# Manual

dB aisla 3.01

TRANSMISSION LOSS PREDICTION SOFTWARE

Note:

The aim of this programme is to perform the normal insulation calculations in the field of Acoustical Engineering.

It is the user's responsibility to decide whether he/she has the necessary theoretical knowledge to use this programme correctly.

*Ingeniería para el Control del Ruido* (ICR) bears no liability for any damage arising from the use of this programme by persons not pertaining to its technical department.

# Index:

# I.- Introduction

**dBKAisla** is a programme designed for the study of insulation, through the calculation of Single and Multiple Walls. This programme is a simulation tool which serves as a guide for the theoretical calculation or insulation, the opinion of the user being necessary.

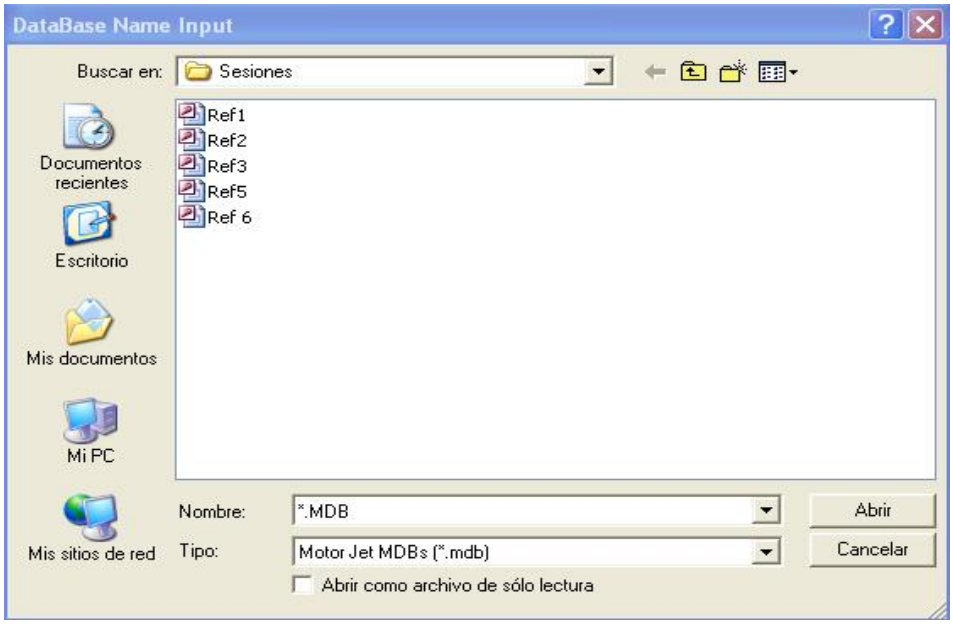
# II.- Beginning


With the LOAD SESSION tab, you access the session selection screen.

With NEW SESSION, you access the startup screen with a new session.

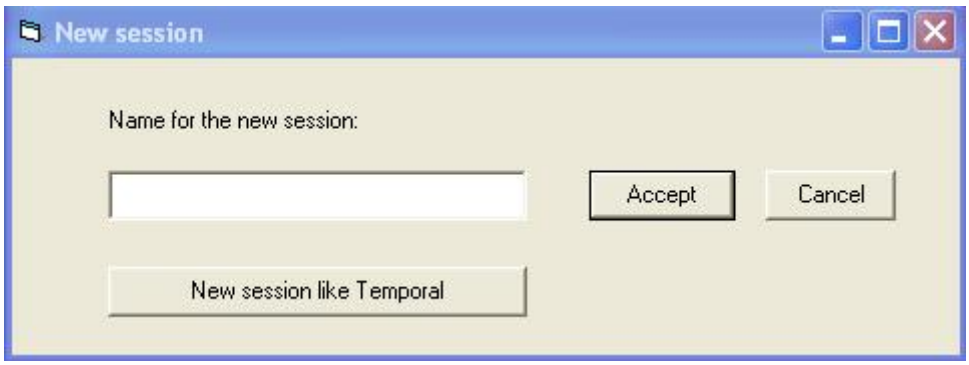
Note: the work is divided into sessions, each session containing the information about all the walls used at the time.

## II. I.- Session selection screen



On loading a session, you have to choose between ‘Opening’ a previously saved session or ‘Cancel’. With the option ‘Cancel’ a new completely empty reference session is started (‘Temporary.mdb’). In order to access the calculations made in the ‘Temporary.mdb’ session at a later time, the user must save this session with a different name, otherwise the programme will delete the calculations made therein.

## II. II.- New session screen



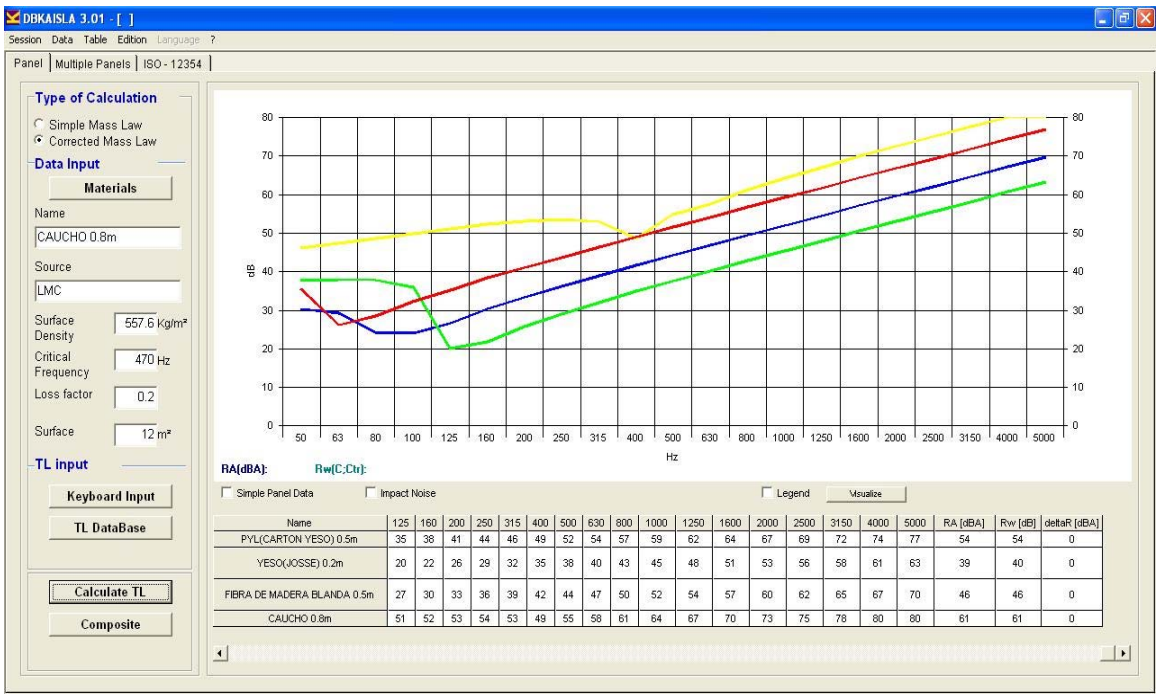

On starting up with a new session, you can insert a name and generate a new session or start up a reference session (‘Temporary.mdb’) by clicking ‘Start up session as Temporary’, which must be saved with a name in order to be accessed at a later time.

## II. III.- Language selection

The language must be selected on starting up a new session.
To change the language again, it is necessary to start up a new session.

# III.- Input panel

On starting up the programme, once the work session has been selected, the following environment appears:



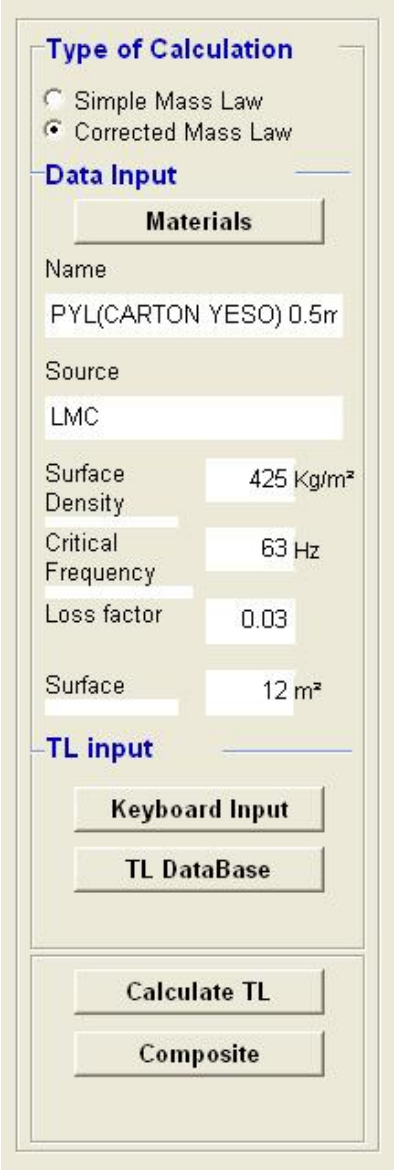

The work environment is divided into two folders (three if you have the ISO-EN 12354 module):

- Panel. For calculating single walls, combined walls and data load.
- Multiple Panels. For calculating multiple walls.
- ISO 12354. For calculating according to the ISO 12354.

# IV.- Panel

In the Panel allocated for calculating the insulation of single walls, different parts can be distinguished:

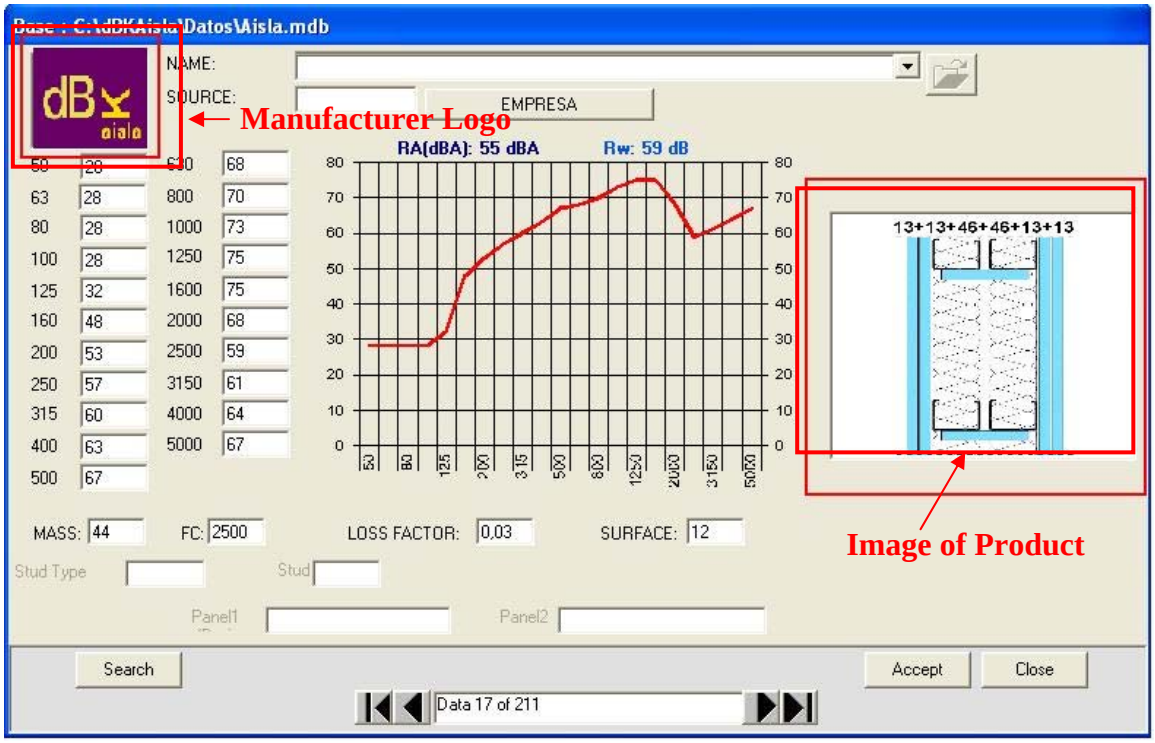
## IV. I.- Calculation



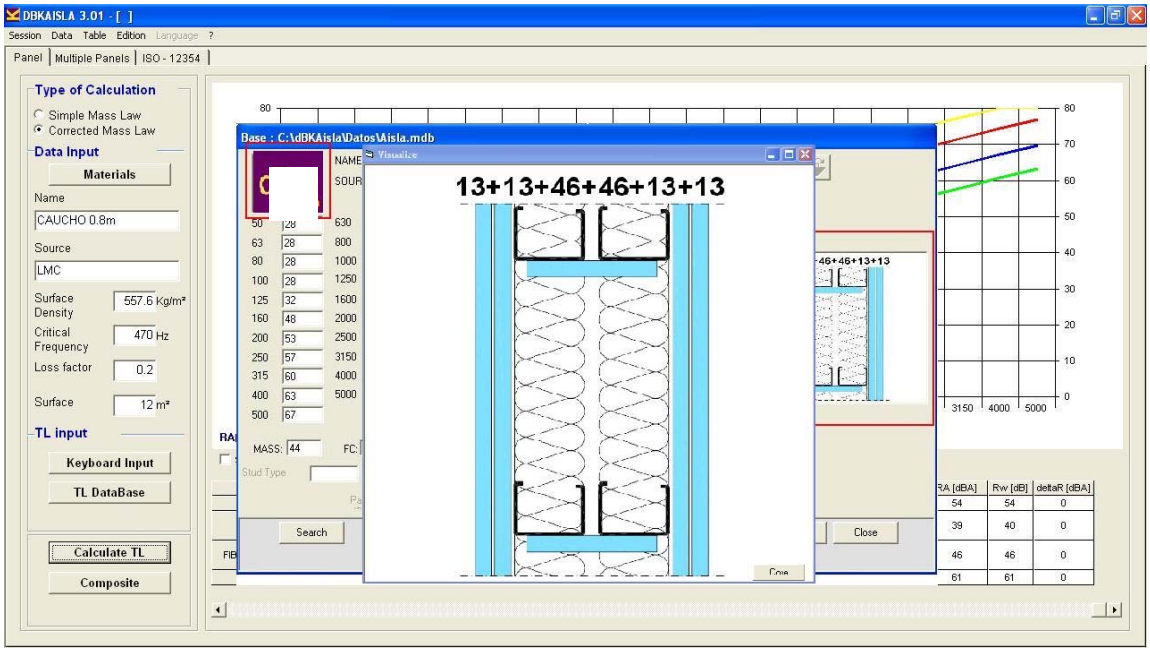

Corresponds to the left of the screen and allows you to select the parameters necessary to calculate the insulation of the panel.

