,95627173	2000	25,8
29	31,5	62,83497084		2500	35,97724109	30,51987449	2500	23,2
30	63	60,84959618		3150	33,89873634	27,97132515	3150	19,3
31	125	49,37531663		4000	31,60083276	25,92407974	4000	17,2
32	250	48,72646762		5000	28,28303783	22,74146972	5000	14

In particular:

B1 Measurement name H3-H36 Minimum spectrum B2 Measurement point K8-K36 MAV of the chosen ISO B3 Measurement date L8-L36 Iso 10 of the chosen ISO B4 Measurement start M8-M36 Iso 20 of the chosen ISO B5 Measurement end N8-N36 Iso 30 of the chosen ISO B6 Measurement duration O8-o36 Iso 40 of the chosen ISO B8 LA eq P8-P36 Iso 50 of the chosen ISO B9 Lc eq Q8-Q36 Iso 60 of the chosen ISO B10 Lz eq R8-R36 Iso 70 of the chosen ISO B11 Peak C S8-S36 Iso 80 of the chosen ISO B14 Maximum value B43-B132 Distribution curve (from 1 to 90 dB) B15-B23 Percentile values C43-C132 Cumulative curve (from 1 to 90 dB) B24 Minimum value D43-D.... Time values B28-B38 Octave values E43-E... LAeq values E3-E36 Third octave values F43-F... RunLAeq values			

In case of masks, in addition to the above:

C8 LA eq part not masked K43-K.. Mask name C14 Maximum not masked value M43-K.. Start position C15-C23 Percentile values not masked N43-K.. End position C24 Minimum not masked value O43-K.. Start time C28-C38 Octave values not masked P43-K.. End time F3-F36 1/3 octave values not masked Q43-K.. Event duration G43-G... Unmasked LAeq values R43-K.. Event LAeq H43-H... Unmasked RunLAeq values S43-K.. Event SEL I43-I... Masked LAeq values			

In case of reverberation time, in addition to the previous ones:

U4-U36 Frequency [Hz] AA4-AA36 Lp Steady State [dB] V4-V36 T20 [s] AB4-AB36 Lp Background [dB] W4-W36 T30 [s] AC4–AC36 Txx [s] X4-X36 Nonlinearity T20 [%] AD4–AD36 Nonlinearity Txx [%] Y4-Y36 Nonlinearity T30 [%] AE4–AE36 Txx Method (Txr/Txm) Z4-Z36 Curvature [%]			

7.2 Example of measurement card

Using one of the templates provided with NoiseTEK, the data in the Data sheet is retrieved from the Print sheet and organized into a card ready for viewing or printing.

The following figure shows an example of a data sheet relating to an environmental measure.

The card reports, in particular:

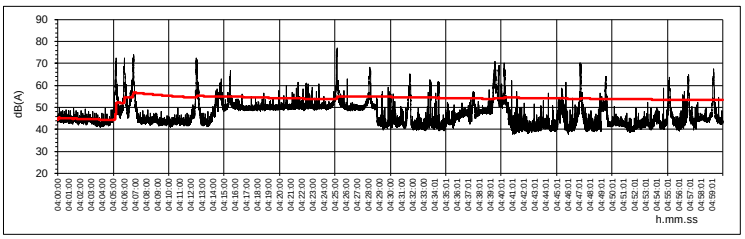
- the identification and temporal data of the measurement;
- the A-weighted equivalent level;
- the time history and the Running LAeq;
- the frequency analysis;
- the percentile levels;
- the distribution and cumulative curves;
- the spectrum of the minima and the relative comparison with the isophonic curves.

The example given in the manual shows exactly this organization in the print sheet.

The graphic structure of the card is only one possible presentation method: by modifying the Print sheet or creating a new template, the user can create different cards using the same data exported from the program.

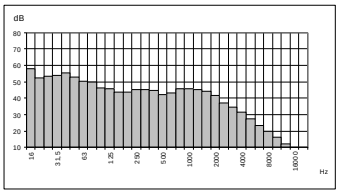
Measurement date 11/15/2024 Measurement start Measurement time 04-05 Measurement end 04:00:00
LA eq Measurement point R1 Measurement duration 05:00:00 53,4 dB(A)
1:00:00

Time History - Weighted Equivalent Levels A



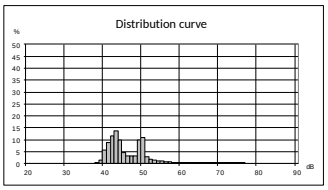
Frequency analysis

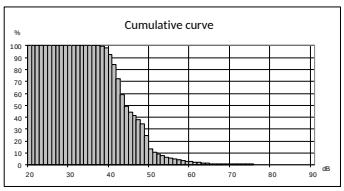
Hz	dB	Hz	dB	Hz	dB	Hz	dB
16	57,9	100	46,5	630	43,0	4000	31,5
20	52,5	125	45,5	800	45,7	5000	27,2
25	53,2	160	43,6	1000	45,8	6300	23,3
31,5	53,8	200	43,8	1250	45,0	8000	19,6
40	55,4	250	45,1	1600	44,0	10000	16,0
50	53,1	315	45,4	2000	41,6	12500	11,9
63	50,3	400	44,5	2500	37,2	16000	9,6
80	49,8	500	42,3	3150	34,5	20000	7,4



Percentile levels

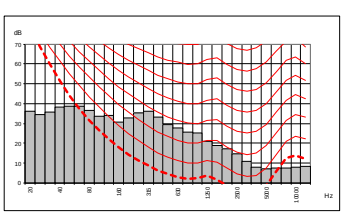
	1 %	5 %	10 %	25 %	50 %	75 %	90 %	95 %	99 %
dB(A)	66,4	56,8	52,4	50,0	44,9	42,8	41,4	40,7	39,9





ISO 2003 minima spectrum

Hz	dB	Hz	dB	Hz	dB	Hz	dB
		100	33,5	630	27,7	4000	8,0
20	36,0	125	33,9	800	25,4	5000	6,9
25	34,4	160	30,7	1000	25,0	6300	7,5
31,5	35,6	200	32,6	1250	21,1	8000	7,6
40	38,2	250	35,3	1600	18,7	10000	8,1
50	38,6	315	36,1	2000	17,2	12500	8,3
63	38,6	400	33,2	2500	14,7	16000	8,4
80	36,4	500	29,6	3150	11,0	20000	6,8



7.3 Noise in work environments

The Work module allows, in addition to exporting the individual measurement sheets described in the previous paragraphs, to export the results of the calculations relating to the work environments.

In particular, dedicated exports are planned:

- to the verification of personal hearing protection devices using the OBM, HML and SNR methods;
- to the calculation of workers' exposure.

For each export, the program offers a default template. As with other customizable exports, the user can use the default template, choose a compatible template, or proceed without a template.

