

# EC704

## Acoustic performance of buildings

The software calculates the sound insulation of buildings according to the procedures indicated in the **UNI EN ISO 12354:2017** and **UNI 11175:2021** standards, from the geometry of the rooms and the characteristics of the building components and according to the type of joints between different structures. Calculations can be performed both in accordance with the previous standard (UNI EN 12354:2002 standards) and with the 2017 versions of the UNI EN 12354 standards package.

It also compares the calculated sound insulation with the limits of the **D.P.C.M. 5/12/1997** "Determination of passive acoustic requirements of buildings" and according to the type of use.

Finally, it is possible to calculate reverberation time **T60**, **C50** and **STI**, according to **UNI 11532** (including **UNI 11532-2:2020** dedicated to school buildings) and to carry out the **Acoustic Classification** of building units according to **UNI 11367** and **UNI 11444**.

The software prepares a dedicated report of acoustic requirements for compliance with the Minimum Environmental Criteria (CAM) under the Ministerial Decree of June 23, 2022.

The acoustic properties of building structures can be easily determined using the many alternatives offered by the software:

- Use of laboratory-certified structures, available in the archive provided by Edilclima;
- Link to the abacus of building structures taken from Appendix B of UNI/TR 11175;
- **Predictive calculation** of acoustic properties from component stratigraphy using empirical relationships (mass laws) or more detailed analytical calculations (Sharp and Davy methods).
- **Correction of sound reduction index** for values below the critical frequency to account for the radiation factor of structures.

The software has a **graphic input**, the same as in the EC700 - Calculation of Energy Performance of Buildings software, which allows graphical processing of building and room geometry with automatic extrapolation of all room couples for verification of  $R'w$  and  $L'n,w$  and of walls to be subjected to facade verification  $D2m,nT,w$ .

As an alternative to graphic input or for manual editing needs, tabular input and/or manual editing of what has been exported is always available in a clear form to allow checking of surfaces, lengths, room couples, facade elements, joint types, etc.

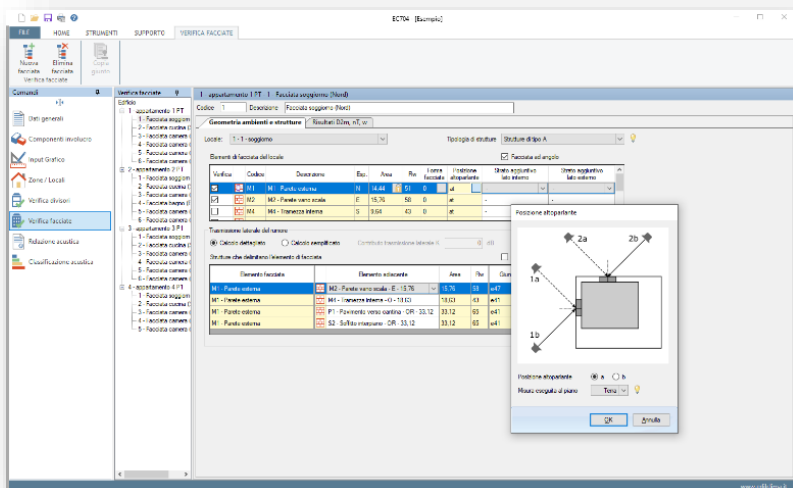
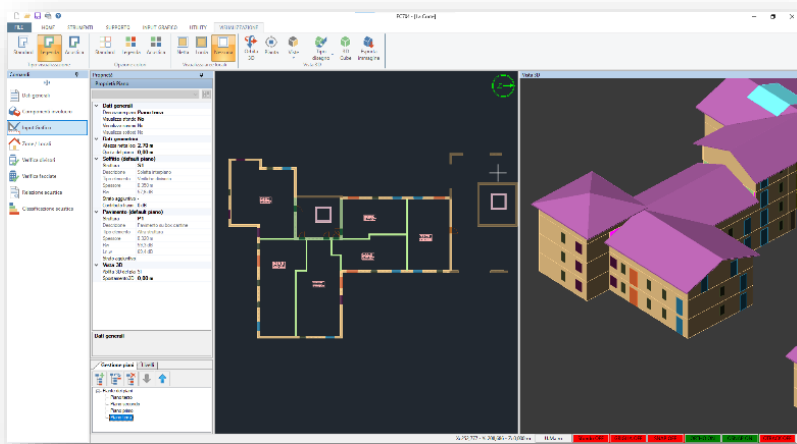
The program can also model and calculate façade sound insulation according to the **corner façade calculation method** introduced by UNI 11175:2021 to account for diffraction effects.