You can choose between '<u>Mass Law</u>': which just requires the name of the wall and surface mass, and '<u>Corrected Mass Law</u>': which also requires, apart from the name and surface mass, the other fields to be filled in (coincidence frequency, internal damping coefficient and surface), which can be introduced manually or by using the **Materials** tab which provides access to data about walls made of standard materials. Having selected the type of calculation, the calculation is then performed using the **Calculate TL** tab. Besides being able to calculate the insulation of the different panels, it is possible to carry out data input via keyboard **Keyboard Input**, whereby it is the user who introduces the insulation values for each and every one of the frequencies. Also, via **TL DataBase** you can access laboratory measured walls and walls calculated in earlier sessions (single and multiple), such that walls continue to be included by clicking on the 'Accept' tab until you close with the 'Close' tab.

Within the laboratory measured walls, you can access the products of different manufacturers, showing the Company logo and a picture of the product among other characteristic parameters:

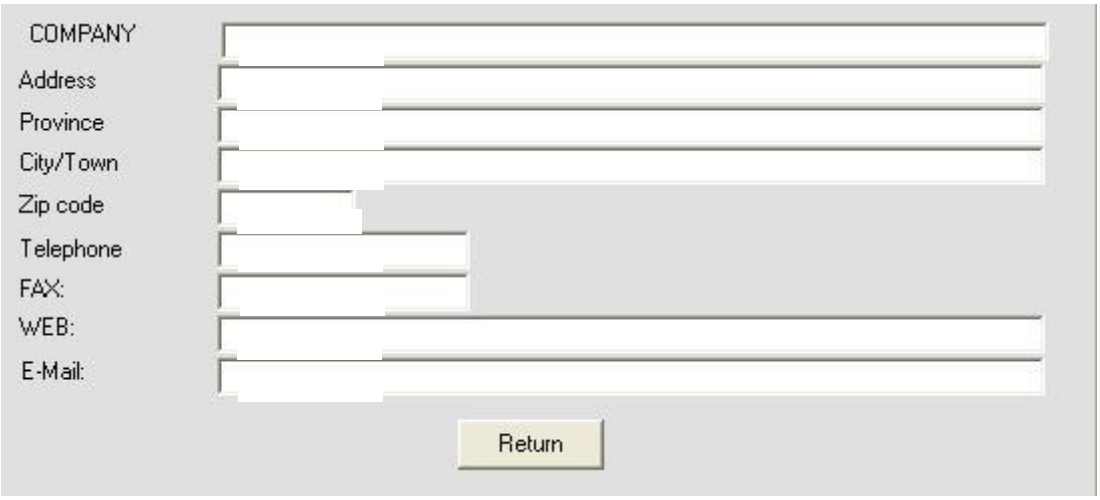



By clicking on the picture of the product, you zoom in on it in order to see it in greater detail:

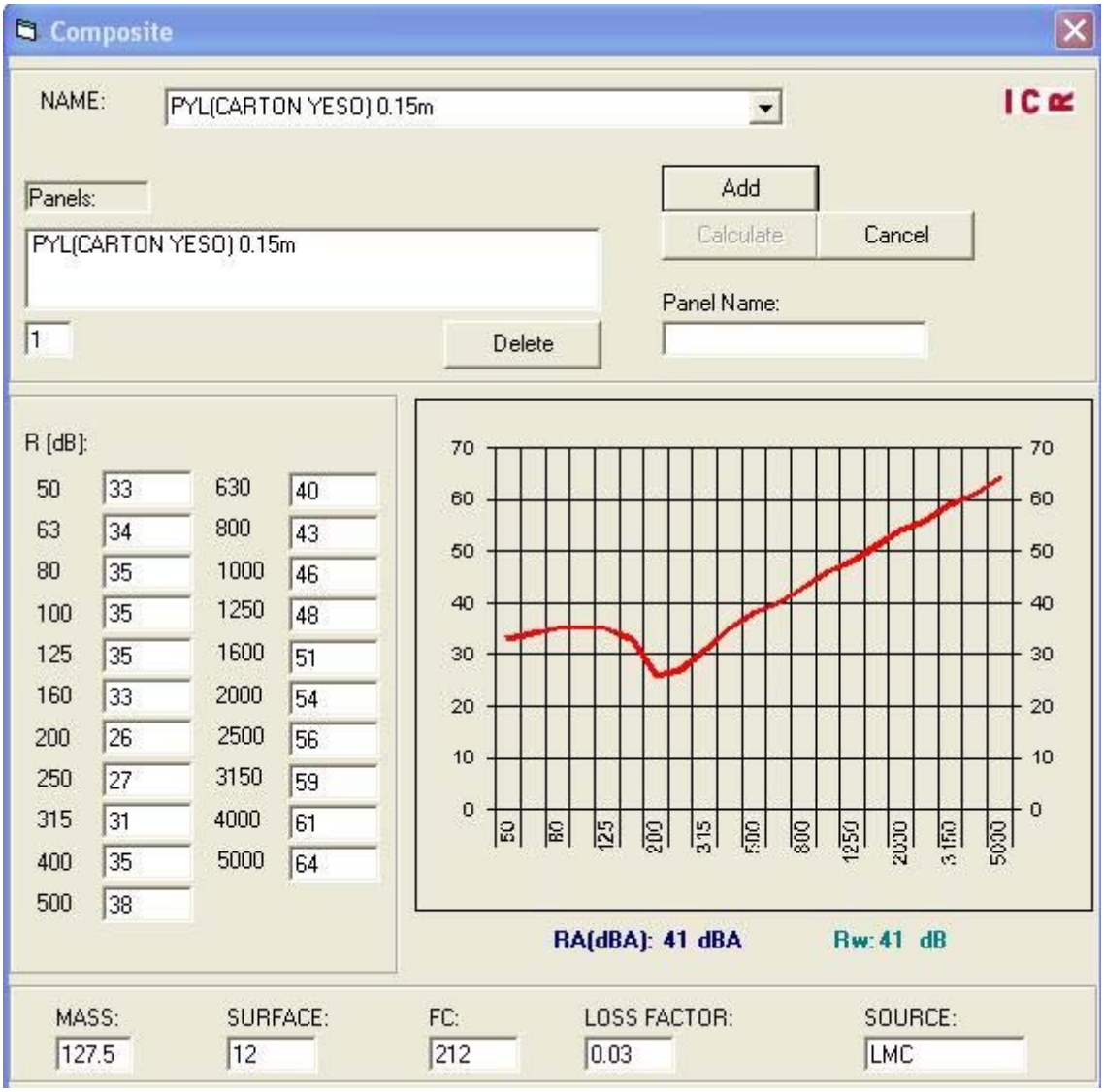



The display is closed using the ‘Close’ tab.

Using the COMPANY tab, you access the data of the manufacturer:




Finally, from the main screen, 'Panel', you can also choose the mixed insulation calculation option, Aislamiento Mixto, giving way to the wall selection screen to constitute the new combined wall:

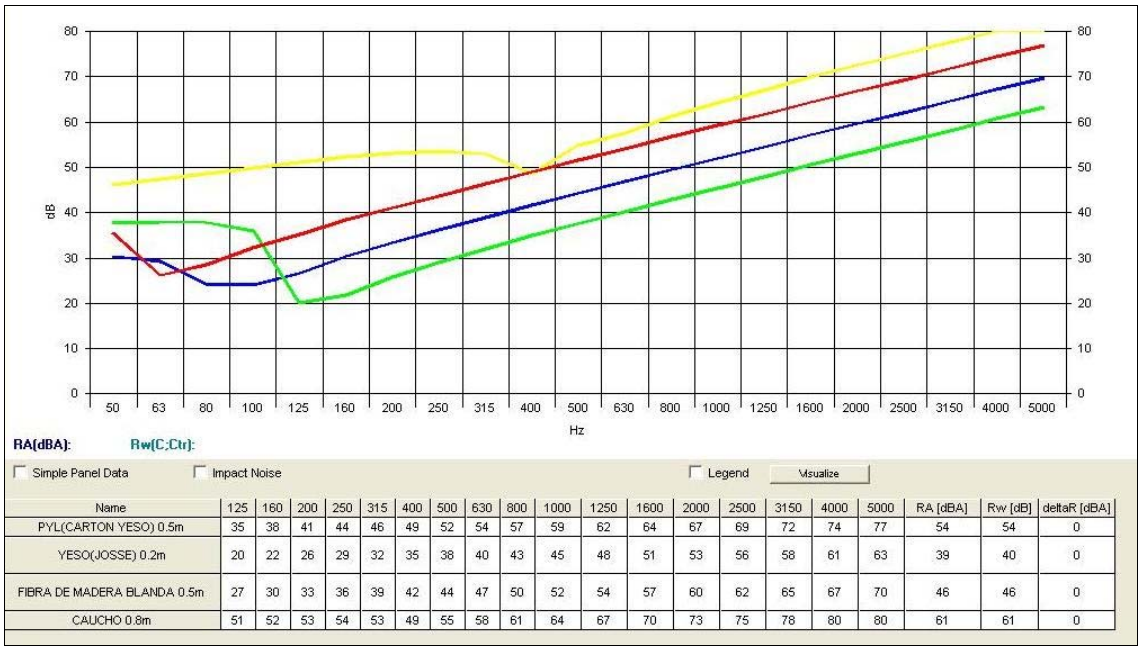



Add is used to introduce the walls that will make up the mixed wall and they are incorporated in the wall panel, where the name of the same can be seen. For each wall, the programme asks the user for the surface with which it will form part of the mixed wall.

Delete is used to delete the selected wall from the list of walls.

Calculate is used to calculate the mixed insulation of the selected walls. If the name of the newly calculated wall is not specified ('Wall name'), el programme asks the user for a name.

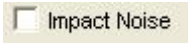
## IV. II.- Graph




| Name | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3150 | 4000 | 5000 | RA [dBA] | Rw [dB] | deltaR [dBA] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PYL(CARTON YESO) 0.5m | 35 | 38 | 41 | 44 | 46 | 49 | 52 | 54 | 57 | 59 | 62 | 64 | 67 | 69 | 72 | 74 | 77 | 54 | 54 | 0 |
| YESO(JOSSE) 0.2m | 20 | 22 | 26 | 29 | 32 | 35 | 38 | 40 | 43 | 45 | 48 | 51 | 53 | 56 | 58 | 61 | 63 | 39 | 40 | 0 |
| FIBRA DE MADERA BLANDA 0.5m | 27 | 30 | 33 | 36 | 39 | 42 | 44 | 47 | 50 | 52 | 54 | 57 | 60 | 62 | 65 | 67 | 70 | 46 | 46 | 0 |
| CAUCHO 0.8m | 51 | 52 | 53 | 54 | 53 | 49 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 75 | 78 | 80 | 80 | 61 | 61 | 0 |

Area in which the different insulation graphs of the calculated walls are shown. The graph legend can be viewed using the ‘Legend’ tab. With the ‘Display’ tab, it is possible to select the insulation curves to be displayed on the graph (useful when there are various graphs on the screen). At the bottom, you can find the list of walls represented in the graph and the different walls are represented with the numerical values in the different calculation frequencies. ‘Single Wall Data’ is used to show all the physical data of the wall.