In all cases, the program generates or rewrites the sheets containing the data required for export. The template determines how this data is presented in the Print sheet.

7.3.1 PPE verification with the OBM method

For the testing of personal hearing protection devices using the OBM (Octave Band Method), the program allows you to export the data used for the calculation and the results obtained.

The program offers the OBM.xlsx template; however, the user can use their own template or proceed without a template.

During export, the Data sheet is generated or completely rewritten by the program. The template may therefore not contain this sheet or may contain an empty one.

In the template provided with NoiseTEK, the Print sheet uses the values present in the Data sheet to reconstruct the information displayed in the verification window: grouping data, DPI characteristics, attenuation values in the different frequency bands and the final result.

Cell / Range Text in Excel sheet Description B1 Grouping Identification of the grouping or area subjected to verification B2 Method Method used for verification B3 LAeq [dB(A)] A-weighted equivalent level of the grouping B4 LCeq [dB(C)] C-weighted equivalent level of the grouping B5 PPE Type Type of protective device B6 Brand Brand of PPE B7 Model Model of PPE B8 β Correction factor applied to the PPE B9 Coverage factor Factor used to determine the attenuation assumed in the calculation B10 Coverage level Associated coverage percentage B13:I13 Frequency [Hz] Heading of the frequency bands B14:I14 Level [dB] Sound levels of the grouping in the frequency bands B15:I15 Mf [dB] Average attenuation value declared for the PPE B16:I16 Sf [dB] Standard deviation of the declared attenuation B17:I17 APVf [dB] Assumed protection value for each band B18:I18 APVf × β [dB] APVf value corrected by β B19:I19 L'eq,f [dB] Residual level for each band after applying attenuation B22 LAeq estimated with DPI [dB(A)]		
A-weighted sound level estimated at the worker's ear with the PPE worn B23 Effectiveness Evaluation of the effectiveness of the protection		

If the PPE does not have attenuation data at 63 Hz, the corresponding cells for Mf and Sf may be empty.

7.3.2 PPE verification with the HML method

For verification using the HML method, the program uses the attenuation values H, M and L declared for the protective device and the LAeq and LCeq levels relating to the grouping considered.

The program offers the HML.xlsx template; in this case, too, the user can use their own template or export the data without a template.

The Data sheet is generated or rewritten entirely by the program during export.

In addition to the values needed to reconstruct the calculation screen, the sheet also reports some intermediate results useful for documenting the procedure followed by the program.

Cell / Range Text in Excel Sheet	Description
B1	Grouping Identification of the grouping, task or area being verified B2 Method Method used for verification B3 LAeq [dB(A)] A-weighted equivalent level B4 LCeq [dB(C)] C-weighted equivalent level B5 PPE type Type of protective device B6 Brand Brand of PPE B7 Model Model of PPE B8 β Correction factor applied to the PPE B9 Coverage factor Coverage factor used B10 Coverage level Associated coverage percentage B13:I13 Frequency [Hz] Heading of frequency bands B14:I14 Level [dB] Levels of the grouping in the frequency bands B17 H [dB] Declared H attenuation for the PPE B18 M [dB] Declared M attenuation for the PPE B19 L [dB] Declared L attenuation for the PPE B21 LCeq - LAeq [dB] Difference between C- and A-weighted levels used in calculation B22 PNR [dB] Expected sound reduction determined by HML method B24 LAeq estimated with DPI [dB(A)]
	A-weighted level estimated at the ear with the PPE
B25	Effectiveness Evaluation of the effectiveness of protection

Spectral values in frequency bands are also exported to the HML method, if available, although the HML calculation uses LAeq, LCeq and the H, M and L values directly.

7.3.3 PPE verification with the SNR method

In the SNR (Single Number Rating) method, verification is carried out using the SNR value declared for the protective device and the equivalent weighted level C relating to the grouping considered.

The program offers the SNR.xlsx template; the user can use this template, their own template, or proceed without a template.

For this export too, the Data sheet is generated or rewritten entirely by the program.

Cell / Range	Text in Excel sheet Description
B1 Grouping Identification of the grouping, task or area being verified B2 Method Method used for verification B3 LAeq [dB(A)] A-weighted equivalent level of the grouping B4 LCeq [dB(C)] C-weighted equivalent level used in the calculation B5 PPE Type Type of protective device B6 Brand Brand of PPE B7 Model Model of PPE B8 β Correction factor applied to the PPE B10 SNR [dB] Declared SNR value for the PPE B13:I13 Frequency [Hz] Heading of the frequency bands B14:I14 Level [dB] Levels of the grouping in the frequency bands B17 SNR × β [dB] Attenuation actually applied by the programme B19 LAeq estimated with PPE [dB(A)]	
	A-weighted level estimated at the ear with the PPE
B20 Effectiveness Evaluation of the effectiveness of protection	

In the SNR method, the frequency band values do not directly intervene in the calculation, but are still exported when available so as to maintain the information relating to the examined grouping in the Excel file.

7.3.4 Calculation of daily exposure

To export the results of the exposure calculation, the program generates or rewrites two sheets containing data:

- Data sheet, which reports the results of the exposure calculation for the various groupings;
- Measurements sheet, which reports the data for the individual measurements included in the project.

If the template provided with NoiseTEK is used, the Print sheet is also available, designed to present the results contained in these sheets.

Data Sheet:

Excel column Text in the Excel sheet Description A Grouping Name of the grouping of measures to which the calculation refers	
B LAeq A-weighted equivalent sound level determined for the grouping	
C u1a Uncertainty component due to sampling of sound levels D LCpeak Maximum C-weighted peak level E No. of measurements Number of measurements performed F Total measurement time Total duration of measurements performed G Strategy Measurement strategy adopted: Task, Job or Full Day H Job Job associated with the grouping	
I HEG Associated Homogeneous Exposure Group J No. of HEG workers Total number of workers belonging to the HEG	
K N. workers measured Number of HEG workers on whom measurements were carried out L Duration Reference duration used for the calculation of exposure	

M Minimum number of measurements Minimum number of measurements required by the adopted strategy N Minimum number of workers Minimum number of workers to be measured		
O Minimum cumulative duration Minimum cumulative duration of measurements required by the adopted strategy P LEX,8h Daily noise exposure level normalized to 8 hours		
Q u1b Uncertainty component associated with the estimation of the duration of exposure R u2 Uncertainty component associated with the measurement instrumentation S u3 Uncertainty component associated with the position of the microphone		
T c1a Sensitivity coefficient associated with the uncertainty component u1a		
U c1b Sensitivity coefficient associated with the uncertainty component u1b V u Combined standard uncertainty associated with the exposure level W k Coverage factor used for the calculation of the expanded uncertainty		
X U Extended uncertainty associated with the exposure level		

The table therefore contains both the final results and the information needed to document the measurement strategy and the different components used in the uncertainty calculation.