**EC704 can read the projects produced by EC700 - Energy Performance Calculation of Buildings**, automatically reporting:

- All building components, opaque structures, and windows with their stratigraphy;
- All zones with their corresponding rooms, whose volume and list of dispersing surfaces are acquired;
- Any graphic input with the drawing processed in EC700, which can be opened, viewed and edited with EC704.

If the structures used within EC700 do not have the acoustic data, it is possible to calculate the missing parameters with EC704 using predictive calculation.

Finally, about Acoustic Classification, the program allows two documents to be drafted in two different ways:

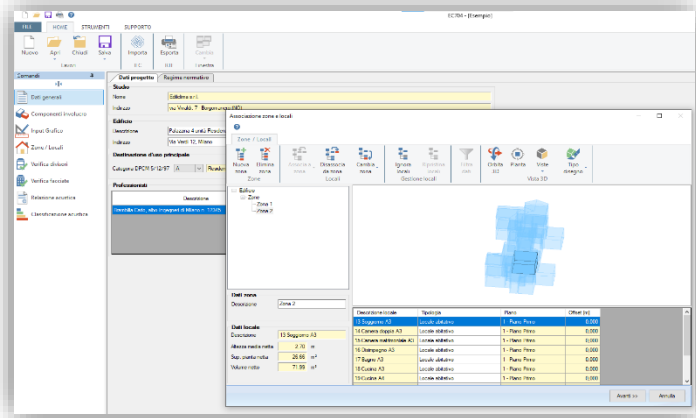


- **Design classification**, based on values calculated using UNI EN ISO 12354 standards; this evaluation is not required by UNI 11367 but allows the designer to preliminarily estimate the acoustic class of the building.
- **Classification from field measurements**, in accordance with UNI 11367 and UNI 11444, allows the entry of measured values, either by measurement of all technical elements or by sampling (specifying the number of homogeneous elements and the level of confidence).

## IFC file import

The software allows the **import of IFC files** produced with any modelling software, ensuring complete **interoperability** between the tools adopted by the designers and EC704.

The use of this functionality greatly facilitates the designer's work, allowing him to avoid the preliminary stages of building modelling (reconstruction of the 3D model, characterization of building components) and concentrate only to the determination of the acoustic parameters of the envelope components.



## Reports

The following printouts can be made:

- technical report certifying compliance with the passive acoustic requirements of buildings and their components, the report is available in text format (.RTF);
- printout of the document certifying compliance with the Minimum Environmental Criteria (CAM).
- printout of the Acoustic Classification document from design or from in field measurements.

## Archives

The software is equipped with the archives listed below; the materials archive and the building structures archive are shared with the EC700 program:

- archive of laboratory-certified building structures from manufacturers, distinguished between stand-alone structures and additional layers (counter walls, false ceilings...) to perform calculation in accordance with UNI EN ISO 12354 standards.
- archive of window components;
- abacus of structures in accordance with Appendix B of UNI/TR 11175;
- archive of small technical elements (e.g., air inlet devices or shutter boxes);
- acquisition of joints from UNI EN ISO 12354-1:2017 considering the different types of structures provided in the standard (type A, B and CLT structures);
- archive of materials with their respective frequency-dependent absorption coefficient values for calculating room reverberation time T60, C50 and STI.