Impact Noise Insulation information is also available. For this it is necessary to activate the “See Impact Noise” tab. If 

is activated, standardized impact sound pressure levels $L_n$ will be shown on the table. If 

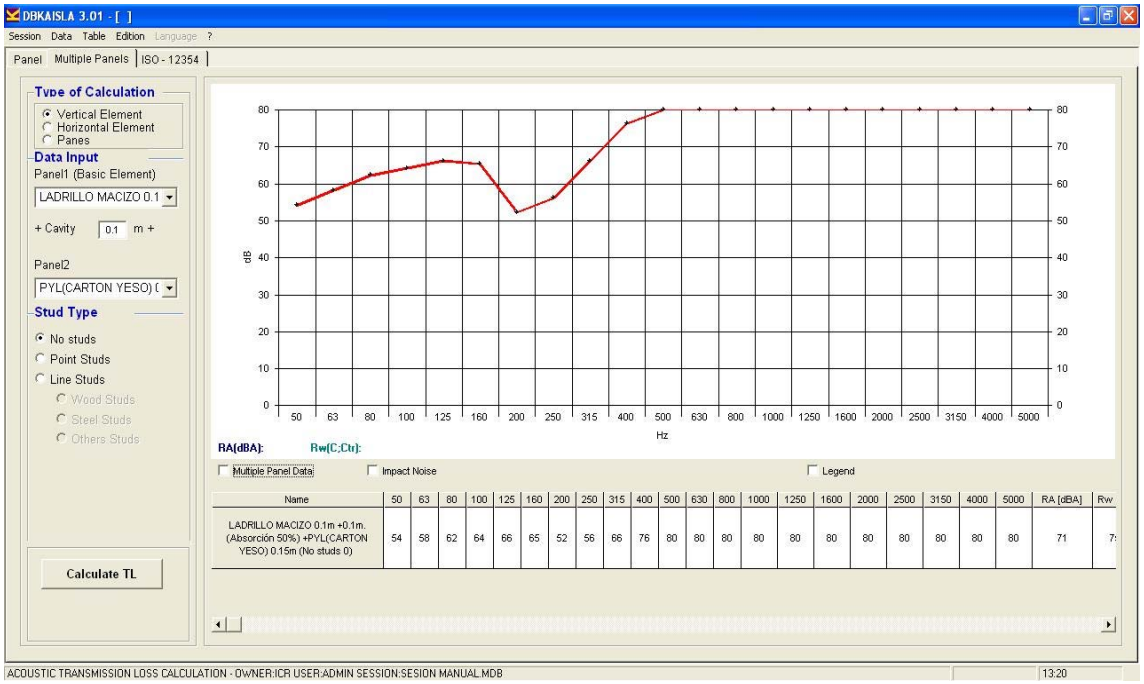
is not activated, the values shown will be for airborne Sound Insulation.

For both single and multiple panels, the overall value of airborne sound insulation in A-weighted form and their corrected value “Rw(C;Ctr)” are shown. The latter is applied for the 100 Hz to 3150 Hz frequency range.

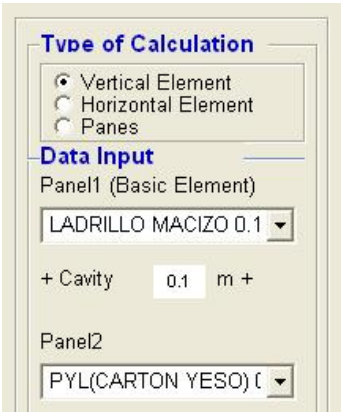
For viewing, it is necessary to click on the row for the panel we wish to see:

# V.- Multiple panels

Corresponds to the folder for the calculation of multiple walls:

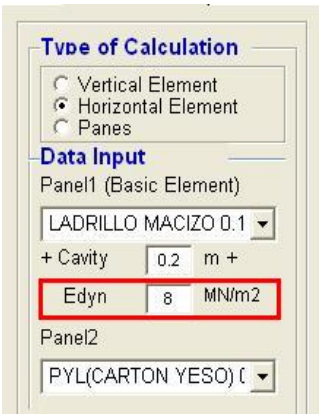



First, you should select the type of multiple panels. For this it is necessary to activate the “Calculation Type”. The data input presentation of Vertical Elements will be:




For Horizontal Elements, the data input will be:

In this case, it is necessary to introduce the dynamic elasticity module value (Edyn [MN/m$^2$]) of the elastic material installed.




The calculation of dynamic stiffness (s') is determined from the Edyn and the cavity distance (d):

$$s' = \frac{Edyn}{d}\left[MN/m^3\right]$$

These are some of the Edyn reference values according to the density of the elastic material:

| | Edyn [MN/m$^2$] | |
|---|---|---|
| Densidad [kg/m$^3$] | Lana de Vidrio | Lana de Roca |
| 10 | 0,1 | |
| 20 | 0,102 | |
| 30 | 0,105 | 0,215 |
| 40 | 0,113 | 0,227 |
| 50 | 0,124 | 0,251 |
| 60 | 0,137 | 0,274 |
| 70 | 0,154 | 0,32 |
| 80 | 0,173 | 0,372 |
| 90 | 0,2 | 0,442 |

Having selected the type of calculation, you then choose a single wall, then the width of the intermediate cavity (air + absorbent material; by default, cavity with 50% absorbent material will be assumed), the dynamic stiffness value of the intermediate elastic material (if it is a horizontal element) and, finally, the second single wall. Next, click on the 

tab to perform the calculation.

In the event of double walls not being ideal walls (without junctions), you must select the type of junction existing between the walls:

- By points (ceilings, screw joints)
- By lines (wooden or metal framework and brick walls). In this case, we can choose the quantity and type of absorbent material in the cavity.

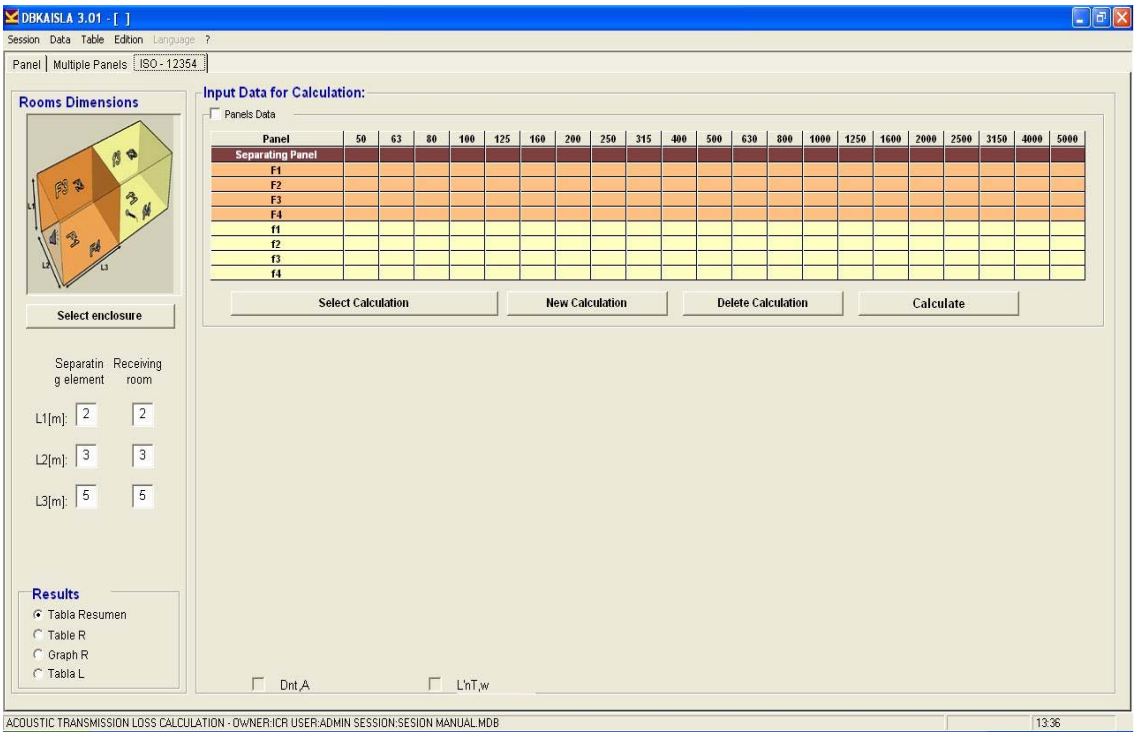
Note1: In the case of the name of a horizontal element, the dynamic stiffness value (s') will be shown followed by the type of absorption.

Note 2: It is important to follow the order of the walls that make up the multiple wall. By default, the wall introduced in Panel 1 will be assumed as the base element of the partition.

# VI.- UNE EN 12354: 2000

**dBKAisla** includes the module for calculating according to the UNE EN 12354-1: 2000 standard for Airborne Sound Insulation and the UNE EN 12354-2: 2000 standard for Impact Sound Insulation. These standards give us the necessary instructions for estimating the acoustic characteristics of buildings based on the characteristics of their elements.

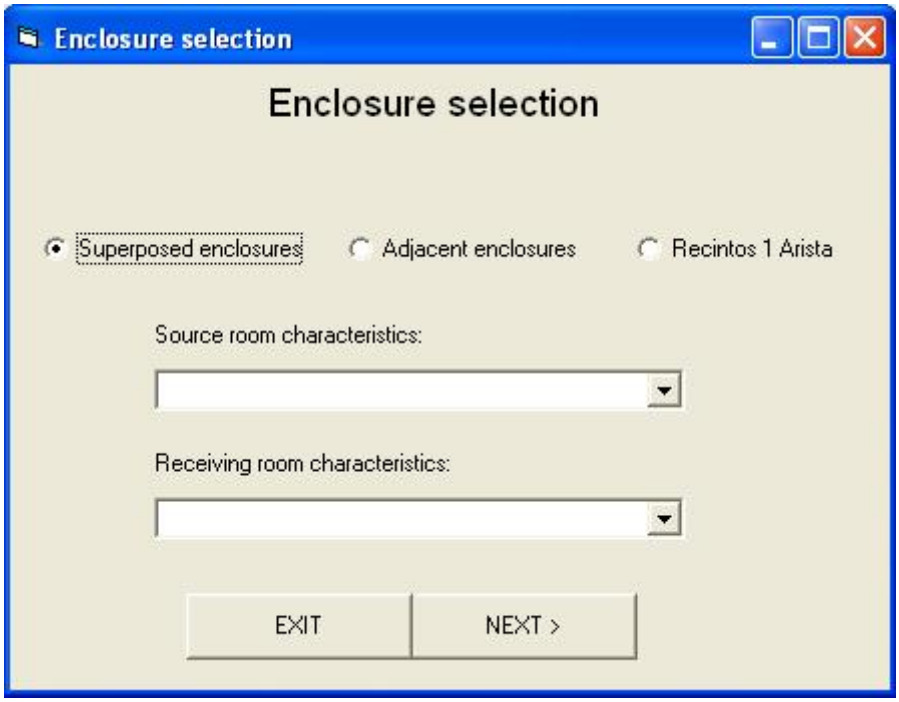
The graphic interface is the one shown below:




To make the calculation, the following steps must be taken:

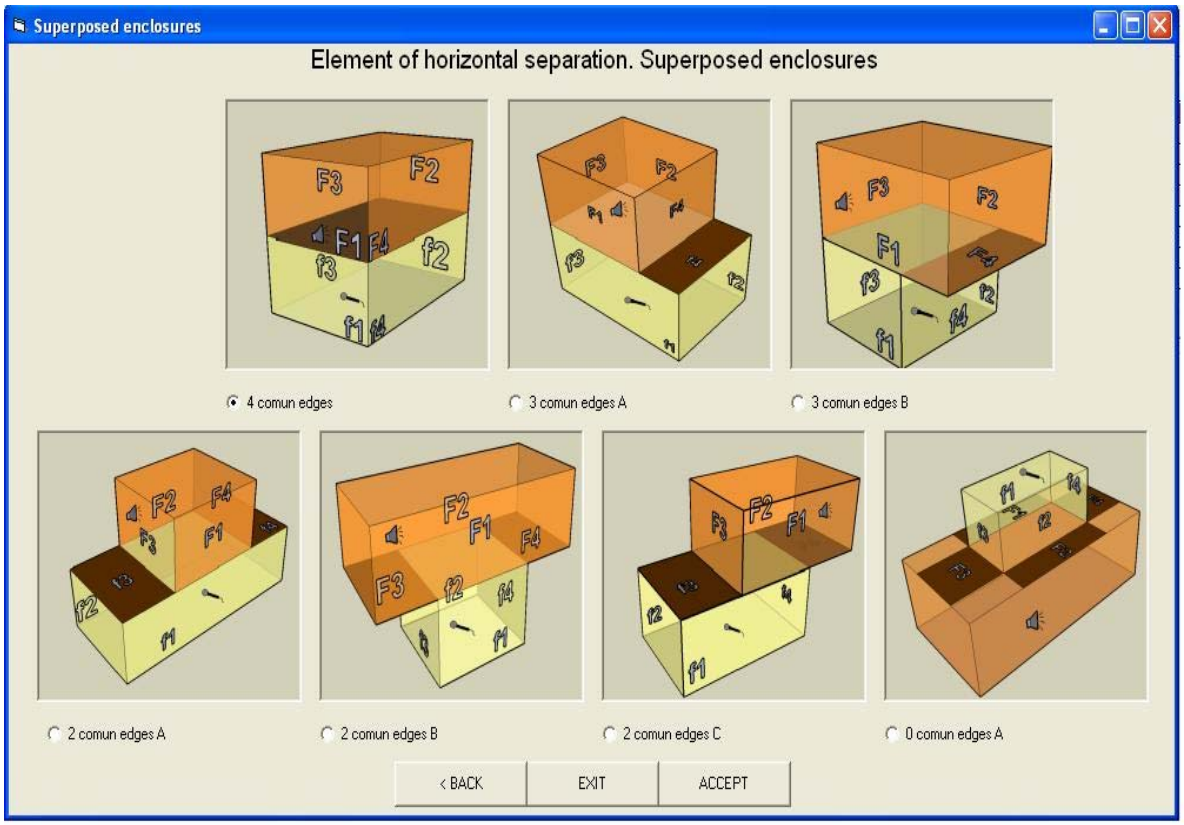
1. Select the type of site characteristic of the calculation we wish to make. The different site options can be accessed using the Select enclosure tab.