Measurement Sheet:

The Measurements sheet contains the data of the individual measurements used in the project. For each measurement, the following are exported:

- measurement name;
- grouping;
- start date and time;
- end date and time;
- duration;
- LAeq;
- LCeq;
- LCpeak;
- levels in octave bands or in third-octave bands, depending on the available data.

In this way, the Excel file stores, in addition to the overall exposure results reported in the Data sheet, also the data of the individual measurements from which these results derive.

7.4 Vibrations in the workplace

To export vibration exposure, the program generates or rewrites two sheets containing the data used in the processing:

- the data sheet, containing the activities and overall results of the exposure groups;
- the Measures sheet, containing the individual measures from which the aggregate values are derived.

The template provided with NoiseTEK also contains four sheets for presenting the results:

- Hand-Arm Print;
- Hand-Arm Activity;
- Whole Body Print;
- Whole Body Activity.

The data and measurement sheets are managed by the program and are regenerated during each export. The four print sheets, however, belong to the template: they can be modified, renamed, or deleted by the user and are not required by the program.

You can then create a completely customized template or proceed without a template. In the latter case, NoiseTEK creates a new Excel file containing the technical data sheets and measurements.

Data Sheet

The datasheet contains both rows relating to individual activities and summary rows for exposure groups.

Column Content Description	
A Row Type Indicates whether the row represents an activity or a group total	
B Type Hand-arm or Whole body	
C Exposure group Group to which the activity contributes	
D Grouping Activity, machine or operating condition considered	
And N. measurements Number of acquisitions used	
F T. total measure [s] Total duration of the measures	
G T. exposure [h] Daily duration attributed to the activity	
H-J ax, ay, az [m/s²] Aggregate values for the three axes	
K Resultant acceleration [m/s²] Resultant value associated with the activity	
L-N Kx, Ky, Kz Multiplication factors applied to the three axes	
O-Q Contributions Ax(8), Ay(8), Az(8) Contributions of the activity to the exposure on the individual axes	
R Contribution A(8) Contribution of activity to hand-arm exposure	
S-U Ax(8), Ay(8), Az(8) Overall group exposures on individual axes	
V A(8) Total daily exposure of the group	
W Determinant axis Axis from which the result for the whole body is derived	
X Note Any anomalies or information to be brought to the technician's attention	

The Activity rows allow you to reconstruct the contributions of individual groupings. The Total rows instead report the overall result for the exposure group.

Measurement Sheet

The Measurements sheet contains the data of the individual acquisitions present in the project grid, including the information used to construct the groupings.

Depending on the available data, the following are exported:

- measurement name;
- accelerometer type;
- grouping;
- start and end date and time;
- duration;
- association of channels to axes;
- hand-arm or whole body type;
- weightings associated with the channels;
- global RMS, VDV and other available parameter values;
- values in the frequency bands, when present.

The sheet therefore stores the data from which the calculations reported in the data sheet derive.

Print sheets

The Hand-Arm Print and Full Body Print sheets present the summary of the final results, keeping the two types of exposure separate.

The Hand-Arm Activity and Whole-Body Activity sheets detail the activities that contribute to the different exposure groups. This separation allows for unlimited documentation of even groups consisting of multiple activities.

The cells intended for identifying data, such as client, site, technician in charge, date and equipment, can be completed and customized by the user.

Print sheet formulas read the values present in the data sheet. Users can freely modify the layout, add their own logo, insert text or additional processing, and define the print areas best suited to the technical report.

The template is for presentation purposes only: its structure does not affect the calculations performed by NoiseTEK.

7.5 Sound power

For the calculation of sound power NoiseTEK provides two predefined templates:

- PotenzaOttave.xlsx, set up for results calculated in octave bands;
- PotenzaTerzi.xlsx, set up for results calculated in third-octave bands.

The logical structure of the export is the same for calculations performed in octaves and third-octaves. Only the number of columns required to represent the frequency bands changes:

- for octaves, the frequencies occupy columns E to L;
- for thirds of an octave, the frequencies occupy columns E to AB.

The first part of the sheet contains the parameters used to calculate the sound power. Starting on line 17, the calculation results are shown, and the subsequent lines, starting on line 25, contain the data for the individual measurements used.

General information

Cell / Range	Text in Excel sheet Description
B1 Parameter Header of the column containing the name of the parameter B2 Environment Type of environment in which the measurement is carried out B3 Standard Standard used for the calculation B4 Shape Geometric shape of the measuring surface B5 Reflective planes Number/configuration of the reflecting planes B6 l1 First characteristic dimension of the measuring surface B7 l2 Second characteristic dimension of the measuring surface B8 l3 Third characteristic dimension of the measuring surface B9 characteristic dimension d0	
	Characteristic size of the source
B10 distance d Measuring distance B11 Surface S Measuring surface S D6 2a Indication of the associated geometric dimension D7 2b Indication of the associated geometric dimension D8 c Indication of the associated geometric dimension D10 Sv Surface Sv D11 V Room volume B12 freq Type of frequency analysis O or T B13 K1 Correction for background noise B14 K2 Room correction B15 DeltaL Level difference used for checking/correcting background noise	

Calculation results

The following columns are used to display the results:

Text column in Excel sheet Description B Noise Identifies the parameter D LAeq A-weighted global equivalent level E:L 63 Hz ... 8000 Hz Single measurement levels in the octave bands		

For export in third octaves, the same structure continues in the subsequent columns up to AB, so as to contain all the third octave bands foreseen by the calculation.

The lines have this meaning:

Text line in Excel sheet Description 18 SOURCE AVERAGE Average energy levels of the measurements made with the source in operation 19 BACKGROUND AVERAGE Average energy levels of the background noise 20 ΔL Difference between the source level and the background level 21 K1 Correction for the background noise actually applied 22 K2 Environmental correction applied 23 LPF Corrected sound pressure level used for the calculation of the sound power 24 LW Calculated sound power level

Measures used

The following columns are used to express the measurements:

Text column in Excel sheet Description A Start of measurement Date and time of start of measurement B Noise Identifies the measurement as Source or Background C Point Measurement point D LAeq A-weighted global equivalent level E:L 63 Hz ... 8000 Hz Levels of the single measurement in the octave bands	

For export in third octaves, the same structure continues in the subsequent columns up to AB, so as to contain all the third octave bands foreseen by the calculation.

	A	B	C	D	E	F	G	H	I	J	K	L
1	**Parametro**	**Valore**										
2	Ambiente	Ambiente chiuso										
3	Norma	UNI 3746										
4	Forma	Parallelepipedo										
5	Piani riflettenti	1 Piano										
6	l1	0,16	2a	1,16								
7	l2	0,16	2b	1,16								
8	l3	0,30	c	0,80								
9	dimensione caratteristica d0	0,32										
10	distanza d	0,50	Sv	126,00								
11	Superficie S	5,06	V	90,00								
12	freq	0										
13	K1	3,00										
14	K2	7,00										
15	DeltaL	3,00										
16												
17	**Inizio misura**	**Rumore**	**Punto**	**LAeq**	**63 HZ**	**125 HZ**	**250 HZ**	**500 HZ**	**1000 HZ**	**2000 HZ**	**4000 HZ**	**8000 HZ**
18		**MEDIA SORGENTE**		**87,2**	**65,8**	**62,0**	**70,8**	**87,4**	**78,3**	**74,8**	**78,7**	**72,1**
19		**MEDIA FONDO**		**50,7**	**64,6**	**58,3**	**51,9**	**47,0**	**44,2**	**42,2**	**34,8**	**32,4**
20		**ΔL**		**36,5**	**1,1**	**3,7**	**18,8**	**40,4**	**34,1**	**32,6**	**43,8**	**39,7**
21		**K1**		**0,0**	**3,0**	**2,4**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
22		**K2**		**2,6**	**6,5**	**4,9**	**3,7**	**3,1**	**2,6**	**2,6**	**2,6**	**2,1**
23		**LPF**		**84,6**	**56,3**	**54,7**	**67,0**	**84,3**	**75,7**	**72,2**	**76,1**	**70,0**
24		**LW**		**91,7**	**63,3**	**61,7**	**74,1**	**91,3**	**82,7**	**79,3**	**83,2**	**77,0**
25	27/02/2026 12:24:18	Sorgente		89,5	64,0	57,7	71,7	89,2	81,0	78,4	80,9	76,0
26	27/02/2026 12:23:42	Sorgente		83,0	57,7	57,8	68,8	80,6	76,8	71,5	76,7	69,7
27	27/02/2026 12:23:00	Sorgente		83,1	69,1	65,0	70,0	81,4	77,0	71,5	76,2	67,6
28	27/02/2026 12:22:26	Sorgente		83,1	68,1	68,1	68,7	81,1	76,7	71,2	76,7	67,8
29	27/02/2026 12:22:02	Sorgente		83,0	63,5	59,7	67,1	80,7	75,8	72,7	77,2	66,8
30	27/02/2026 12:21:20	Sorgente		84,0	63,6	57,4	67,0	83,2	75,1	72,6	77,6	69,8
31	27/02/2026 12:20:39	Sorgente		88,4	68,3	58,7	72,6	89,6	79,9	76,6	74,4	70,3
32	27/02/2026 12:20:01	Sorgente		90,1	65,4	57,2	72,8	90,8	79,6	76,3	81,3	74,7
33	27/02/2026 12:19:29	Sorgente		90,3	62,2	58,2	73,1	91,1	78,8	75,9	81,2	74,8
34	27/02/2026 12:16:51	Fondo		49,6	59,6	54,5	48,9	44,6	44,4	43,2	34,4	27,2
35	27/02/2026 12:15:57	Fondo		50,5	63,5	54,5	47,2	42,0	40,4	47,4	34,7	31,9
36	27/02/2026 12:15:23	Fondo		49,7	62,1	57,3	51,7	48,3	42,4	38,2	34,4	30,5
37	27/02/2026 12:14:45	Fondo		52,2	66,2	59,9	53,2	48,0	46,2	42,9	36,8	29,6
38	27/02/2026 12:13:57	Fondo		51,6	66,2	57,6	52,6	48,0	45,7	41,4	37,4	40,0
39	27/02/2026 12:13:03	Fondo		49,7	63,4	58,1	50,6	45,9	44,5	39,0	30,8	21,5
40	27/02/2026 12:12:18	Fondo		46,6	60,6	54,3	48,5	42,8	40,3	37,1	31,3	25,6
41	27/02/2026 12:11:31	Fondo		52,1	65,6	62,1	54,7	48,2	44,7	40,6	34,4	26,2
42	27/02/2026 12:09:13	Fondo		51,9	67,9	59,6	54,1	49,7	45,1	40,2	35,2	28,7

8 Sound Level Meters and Measurement Modes

Information regarding compatible sound level meters and measurement management methods is constantly evolving. Currently, the system supports measurements in the following formats:

- NoiseTEK – Internal format used for creating reworked files, for example for hourly subdivisions, partial measurement extractions or application of masks.
- NL53 – Specific format for Rion model NL-53 sound level meters.
- NL52 – Specific format for Rion model NL-52 sound level meters.
- LA70XX – Format relating to the LA70xx series sound level meters produced by Onosokki.
- SC250 – Reading data from CSV export for Cesva model SC-250 sound level meters
- SC420 – Reading data from CSV export for Cesva model SC-420 sound level meters
- Svantek – Reading data from CSV export using the SvanPC++ program
- Norsonic – Reading data from Excel export using the NorXfer program

The availability of drop-down formats may vary based on commercial distribution choices. The NoiseTEK format is always available.

8.1 NoiseTEK Format

The proprietary format used by NoiseTEK is a text file in CSV format, used for exchanging data between the various software functions and for exporting measurements.

The file uses the following conventions:

- field separator: ;
- decimal separator: . (the separator , is also accepted during reading)

The first column contains the date and time of each sample in the format:

yyyy/mm/dd hh:mm:ss.x

The first line of the file contains the names of the acquired parameters.

The parameters relating to the frequency bands are identified directly by the frequency value expressed in Hz or kHz and, if they contain decimal values, they also use the dot (.) as a decimal separator.

Data	LAI	LAF	LAeq	LAFmax	LAFmin	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz
2026/06/11 14:53:51.0	49.7	42.7	44.3	43	40.5	37.8	42.3	40.9	52.8	48.6	50.7	42.3	38.6	50.4	35.5	36	32.9	33.5	32.5	33.8
2026/06/11 14:53:51.1	49.4	41.2	39	42.8	41.1	38	41.3	37.9	53.9	48.4	50.4	45	37.6	50	37	34.5	34.8	32.7	30.5	32.5
2026/06/11 14:53:51.2	49.1	40.8	40.5	41.3	40.7	37.5	38.9	35.6	53.9	50.1	47.7	43.1	38.5	49.5	39.7	35.9	32.5	30.9	31.1	32.4
2026/06/11 14:53:51.3	48.8	40.7	40.7	40.8	40.6	37	35.6	35.7	52.2	49.4	49.6	43.2	41.4	49.4	37.9	35.5	34.2	31.4	30.7	31.8
2026/06/11 14:53:51.4	48.5	41.6	42.3	41.8	40.7	34.4	36.9	40.4	53.4	47.9	50.5	45	42.7	50.7	39.4	35.8	32.4	30.1	29.6	32.1
2026/06/11 14:53:51.5	48.2	41.3	41	41.8	41.2	36.6	42	41.2	55.2	48.7	50.7	47.3	42.5	49.6	39.9	35.6	34.3	28.5	29	29.8
2026/06/11 14:53:51.6	48	41	40.8	41.4	41	41	43.1	42.2	55.2	47.4	50.3	47.5	41.9	49.8	39.4	36.4	35.9	27.3	28.4	31.4
2026/06/11 14:53:51.7	47.7	39.9	38.9	41	39.9	41.9	41.5	40.1	53.3	46.7	48.8	46	41.9	49.9	37.7	35.5	35	26.8	27.4	31.2
2026/06/11 14:53:51.8	47.4	42.1	43.2	42.4	39.9	42.1	42.3	40.2	54.3	49.3	46.4	44.6	41.5	49	41.5	36.8	34	29.4	31.5	30.6

The format is automatically generated by the following software features:

- Splitting into time intervals;
- Extracting a portion of the measurement;
- Extracting masks as separate measurements;
- Exporting to CSV format.