   Having selected this option, a new window appears where you can choose the type of site depending on whether they are superimposed or adjacent sites or sites with a single edge in common.

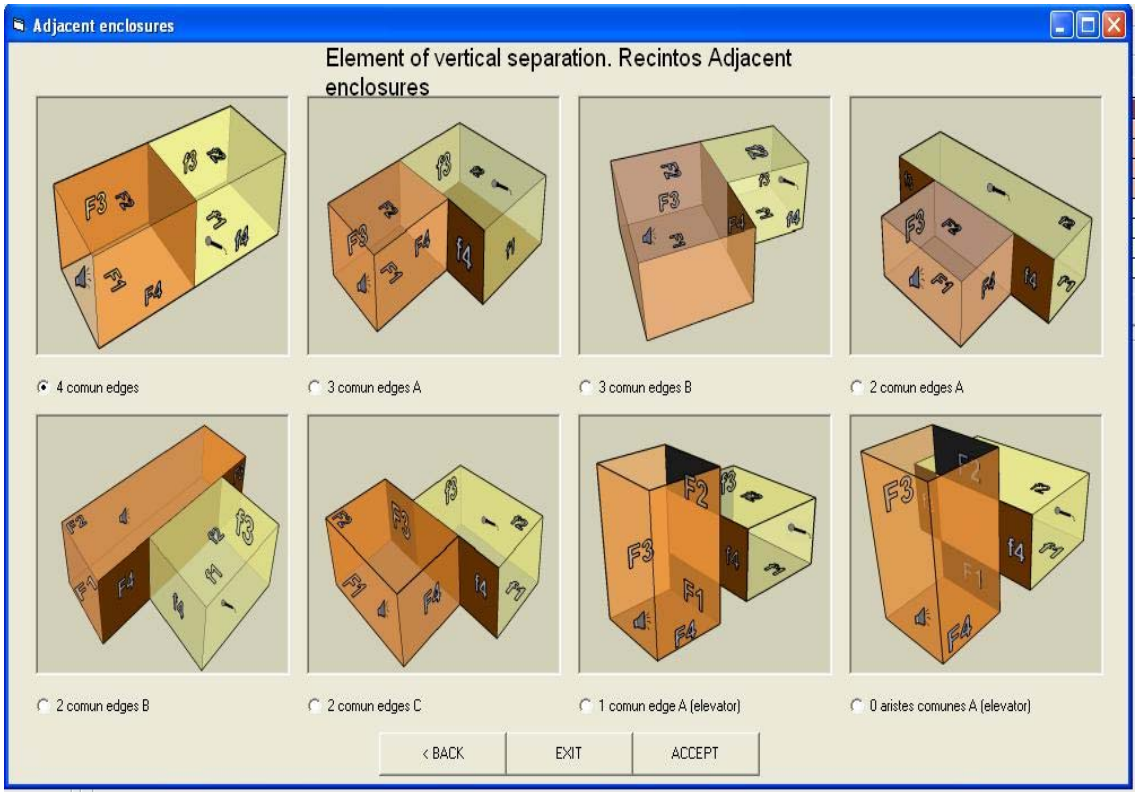



By accepting the chosen option, you access the different sites:

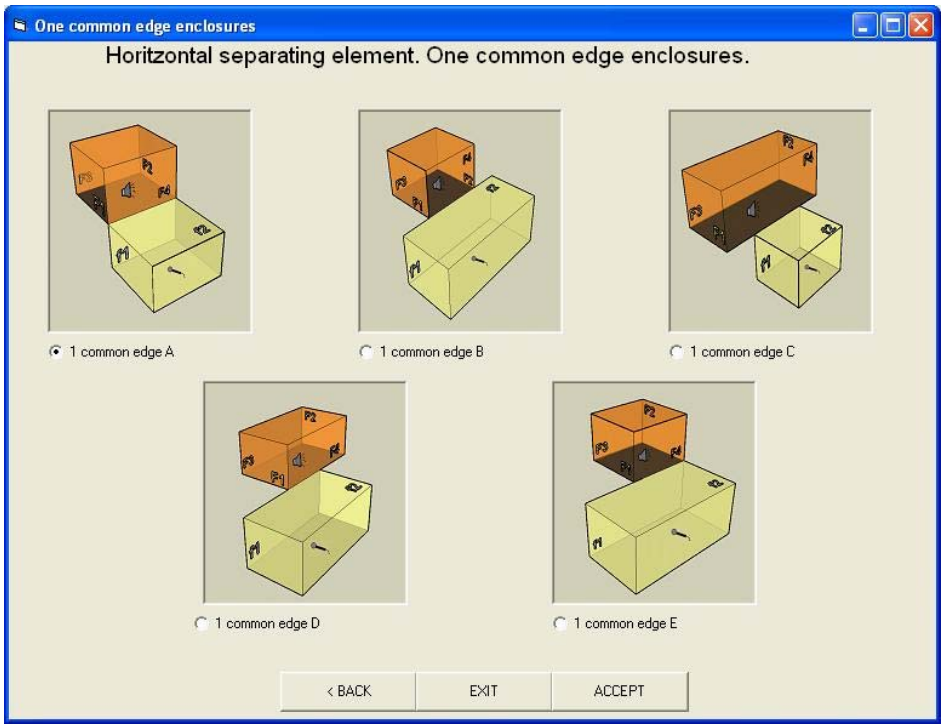
Choosing the ‘Superimposed Sites’ option takes you to the following screen:




If you choose ‘Adjacent Sites’ the screen which appears is shown below:




By choosing the 'Sites 1 Edge' option, you can select on the following screen:

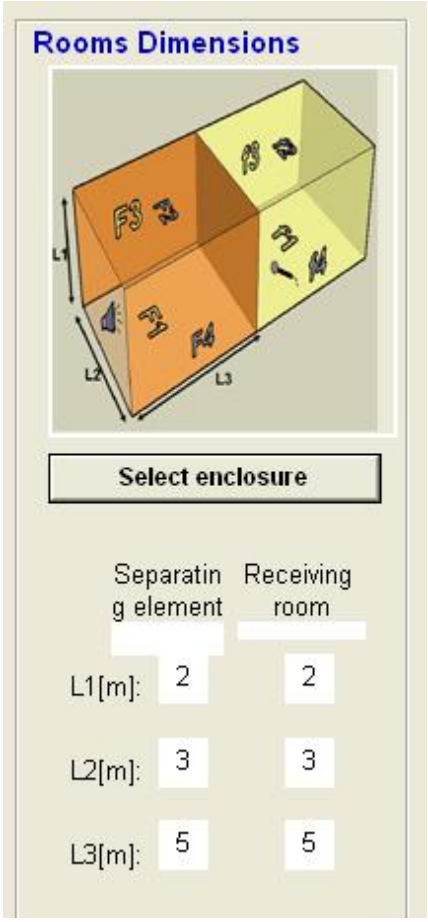



In all cases, after having selected the desired option, you then have to click on the 'Accept' tab to make the calculation. By clicking the 'Exit' tab, you exit the screen without making any changes.

The chosen site option is now displayed on the main ISO 12354 screen of the programme. By clicking on the image which appears on said screen, the zoom of the chosen site is shown.

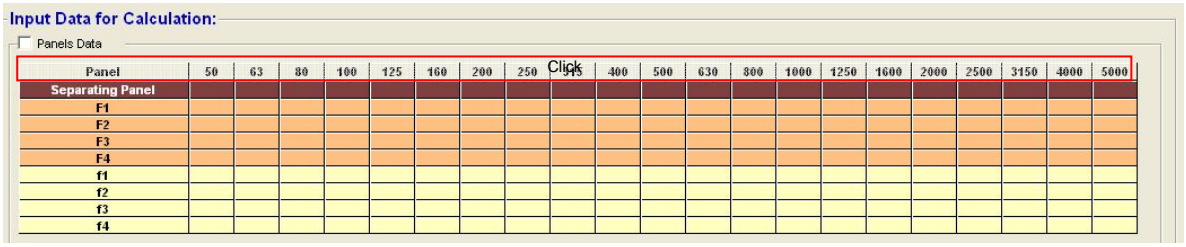
Having chosen the type of site corresponding to the calculation we wish to make, we move on to the second step:

2. Enter the dimensions of the transmitter site and the receiver site

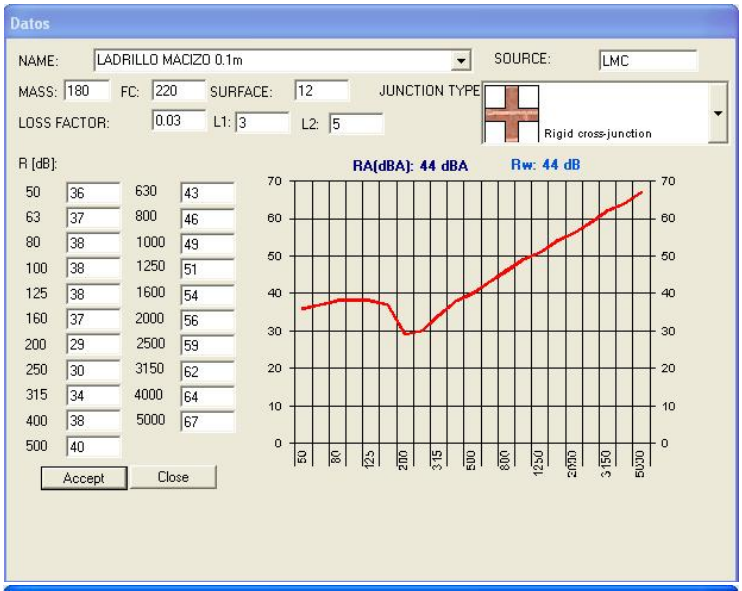


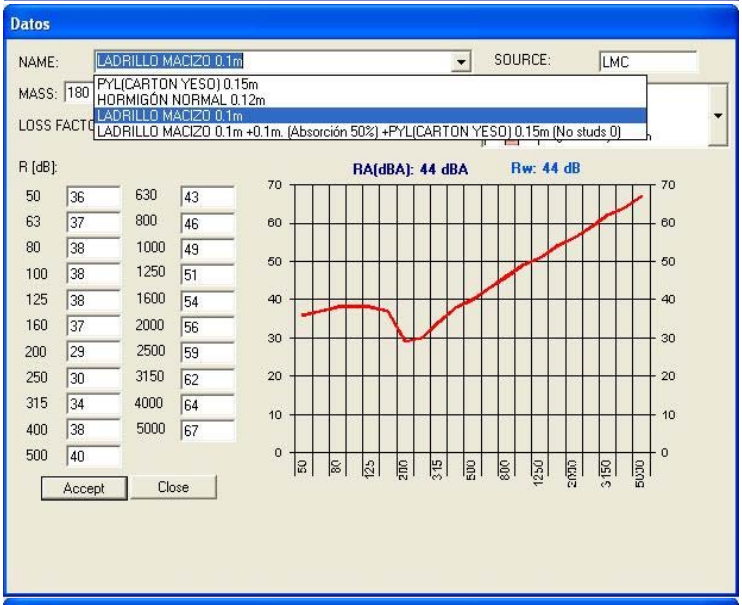

Any change in the dimensions will update the values entered in the table of insulation characteristics of each of the walls (point 2)

3. Enter the insulations of each of the walls which make up the two rooms. To do this, click on the box on each of the walls (ordered in rows) as shown in the following illustration:

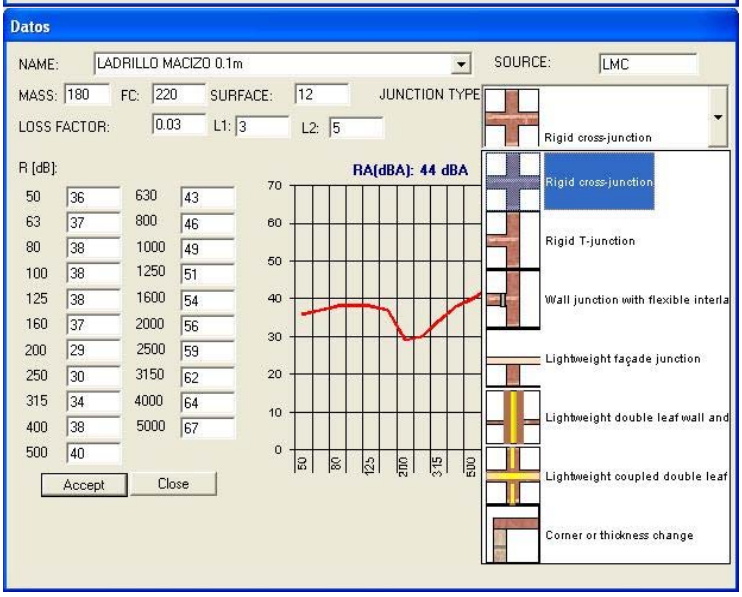



After clicking, the following selection window will appear;




You have to select the type of wall from the dropdown list shown in this illustration




Having chosen the desired wall, set the type of junction with the remaining walls.