8.2 NL53 Format

Files generated by the Rion NL53 sound level meter saved in “Auto” mode are recognized, therefore the NX-43EX module is required.

Files can be produced by two distinct modules:

- “Sound Level Meter” (SLM) module → requires NX-43EX only
- “Octave, 1/3 Octave Real-Time Analysis” (RT) module → requires NX-43EX + NX-43RT

The correct structure of the measure must be present and must respect the following scheme:

A root directory named Auto_xxxx, containing:

- The Auto_xxxx.rnh file
- The subdirectories:

  or Auto_Leq or Auto_Lp_01

For the SLM module

- The Auto_xxxx structure is contained in the directory: NL-53 of the SD card
- In the Auto_Leq subdirectory you can find one or more files in the format: NL_0001_SLM_Leq_xxxx_yyyy.rnd
- In the Auto_Lp_01 subdirectory you can

  one or more files in the format: NL_0001_SLM_Lp_xxxx_yyyy.rnd

```
NL-53/
└── Auto_0001/
    ├── Auto_0001.rnh
    ├── Auto_Leq/
    │   ├── NL_0001_SLM_Leq_0001_0001.rnd
    │   └── ...
    └── Auto_Lp_01/
        ├── NL_0001_SLM_Lp_0001_0001.rnd
        └── ...
```

For the RT module

- The Auto_xxxx structure is contained in the directory: NX-43RT of the SD card
- In the Auto_Leq subdirectory there may be one or more files in the format: NL_0001_OCT_Leq_xxxx_yyyy.rnd
- In the Auto_Lp_01 subdirectory there may be

  one or more files in the format: NL_0001_OCT_Lp_xxxx_yyyy.rnd

```
NX-43RT/
└── Auto_0001/
    ├── Auto_0001.rnh
    ├── Auto_Leq/
    │   ├── NL_0001_OCT_Leq_0001_0001.rnd
    │   └── ...
    └── Auto_Lp_01/
        ├── NL_0001_OCT_Lp_0001_0001.rnd
        └── ...
```

 Note:

- Currently only the LP files contained in Auto_Lp_01 are read, i.e. the first 9999.
- The external directory Auto_xxxx can be copied from the SD to the PC or renamed without problems but the files inside it should not be renamed or moved.

In project management, the procedure prioritizes reading LEQ files in order to reduce the amount of data to be processed and obtain measurement results more quickly.

While viewing the measurement, you can choose whether to use:

- the LP data, which contains the complete time history
- the calculated LEQ values

The measurement display is only available if it contains at least two time history records: Files with only one record cannot be displayed, as they do not have enough time history for graphical processing.

When reading LEQ files, some of the view tabs will not be available, as they require the detailed data only present in LP files.

The user has complete freedom to configure the sound level meter parameters according to their needs. To this end, please refer to the sound level meter's technical documentation for details on the available settings.

It is possible, for example:

- Enable only the “Main” channel, or one or more “Sub” channels
- Freely choose the time constants: Slow, Fast, Impulse
- Select the desired weighting: A, C or Z

The procedure automatically reads the Auto_xxxx.rnh file, renaming the parameters consistently with the chosen configuration: a complete name for the parameters is constructed and any duplicate data is eliminated.

For example, if the user sets:

- Weighting: A
- Time constant: Fast the channel data will be renamed as follows:

- LAF → Instantaneous level with A-weighting and Fast time
- LAeq → Equivalent level
- LAFmax → Maximum level (Fast)
- LAFmin → Minimum level (Fast)
- LApeak → Peak level

For processing octave and third-octave bands, the procedure reads only the columns relating to the main data (Band). The columns relating to the second channel (Band2) are not acquired, regardless of the set configuration.

In the “Info” tab of the measurement display, all the data present in the Auto_xxxx.rnh file are reported, relating to the general information on the measurement and the sound level meter settings,

Depending on the type of acoustic analysis to be performed, it is recommended to configure the sound level meter to ensure the most appropriate data acquisition for the context. The recommended configurations are listed below:

- Environmental acoustics
    - o At least three channels with:
        - A-weighting Time constants: Fast, Slow, Impulse

        - Necessary for a correct evaluation of the impulsive components and percentiles. or "Frequency Analysis":

        - Third-octave bands Z - Fast

        - Necessary for identifying tonal components.

- Building acoustics
    - o At least one channel with:
        - Weighting A Time constant: Slow

    - Suitable for the correct evaluation of the maximum levels of discontinuous systems. or "Frequency Analysis":
        - Third-octave bands Z

- Necessary for performing Rw, D2mnT and Lnw calculations.
- Acoustics in work environments
    - o At least two channels:
        - One with A-Weighting – Slow
        - For the assessment of exposure levels One with C-Weighting

    - For the evaluation of the maximum peak level or “Frequency Analysis”:

Third-octave bands or octave bands Z Important note: If you use third-octave bands, the procedure still allows you to manage the project in octaves. Conversely, it is not possible to derive third-octave bands from measures recorded in octaves.

8.3 NL52 Format

Files generated by the Rion NL52 sound level meter saved in “Auto” mode are recognized

Files can be produced by three distinct modules:

- “Sound Level Meter” (SLM) module
- “Octave, 1/3 Octave Real-Time Analysis” (RT) module
- “Reverberation time” (RV) module

The correct structure of the measure must be present and must comply with the following scheme for the SLM and RT modules

A root directory named Auto_xxxx, containing:

- The Auto_xxxx.rnh file
- The subdirectories:
    - or Auto_Leq or Auto_Lp

For the SLM module

- The Auto_xxxx structure is contained in the directory: NL-52 of the SD card
- In the Auto_Leq subdirectory there may be one or more files in the format:

NL_001_SLM_Leq_xxxx_yyyy.rnd

- In the Auto_Lp subdirectory there may be one or more files in the format:

NL_001_SLM_Lp_xxxx_yyyy.rnd

For the RT module

- The Auto_xxxx structure is contained in the directory: NX-42RT of the SD card
- In the Auto_Leq subdirectory there may be one or more files in the format:

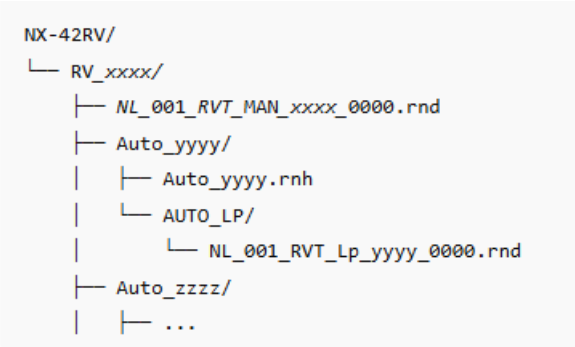
NL_001_OCT_Leq_xxxx_yyyy.rnd

- In the Auto_Lp_01 subdirectory there may be one or more files in the format:

NL_001_OCT_Lp_xxxx_yyyy.rnd

The correct measurement structure for the RV module is contained in the NX-42RV directory of the SD card and must comply with the following scheme:

- directory of the measure named RV_xxxx,
  containing:
  or The file
  NL_001_RVT_MAN_xxxx_0000.rnd o One or more Auto_yyyy subdirectories,
  each of which contains:
  The Auto_yyyy.rnh file The AUTO_LP subdirectory,
  containing the file:
  - NL_001_RVT_Lp_yyyy_0000.rnd



In project management, the procedure reads LP files first; in their absence, LEQ files are used.

When viewing the measurement, the LP data, if available, is displayed, supplemented with the Ly and Ly2 values contained in the LEQ file. If the LP files are not available, only the data from the LEQ file is displayed.

The measurement display is only available if it contains at least two time history records: Files with only one record cannot be displayed, as they do not have enough time history for graphical processing.

The user has complete freedom to configure the sound level meter parameters according to their needs. To this end, please refer to the sound level meter's technical documentation for details on the available settings.

The procedure automatically reads the Auto_xxxx.rnh file, renaming the parameters consistently with the chosen configuration.

In the “Info” tab of the measurement display, all the data present in the Auto_xxxx.rnh file are reported, relating to the general information on the measurement and the sound level meter settings,

Depending on the type of acoustic analysis to be performed, it is recommended to configure the sound level meter to ensure the most appropriate data acquisition for the context. The recommended configurations are listed below:

- Environmental acoustics

  or Main:

  □ Weighting A □ Time constant: Fast or SubMain

  □ A-weighting □ Time constant: Impulse □ Ly: LAImax □ Ly2: LASmax or “Frequency analysis”:

  □ Third Octave Bands □ Z – Fast or Store Times:

  □ Lp Store Interval: 100 ms □ Leq Calculation Interval: 1 s

  □ Indicated for the correct evaluation of impulsive and tonal components.

- Building acoustics

  or Main

  □ Weighting A □ Time constant: Slow

  □ Suitable for the correct evaluation of the maximum levels of discontinuous systems. or "Frequency Analysis":

  □ Third-octave bands □ Z

□ Required for performing R□w, D2mnT and L□nw calculations.

- Acoustics in work environments

  or Main

  □ Weighting A – Slow

  □ For the assessment of exposure levels or SubMain

  □ C-Weighting □ Ly: LCpeak

  □ For the evaluation of the maximum peak level or “Frequency Analysis”:

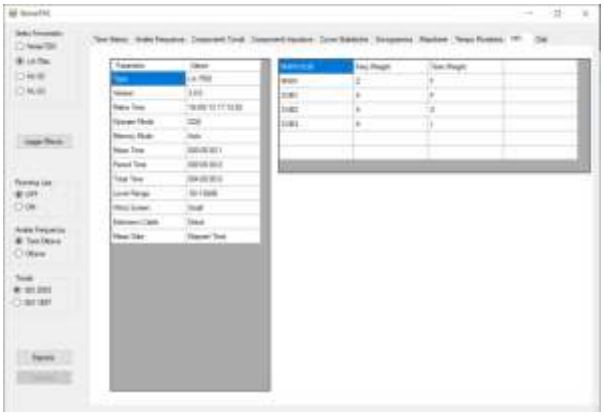
□ Third-octave bands or octave bands □ Z □ Important note: If you use third-octave bands, the procedure still allows you to manage the project in octaves. Conversely, it is not possible to derive third-octave bands from measures recorded in octaves.

8.4 LA70XX Format

Even for OnoSokki sound level meters only Auto files are recognized, in particular:

- Single SNGL-AUTO_*.csv
- Dual DUAL-AUTO_*.csv
- Quad: QUAD-AUTO_*.csv
- SQE SQE_-AUTO_*.csv
- Filter1/3 FIL3-AUTO_*.csv
- Filter1/1 FIL1-AUTO_*.csv
- RTA1/3 RTA3-AUTO_*.csv
- RTA1/1 RTA1-AUTO_*.csv
- LSIM LSIM-AUTO_ *.csv

The measurement display is only available if it contains at least two time history records: Files with only one record cannot be displayed, as they do not have enough time history for graphical processing.



The “Info” tab of the measurement view shows all the data present in the file header, relating to the general information on the measurement and the sound level meter settings.

Please refer to the technical documentation of the sound level meter for details on the available settings and the meaning of the individual sampled acoustic parameters.

8.5 SC250 Format

The procedure reads files with the extensions *1s.csv, *T.csv, and *F.csv, obtained using the sound level meter data converter to CSV files. Files with the extension *20ms.csv are not supported.



If a measure does not contain at least two records, it cannot be displayed, but it can still be used in projects.

So if you insert a *F.csv measure or a *T.csv measure with a single recording into a project, it will not be visible by double-clicking on the recordings grid.

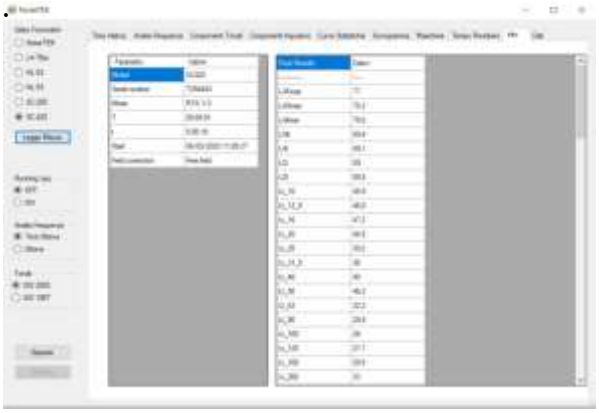
The “Info” tab of the measurement view shows all the data present in the file header, relating to general information on the measurement and the sound level meter settings.

For details on the sound level meter settings and the meaning of the individual sampled acoustic parameters, please refer to the sound level meter's technical documentation.

8.6 SC420 Format

The procedure reads files from the “RTA 1/3”, “RTA 1/1”, “Dosimeter” and “Sound Level Meter” acquisitions, while the “FFT” acquisition is not supported.