Only in the case of the dividing wall will this list be blocked, because the junction with the other walls will be set by the latter.

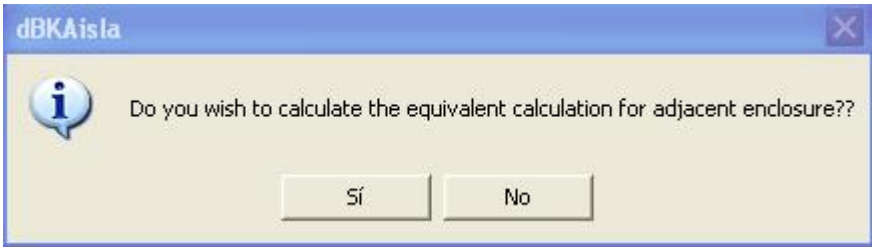
The data which feed the selection window are the walls calculated and entered in the simple and multiple panel sections. In the event of no wall having been entered, the calculation cannot be carried out.

4. Having entered the data, click on Calculate after which the software will ask us for the name under which we wish to store the calculation. This calculation can be retrieved whenever we want by selecting the Select Calculation tab and choosing from the dropdown list.

If you wish to delete a calculation, just click on Delete Calculation.

Finally, whenever we click on New Calculation, we clear both the results tables and the data input table.

When making a calculation, the software will ask us if we wish to calculate the equivalence for another type of site (superimposed, adjacent or with one edge in common). This will be asked when the calculation has any characteristic which is different from the previous one and when the three types have not already been done.

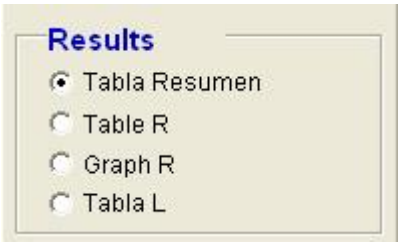



By selecting 'Yes' for the making of an equivalent calculation, the software will change the input parameters, preparing them for the new calculation. You can check them and calculate.

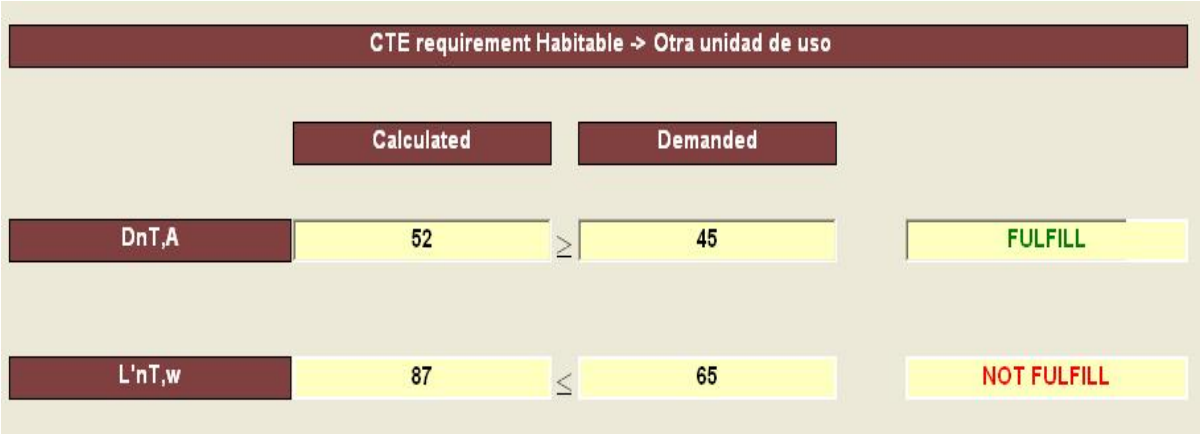

Note: To check the meaning of the rest of the messages that appear after the calculation, see chapter ***XII.- Appendix III: Explanation of informational messages***, of this manual.

5. The calculation results will be shown in graphic and tabular form.

To change between the different displays of the results, you will interact on the following panel of options:




By default, a Summary Table will appear showing the DnT,A and L'nT,w values calculated and specifying whether or not these comply with the limit values required by the Technical Building Code (CTE. DB HR) according to the characteristics of the transmitter and receiver site (inhabitable, protected site, etc.).




Compliance with standards will be continuously shown at the bottom of the screen by means of indicators:

The calculated value does not comply with regulations.

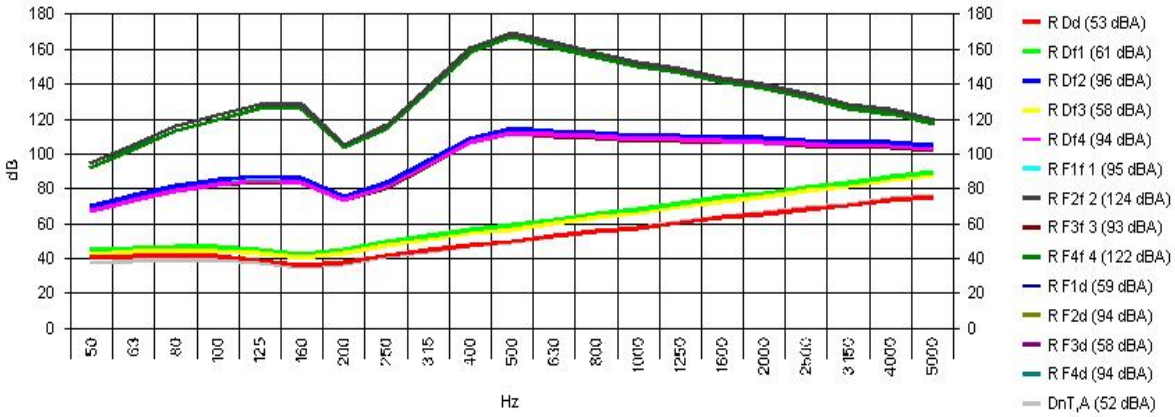
The calculated value is ± 3 dB with regard to the value required by regulations.

The calculated value complies with regulations.

The results, ($D_{nT}$, $D_{nT,A}$, $R_{Ff}$,$R_{Ff,A}$ ), can be seen in table form by selecting the option 'Table R' from the 'Results' option panel:

| Panel | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3150 | 4000 | 5000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Separating Panel | 39 | 40 | 40 | 40 | 38 | 35 | 37 | 41 | 44 | 47 | 49 | 52 | 55 | 57 | 60 | 63 | 65 | 68 | 70 | 73 | 75 |
| F1 | 54 | 58 | 62 | 64 | 66 | 65 | 52 | 56 | 66 | 76 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| F2 | 54 | 58 | 62 | 64 | 66 | 65 | 52 | 56 | 66 | 76 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| F3 | 54 | 58 | 62 | 64 | 66 | 65 | 52 | 56 | 66 | 76 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| F4 | 54 | 58 | 62 | 64 | 66 | 65 | 52 | 56 | 66 | 76 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| f1 | 39 | 40 | 40 | 40 | 38 | 35 | 37 | 41 | 44 | 47 | 49 | 52 | 55 | 57 | 60 | 63 | 65 | 68 | 70 | 73 | 75 |
| f2 | 54 | 58 | 62 | 64 | 66 | 65 | 52 | 56 | 66 | 76 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| f3 | 39 | 40 | 40 | 40 | 38 | 35 | 37 | 41 | 44 | 47 | 49 | 52 | 55 | 57 | 60 | 63 | 65 | 68 | 70 | 73 | 75 |
| f4 | 54 | 58 | 62 | 64 | 66 | 65 | 52 | 56 | 66 | 76 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |

In graph form, using the option ‘Graph R’:




The Impact Sound Insulation results, (Ln,w, Lndirect, LD-f, LF-D) can only be seen in table form by using the option ‘Table L’:

| | LwGlobal | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3150 | 4000 | 5000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L'n,w | 87 | 56 | 59 | 62 | 64 | 68 | 73 | 69 | 70 | 73 | 76 | 77 | 75 | 74 | 74 | 73 | 72 | 71 | 70 | 69 | 69 | 68 |
| L F1-D | 80 | 63 | 66 | 69 | 71 | 75 | 79 | 76 | 75 | 79 | 81 | 82 | 80 | 79 | 77 | 75 | 74 | 73 | 71 | 70 | 68 | 67 |
| L F1-f1 | 86 | 63 | 66 | 69 | 72 | 75 | 80 | 76 | 78 | 81 | 84 | 84 | 83 | 82 | 83 | 81 | 81 | 80 | 79 | 79 | 78 | 77 |

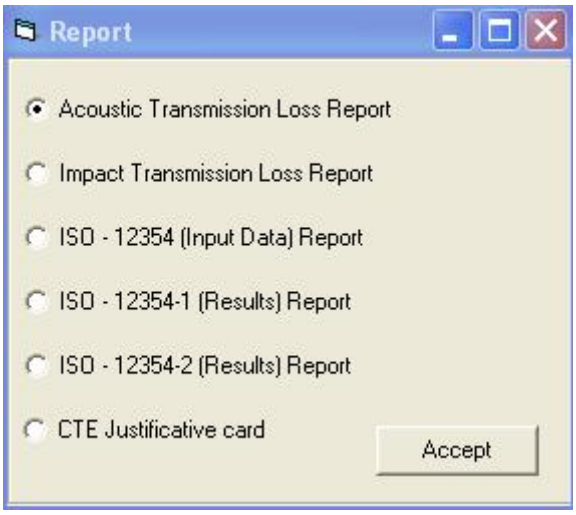
# VII.- Utilities

Corresponds to the different dropdown menus in the main window of the application:

- Session
  - New Session (Ctrl+N): Return to the start-up session selection screen
  - Open Session (Ctrl+ F1): Opens a previously calculated session
  - Save Session(F2): Saves the current session
  - Report Session (Ctrl+F5): Generates a report in Word format of the current session (see VI-I).
  - End Session: Ends programme
- Data
  - Insulation Database (Ctrl+A) : Access to the database of laboratory tested insulations
  - Materials Database (Ctrl+D) : physical data of the walls
- Table
  - Delete selection (Supr) : Deletes the wall selected in the single walls column. The wall can also be deleted from the database (and from the session) by accepting when the programme asks.
- Edition
  - Copy Results (Ctrl+ C): Copies the wall data calculated in the active session to the clipboard, for further processing (if wanted), by pasting the contents into another document.
- Language : For selecting the language
- Help (?):
  - Help : Access to the manual
  - About: Information about the system and the software creator