Files with the extension *S.csv, *T.csv, *O.csv and *D.csv, obtained using the converter of sound level meter data into CSV files, are therefore managed.



If there are at least two time history records, the measurements can be viewed; otherwise, they can only be used in projects.

The “Info” tab of the measurement view shows all the data present in the file header, relating to general information on the measurement, the sound level meter settings and the total measurement data.

For details on the sound level meter settings and the meaning of the individual sampled acoustic parameters, please refer to the sound level meter's technical documentation.

8.7 Svantek Format

To enable reading of measurements from Svantek sound level meters, it is necessary to download the data from the sound level meter using the SvanPC++ software and export them in CSV format.

The NoiseTEK procedure reads the data present in the buff*.csv files containing the time recording of the measurement.

The “Info” tab is not populated with additional information regarding the sound level meter configuration

For details on sound level meter settings and export procedures, please refer to the sound level meter's technical documentation.

8.8 Norsonic Format

To enable reading of the measurements from Norsonic sound level meters, it is necessary to download the data using the NorXfer program in Excel format.

The NoiseTEK procedure is able to read the data present in the “Summary” sheet of the NOR140_*_PROFILE.xlsx files.

Files produced by Norsonic sound level meters exported using the NorXfer software are recognized.

The “Info” tab is populated with additional information relating to the sound level meter configuration available in the *profile.xlsx file

For details on sound level meter settings and export procedures, please refer to the sound level meter's technical documentation.

9 Common Troubleshooting

This section collects the most frequent reports encountered during the installation and use of the NoiseTEK software.

If you encounter problems not described in this chapter, you can contact technical support (see the section dedicated to contacts).

9.1 Errors during installation

If you receive error messages while installing the software:

- Verify that you have administrator rights
- Make sure that antivirus and firewall are not blocking the executable
- Check that the .NET framework (minimum version 4.8) or higher is present

In case of unsuccessful installation, we recommend:

- Reboot your system
- Rerun the installer as administrator
- Send a screenshot of the error to technical support

9.2 Activation problems

The software requires an activation license:

- Verify that the proposed and sent data are correct
- Verify that the entered data are correct
- Run the program for the first time as administrator to be able to write on the

  %APPDATA%\NoiseTEK directory
- Verify that you can access and write to the %APPDATA%\NoiseTEK directory

9.3 Data import failed

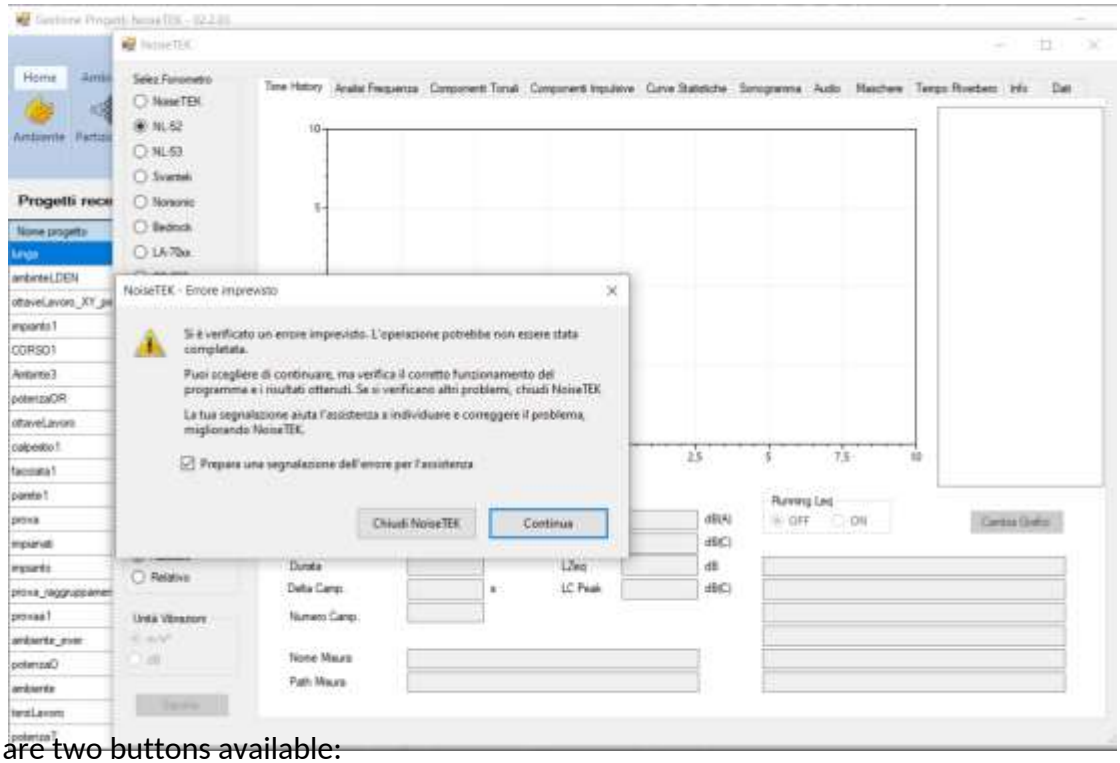
If importing or reading measurement files fails:

- Check that the file format is supported
- Check that the file is not opened in another application (e.g. Excel or Notepad)
- Check that the files have not been moved or renamed compared to the original project
- Make sure that the type of sound level meter selected is correct
- In case of generic CSV files, check that the internal structure is consistent with the standards

    expected

9.4 Unexpected errors

If an unexpected error occurs, NoiseTEK displays a warning window that warns you that the current operation may be interrupted and allows you to choose how to proceed.



There are two buttons available:

• Continue: Closes the warning window and attempts to resume normal operation of the program. The operation that caused the error may not have been completed, and some data or results may not have been updated correctly. If the error is limited, other functions may continue to operate normally. However, there is no guarantee that the program is in a completely consistent state. It is therefore recommended that you check the results obtained and, if further anomalies occur, close and restart NoiseTEK.
• Close NoiseTEK: This terminates the program. Any unsaved changes may be lost.

be lost, while previously saved data and projects normally remain available.