## VII-I.- Generation of Reports

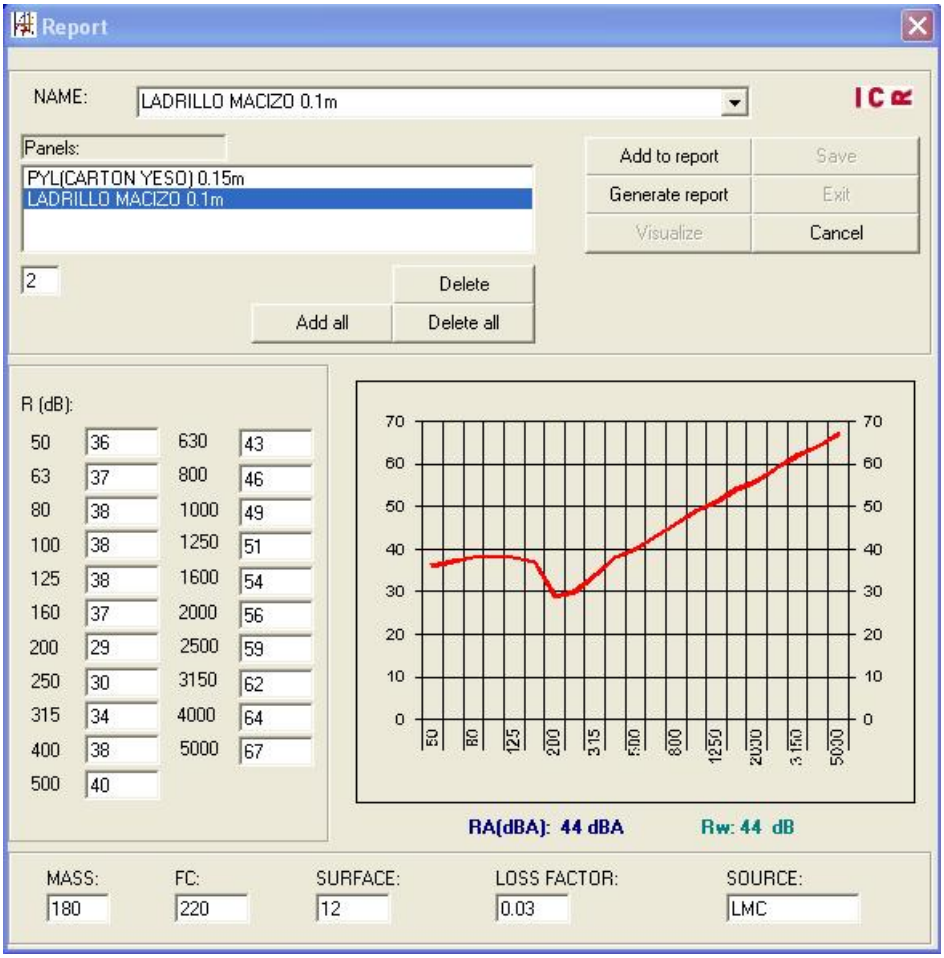
By pressing Ctrl+F5 or 'Generate report', the following report type selection window will appear:



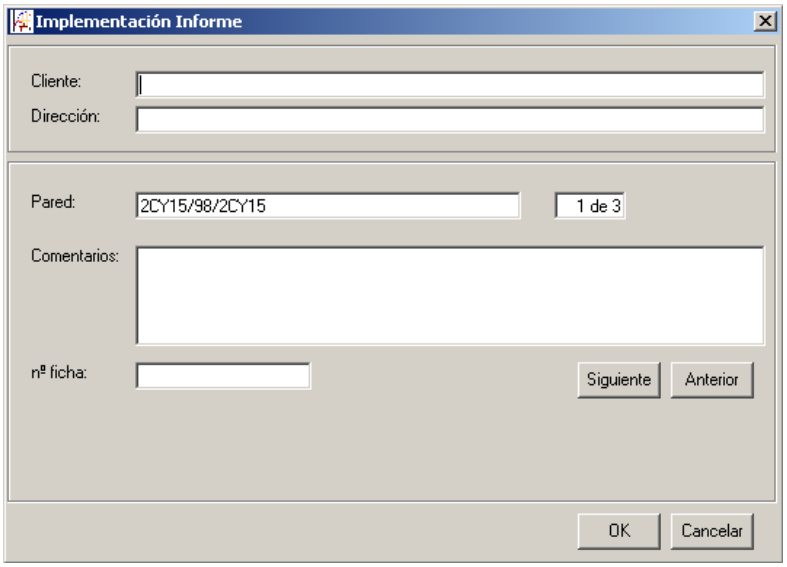

Depending on the options chosen, a different type of report will be generated:

- **Simple and Multiple Panel Report - R.** Generation of report based on the UNE-EN ISO140-3:1995 standard. *Measurement of sound insulation in buildings and building elements. Part 3: Laboratory measurement of the airborne sound insulation of building elements.*
- **Simple and Multiple Panel Report - L.** Generation of report based on the UNE-EN ISO 140-6:1998 standard. *Measurement of sound insulation in buildings and building elements. Part 6: Laboratory measurement of the impact sound insulation of floors.*
- **ISO – 12354 Report (Input data).** Generates a report based on the UNE-EN ISO140-3:1995 standard. *Measurement of sound insulation in buildings and building elements. Part 3: Laboratory measurement of the airborne sound insulation of building elements.* The panels entered into the input data table of the ISO 12354 module will be implemented in the report.
- **Informe ISO – 12354-1 (Results).** Generates a report based on the UNE-EN ISO140-4:1999 standard. *Measurement of sound insulation in buildings and building elements. Part 4: On site measurement of airborne sound insulation between premises.* The channels of transmission represented in the results section of the ISO 12354 module will be implemented in the report.
- **Informe ISO – 12354-2 (Input data).** Generates a report based on the UNE-EN ISO140-7:1999 standard. *Measurement of sound insulation in buildings and building elements. Part 7: On site measurement of the impact sound insulation of floors.* The panels entered into the input data table of the ISO 12354 module will be represented in the report.
- **CTE supporting sheet.** Generates a supporting sheet report based on the model specified by the CTE. DB-HR in its Appendix L. Supporting sheets.

When the type of report has been selected, the following will appear:




We use Add to report, to insert the panels we want in the report. The wall selected can be deleted using the Delete tab. The report will consist of a home page followed by a sound sheet for each of the walls chosen for the report. Having selected all the walls, click on Generate report. A form will then appear for implementing the report:




On this form, various fields appear.

At the heading, the name and address of the client appear. These two sections are the same for each sheet of the report. It is also possible to include comments on each of the walls calculated, and to give them a sheet identifier (number, letter or both) chosen by the user.

The next tab is used to access the next wall in the report, and the previous tab to access the previous wall. In the event of not including comments or client name, the respective fields in the report remain blank.

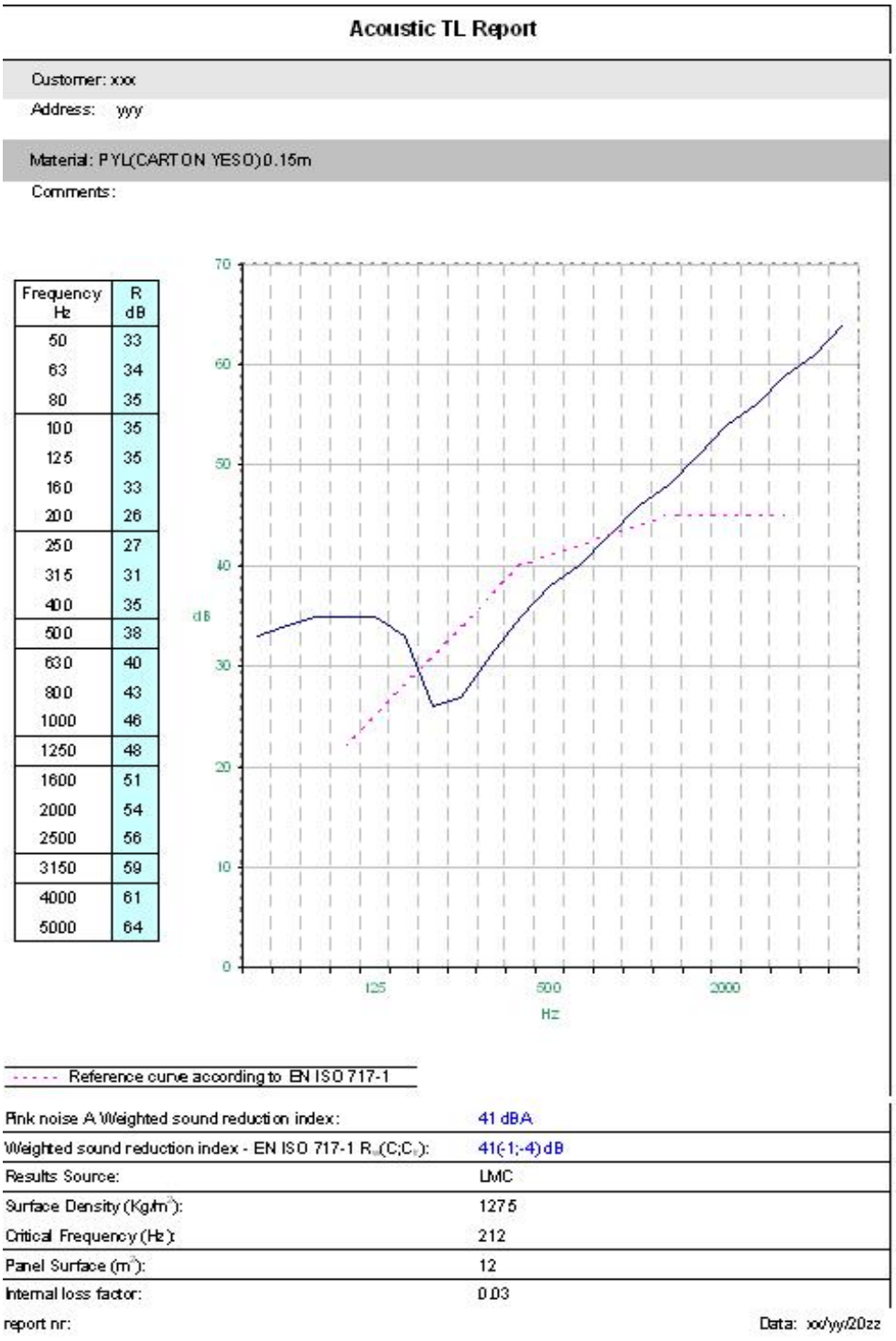
Having filled in the various fields, the 'OK' tab is used to continue with the creation of the report.

Once the report has been created, we activate the Visualize tab, which displays the report in preview, and the save and exit tabs.

The report presents the overall pink noise insulation indices, R(dBA) and Rw(C;$C_{tr}$), and other wall data (Origin, Mass, Coincidence frequency, Surface and Internal damping).

It is important not to delete the folders \Documents, \Templates and \Sessions or the files that appear by default, as errors may occur when generating the report.

Example of Report:



**Acoustic TL Report**

Customer: xxx

Address: yyy

Material: PYL(CARTON YESO)0.15m

Comments:

| Frequency Hz | R dB |
|---|---|
| 50 | 33 |
| 63 | 34 |
| 80 | 35 |
| 100 | 35 |
| 125 | 35 |
| 160 | 33 |
| 200 | 26 |
| 250 | 27 |
| 315 | 31 |
| 400 | 35 |
| 500 | 38 |
| 630 | 40 |
| 800 | 43 |
| 1000 | 46 |
| 1250 | 48 |
| 1600 | 51 |
| 2000 | 54 |
| 2500 | 56 |
| 3150 | 59 |
| 4000 | 61 |
| 5000 | 64 |



----- Reference curve according to EN ISO 717-1

| | |
|---|---|
| Pink noise A Weighted sound reduction index: | 41 dBA |
| Weighted sound reduction index - EN ISO 717-1 $R_w(C;C_{tr})$: | 41(-1;-4) dB |
| Results Source: | LMC |
| Surface Density ($Kg/m^2$): | 12.75 |
| Critical Frequency (Hz): | 212 |
| Panel Surface ($m^2$): | 12 |
| Internal loss factor: | 0.03 |

report nr: Data: xx/yy/20zz

This example is valid for Single and Multiple Panel Reports and ISO 12354 data input and results reports.

Example of Supporting sheet CTE:

Element Vertical Separation:

**Ficha Justificativa de aislamiento acústico según DB-HR del CTE**

Cliente: ICR

Dirección:

Comentarios: Elemento de separación: LADRILLO MACIZO 0.1 m +0.1 m. (Absorción 50%) +LADRILLO MACIZO 0.1m (Sin Uniones 0)

**Elementos de separación vertical entre:**

| Recinto Emisor | Recinto Receptor | Tipo | Características | Aislamiento Acústico | | |
|---|---|---|---|---|---|---|
| | | | | en proyecto | | exigido |
| Otra unidad de uso | Habitable | Elemento base | m(Kg/m²)=360 | $D_{nT,A}$ = | 40 ≥ | 45 |
| | | | $R_A$ (dBA)= 73 | | | |
| | | Trasdosado | $\Delta R_A$ (dBA)= 29 | | | |

**Elementos de separación horizontal entre:**

| Recinto Emisor | Recinto Receptor | Tipo | Características | Aislamiento Acústico | | |
|---|---|---|---|---|---|---|
| | | | | en proyecto | | exigido |
| - | - | Forjado | m(Kg/m²)= - | $D_{nT,A}$ = | - ≥ | - |
| | | | $R_A$ (dBA)= - | | | |
| | | | $L_{n,w}$ (dB) = - | | | |
| | | Suelo Flotante | $\Delta R_A$ (dBA)= - | $L'_{nT,w}$ = | -≥ | - |
| | | | $\Delta L_W$ (dB)= - | | | |
| | | Techo Suspendido | $\Delta R_A$ (dBA)= - | | | |
| | | | $\Delta L_W$ (dB)= - | | | |

nº ficha: Fecha: 15/01/2009

Element Horizontal Separation:

**Ficha Justificativa de aislamiento acústico según DB-HR del CTE**

Cliente: ICR

Dirección:

Comentarios: Elemento de separación: LADRILLO MACIZO 0.1m +0.1m. (Absorción 50% 8MN/m3) +LADRILLO MACIZO 0.1m (Sin Uniones 0) +0.1m. (Absorción 50% 10MN/m3) +LADRILLO MACIZO 0.1m (Sin Uniones 0)

**Elementos de separación vertical entre:**

| Recinto Emisor | Recinto Receptor | Tipo | Características | Aislamiento Acústico | | |
|---|---|---|---|---|---|---|
| | | | | en proyecto | | exigido |
| - | - | Elemento base | m(Kg/m²)= - | $D_{nT,A}$ = | - ≥ | - |
| | | | $R_A$ (dBA)= - | | | |
| | | Trasdosado | $\Delta R_A$ (dBA)= - | | | |

**Elementos de separación horizontal entre:**

| Recinto Emisor | Recinto Receptor | Tipo | Características | Aislamiento Acústico | | |
|---|---|---|---|---|---|---|
| | | | | en proyecto | | exigido |
| **Otra unidad de uso** | **Habitable** | Forjado | m(Kg/m²)=540 | $D_{nT,A}$ = | 59 ≥ | **45** |
| | | | $R_A$ (dBA)= 80 | | | |
| | | | $L_{n,w}$ (dB) = 76 | | | |
| | | Suelo Flotante | $\Delta R_A$ (dBA)= 7 | $L'_{nT,w}$ = | 45≥ | **65** |
| | | | $\Delta L_W$ (dB)= 27 | | | |
| | | Techo Suspendido | $\Delta R_A$ (dBA)= 7 | | | |
| | | | $\Delta L_W$ (dB)= 26 | | | |

nº ficha: Fecha: 15/01/2009

Note: It is important not to have many processes running when creating a report as it could lead to errors due to lack of computer memory.

# VIII.- Installation / Uninstallation

To install the software, just insert the CD. It contains a self-executing file that will start the installation automatically. If this does not occur, enter the directory where the CD has been inserted and run the file, setup.exe, located in the root.

To use the programme, the attached USB key must be inserted. On the CD, in the "Drivers" directory, are the key drivers, in the event of Windows failing to recognize it.

To uninstall, insert the CD and the installed software will be detected automatically. You will be asked whether you want to uninstall or repair it.

**Note:**

If error 429 occurs when you run dBKAisla with Windows XP, run the Update to XP, a folder to be found in Drivers.

# IX.- Author

dBKAisla has been designed by:

**Ingeniería para el Control del Ruido, S.L.**

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websites: http://www.icrsl.com/ - http://www.dbkaisla.com

# X.- Glossary

CSTB: *Centre Scientifique et Technique du Batiment*

LGAI: *Laboratori General d'assaigs i d'investigacions* (General Testing and Research Laboratory)

LM: Origin of the insulation calculated: Simple Mass Law

LMC: Origin of the insulation calculated: Corrected Mass Law

P. Double: Origin of the insulation calculated: Double Wall

UPV: *Universitat Politécnica de Valencia*

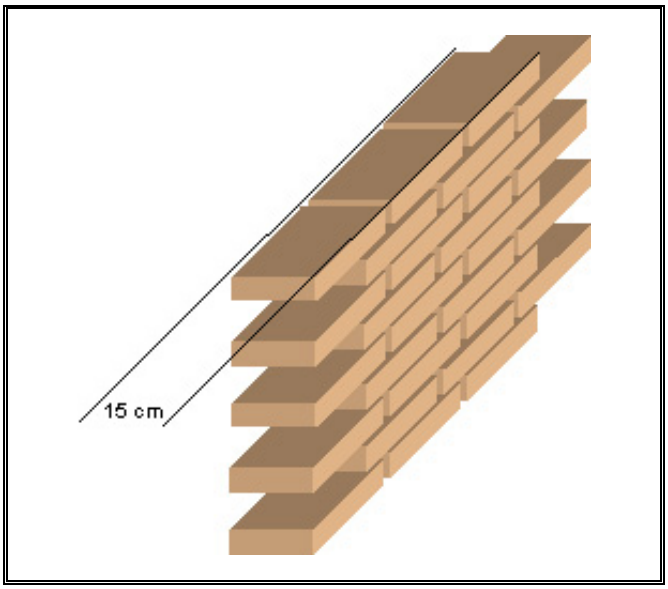
$\eta$: Internal damping coefficient of the material.

# XI.- Appendix I: Practical examples

Various comparisons between calculations performed with the dBKAisla and measurements taken in the laboratory are shown below.

Note: the area shown in yellow in the graphs is a non-comparable area because laboratory measurements are taken from 100Hz and upwards.

## XI. I.- 15 cm SOLID WALL.

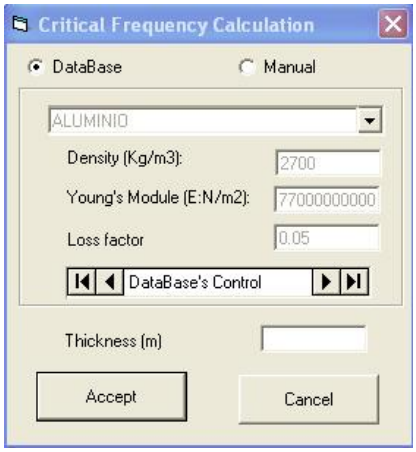


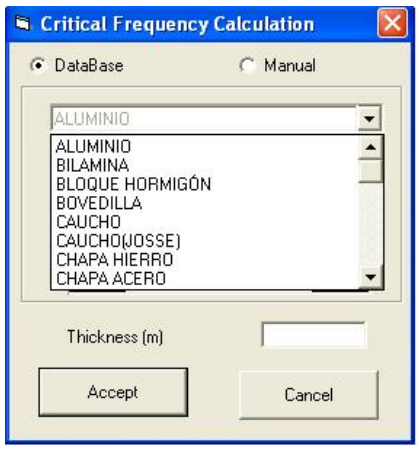

15 cm **SOLID WALL**
**DATA**:
Catalonia Format
30x15x5

CALCULATION METHOD

**T**o calculate the insulation of a homogeneous element, the calculation is direct. **A**ctivate the Wall Data tab.

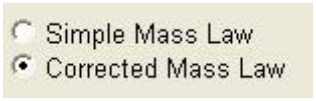
Data Input



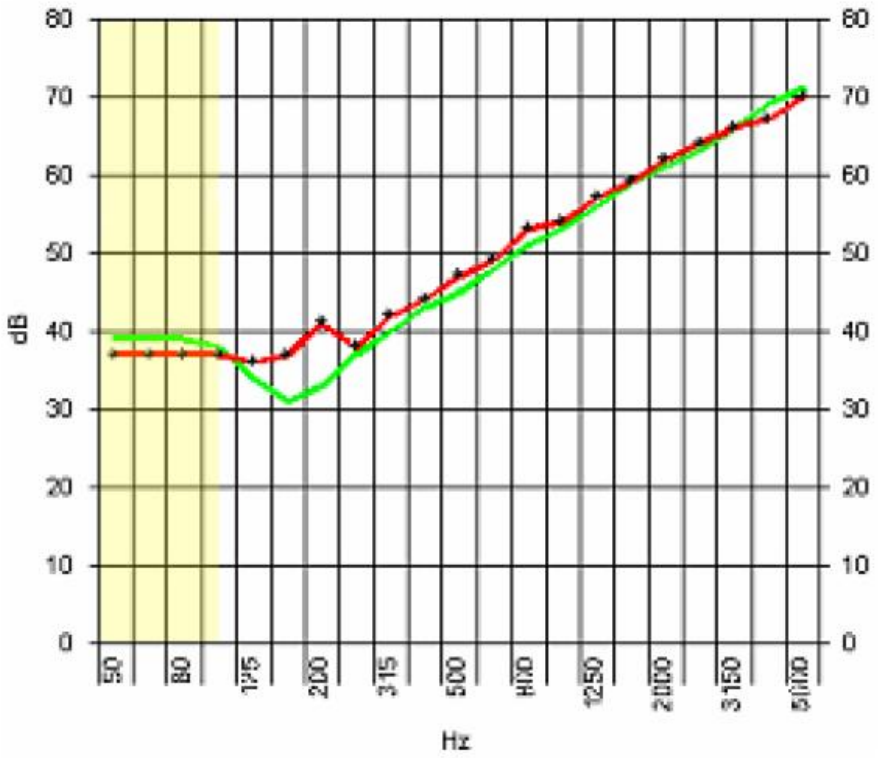

**I**n the window which appears, open out the top box and mark in Solid Brick. In the bottom right-hand box, write in the thickness of the wall, in this case 150 mm. Accept and Wall Data closes.

We can change the name of the wall which has been filled in automatically.

**A**ctivate the calculation method 

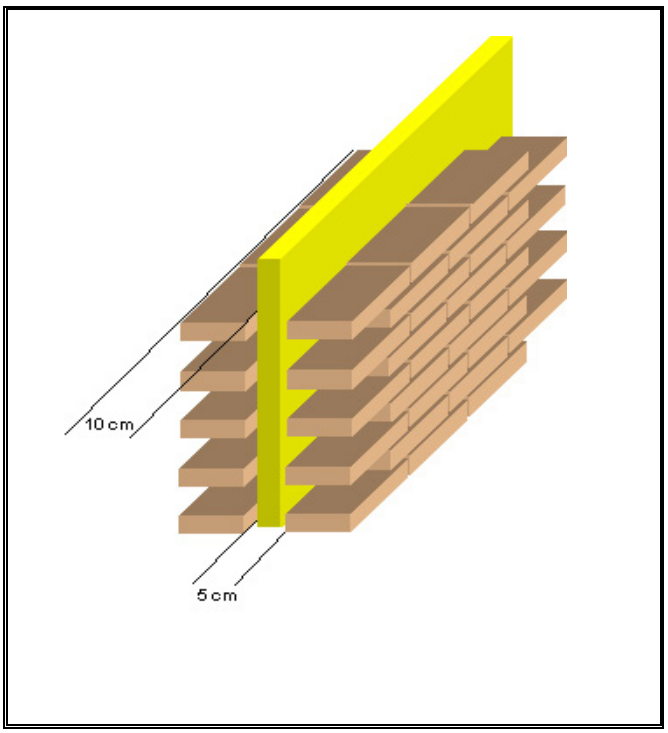
and we can now calculate 

.




Green curve - Calculation
Red curve – Measured by LGAI

## XI. II.- 15 cm DOUBLE SOLID WALL.




**10 cm DOUBLE SOLID WALL:**
Unknown USA format
Thickness of one wall 10cm
Cavity: 5 cm
Fibreglass
Walls joined by 0.6 $m^2$/point rods

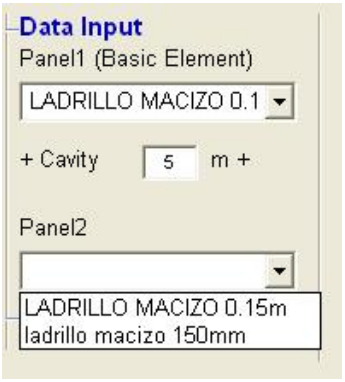
CALCULATION METHOD

**W**e first calculate the insulation of the single wall in the same way as for the 150 mm solid wall (See SOLID WALL sheet)

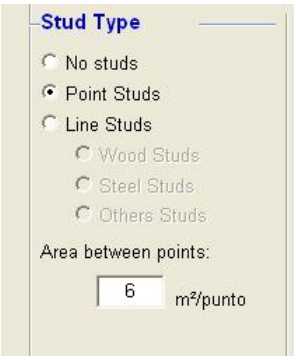

Green curve - Calculation
Red curve – Measured

To calculate the double wall, we now go to the MULTIPLE PANEL module.

In the upper left-hand part, the large dropdown boxes contain the simple wall calculated; select the same wall in both boxes and enter 5 cm. in the cavity.