Reporting the error to support

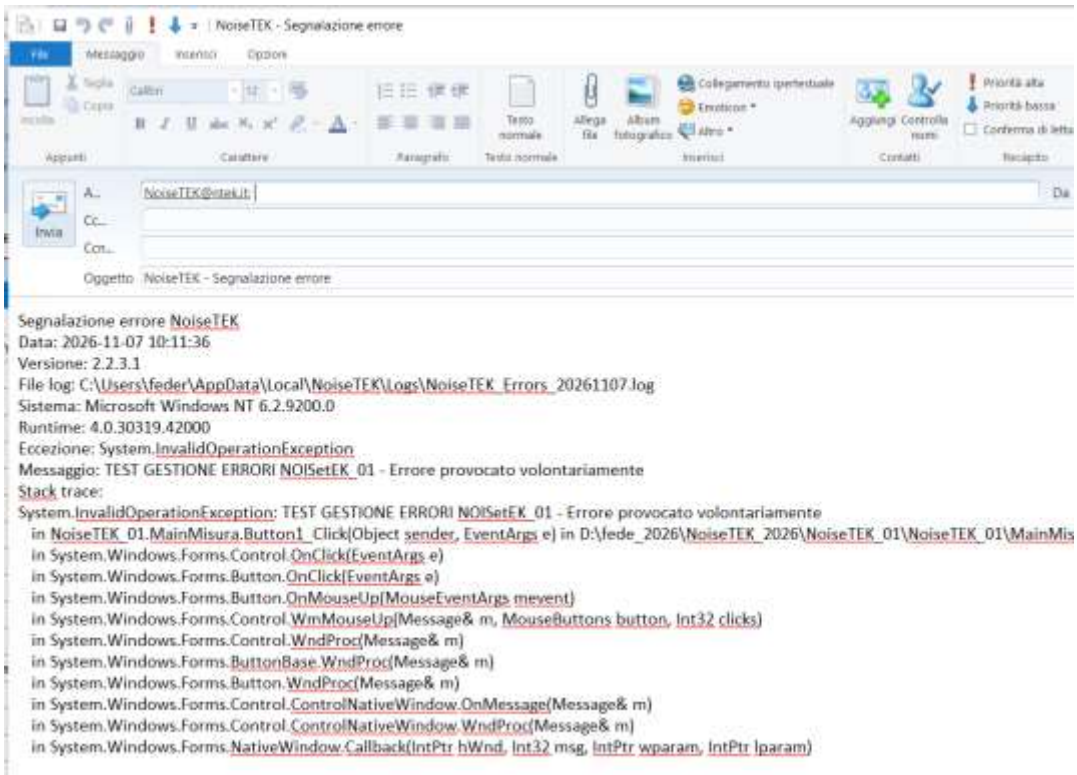
The "Prepare an error report for support" checkbox is selected by default. If left enabled, NoiseTEK will prepare a message in your email program, addressed to technical support.

The message automatically contains the main diagnostic information available, including:

- Date and time of the error.
- Version of NoiseTEK used.
- Path to the log file where the error was recorded.
- Information about the operating system and .NET environment version.
- Type of exception and its error message.
- Stack trace, which is the sequence of program calls that allows support to

  locate where the problem occurred.

The report is opened as an 'email draft': the user can check its content, add a description of the operations he was performing and possibly attach useful files or screenshots or the log file



Sending is not automatic: the message is sent to support only when the user presses “Send” in the email program.

By unchecking the box, no notification email will be prepared.

Error Logging

Regardless of whether you choose to submit a report, NoiseTEK automatically records errors in daily log files in the folder: `C:\Users\<user>\AppData\Local\NoiseTEK\Logs`

These files allow technical support to examine errors even later, if a report was not submitted at the time of the problem.

9.5 Failure to open email program

NoiseTEK allows you to automatically prepare email messages for:

- Request for activation codes, containing the information needed to obtain the license.
- Reporting of unexpected errors, containing useful diagnostic information to technical assistance.

To use these features, Windows must have a properly configured default email program.

If your mail program doesn't open, or you see a prompt to choose an application, you can configure it by following the instructions below.

Setup in Windows 10

1. Open the Start menu → Settings.

2. Select Apps → Default Apps.

3. Locate the Email item.

4. Click the currently selected application and choose your usual email program, such as Microsoft Outlook, Thunderbird, ...

5. Check, if necessary, that the MAILTO protocol is also associated with the same program, by selecting the default applications for the protocol.

Setup in Windows 11

1. Open Start → Settings → Apps → Default apps.

2. Find the email program you are using and select it.

3. In the list of available associations, locate the MAILTO protocol and set the chosen program as the default.

Manually sending requests

If you can't configure your email program, or you use email directly from your browser, you can still send the information manually.

For the activation request:

1. Open the code request window in NoiseTEK.

2. The request code is automatically copied to your clipboard.

3. Open your email program or service and create a new message addressed to NoiseTEK support: noisetek@ntek.it

4. Paste the code into the message text using Ctrl+V.

5. Add your contact details and submit your request.

To report an error:

1. If automatic email preparation does not work, note the operation during which the error occurred.

2. Open your email program and create a message addressed to NoiseTEK support: noisetek@ntek.it

3. Describe the problem, indicating the program version.

4. Attach the log file for the day of the error, located in the folder:

`C:\Users\<user>\AppData\Local\NoiseTEK\Logs`

5. Send the message.

The log file contains technical information that is useful for identifying the source of the error, even when it was not possible to automatically prepare the report.

Note: NoiseTEK does not automatically send emails. Even when automatic preparation is working properly, the user can check the message and confirm sending in their email program.

9.6 Technical support contacts

For any technical problems, please write to: noisetek@ntek.it

10 Appendix A – Supported Tools and Features

Sound level meter / format	Sound levels	Audio	Marker	Reverberation time from SLM	Vibrations
NoiseTEK	ok	Not provided	Not provided	Not applicable	Not applicable
NL-52	ok	ok	ok	ok	Not applicable
NL-53	ok	ok	ok	Planned	Not applicable
Svantek	Under test	Planned	Planned	Not provided	Planned
Norsonic	ok	ok	ok	Not provided	Not applicable
Bedrock	Under test	Planned	Planned	Not provided	Not applicable
LA-70xx	ok	Planned	Planned	Not provided	Not applicable
SC-250	ok	Planned	Planned	Not provided	Not applicable
SC-420	ok	Planned	Planned	Not provided	Not applicable
VI400	ok	Not provided	Not provided	Not provided	ok
BSWA / PCE	Under test	Planned	Planned	Not provided	Not applicable
Wave (TR only)	ok	Not applicable	Non applicabile	Non applicabile	Not applicable

11 Appendix B – NoiseTEK File Extensions

Extension	Module	Function
.nta	A2A	A2A cabinet measurements
.ntc	Impact sound	Impact sound measurements
.ntf	Facade	Facade insulation measurements
.ntg	Environment	Environmental noise measurements
.nti	Imag. Wall	Imaginary wall measurements
.ntic	Cont. sys.	Continuous-operation system measurements
.ntid	Interm. sys.	Intermittent-operation system measurements
.ntl	Workplace	Workplace noise measurements
.nto	Octaves	Octave-band measurements
.ntp	Partition	Partition sound insulation measurements
.ntv	Vibrations	Workplace vibration measurements
.ntw	Sound power	Sound power measurements
.ntk	Measurements	Saving masks
.ntktr	Measurements	Saving reverberation times
.9612	Workplace	Saving workers' noise exposure assessment
vev	Vibrations	Saving workers' vibration exposure assessment