Define the type of junction as point junction by activating its indicator



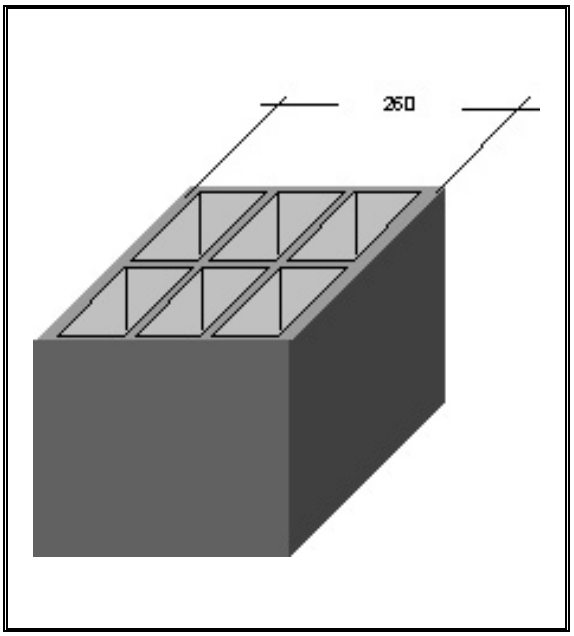

and enter .6 in the $m^2$/point box.

Then calculate 

.


Green curve - Calculation
Red curve - Office of Noise Control California (USA)

## XI. III.- LIGHTWEIGHT CONCRETE BLOCK

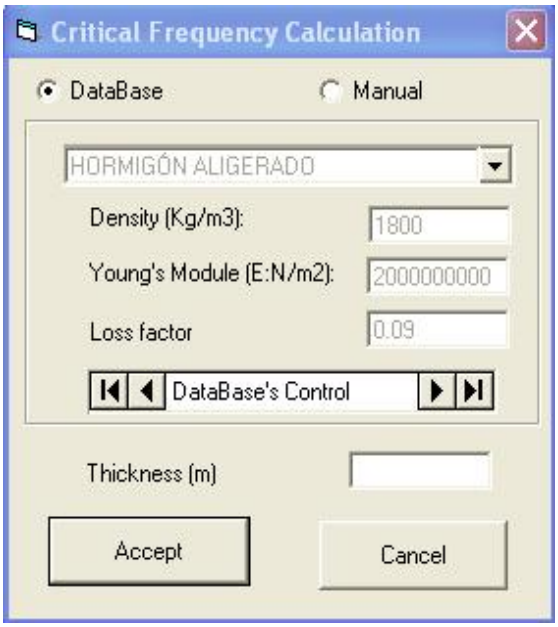



**DATA**
WEIGHT: 290 Kg/m$^2$
THICKNESS: 260 mm
INSULATION**:** LGAI

CALCULATION METHOD

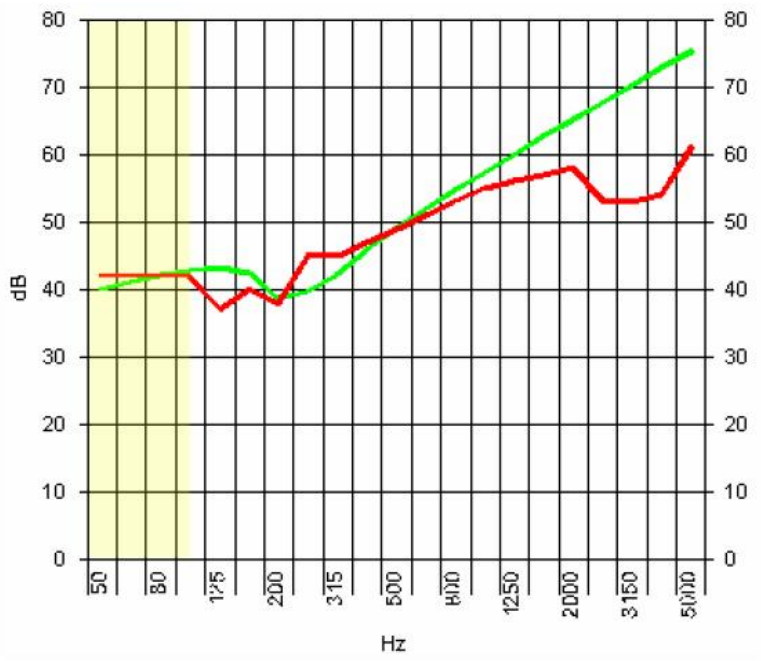
**C**alculate the Insulation of a 260 mm thick Lightweight Concrete Block but substituting its weight for the actual weight.

Data Input



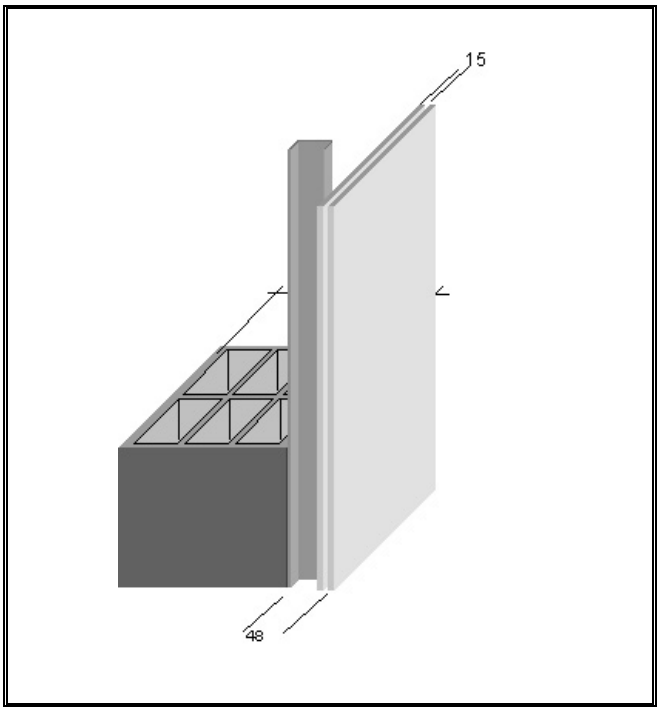

The data in colour are changed manually. Now calculate the insulation.

Calculate.




Green curve - Calculation
Red curve – Measured

## XI. IV- LIGHTWEIGHT CONCRETE BLOCK WITH EXTRADOS

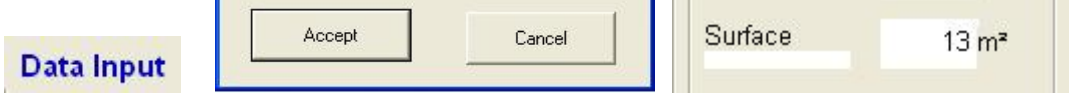


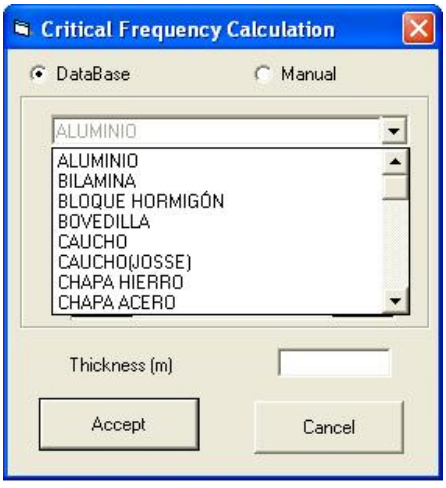

**BLOCK DATA:**
Weight: 290 Kg/m$^2$
Thickness: 260 mm
**CHANNEL:**
Thickness: 48 mm
**CGYPSUM BOARD:**
Two 15 mm sheets
**ATTACHMENT:**
Screws, 0.5 m$^2$/point

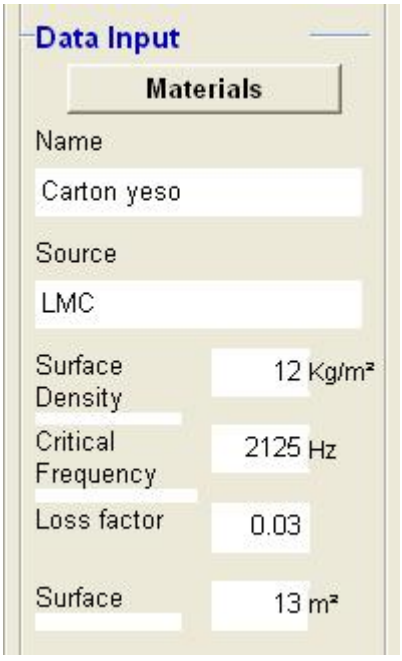
CALCULATION METHOD

**R**epeat the LIGHTWEIGHT CONCRETE BLOCK calculation (See Sheet).

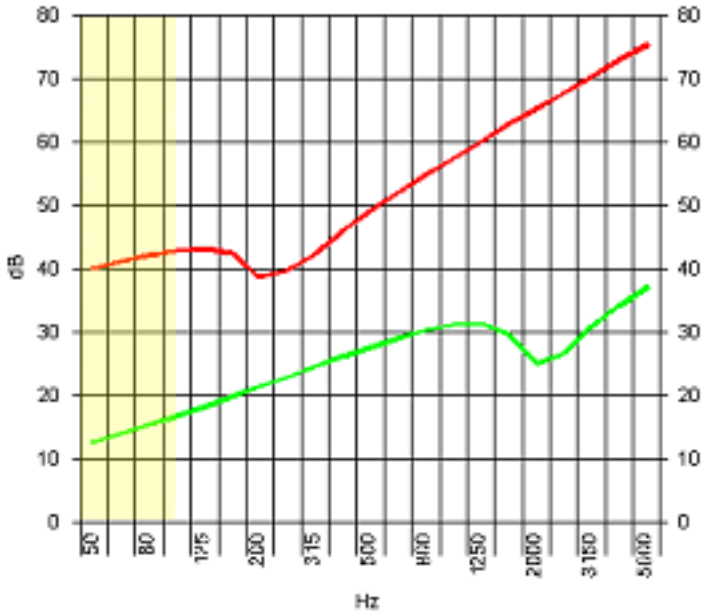
**N**ext, calculate the insulation of a sheet of Gypsum Board using the normal sequence.



The data in colour are changed manually. Now calculate the insulation. Calculate.




Green curve - 15 mm Gypsum board

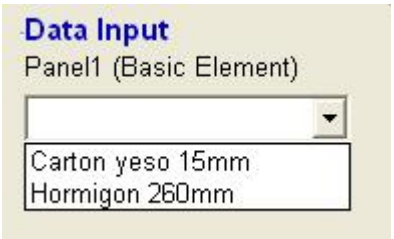
Red curve – Concrete block

**N**ext we must assemble the elements, for which purpose we select the MULTIPLE PANEL module.

**A**t the top left there are three boxes.

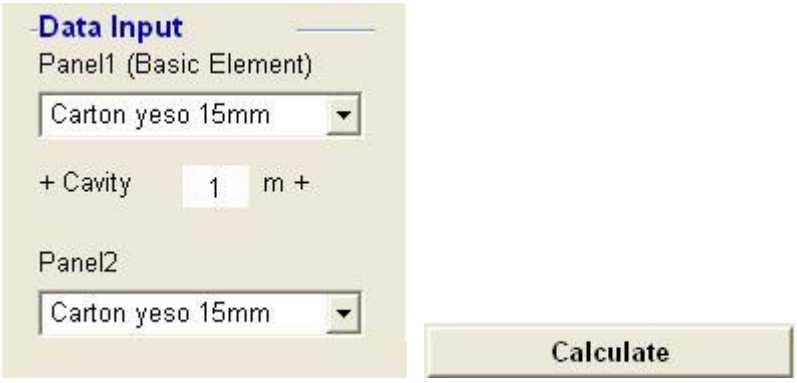
**T**he two largest should contain the types of wall which make up the double wall.

**I**f we open one of them, we will see that it contains everything calculated with the PANEL module.

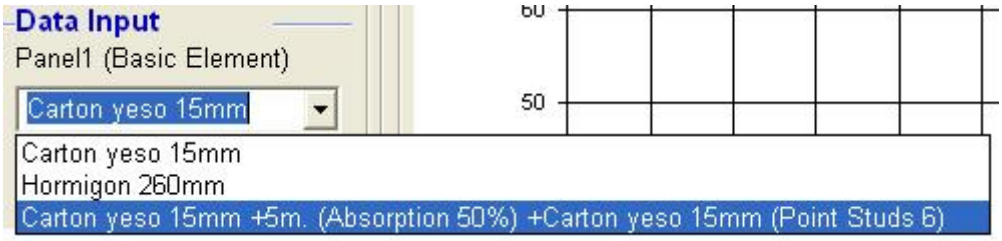


**U**se the mouse to select Gypsum Board and then repeat the process in the other box and select Gypsum Board again to join the two sheets of Gypsum Board.

**F**inally, enter the distance between walls. In the small box (Cavity), insert a very small distance to indicate that they are two sheets together.

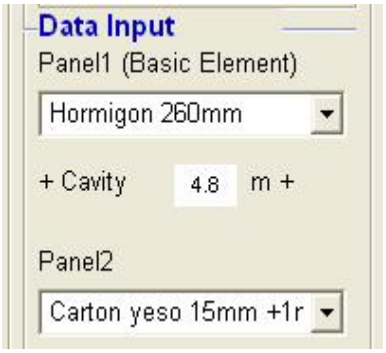



**A**fter running the calculation, we now have the insulation of two sheets of Gypsum Board.
**I**f we open one of the windows again, we will see that the double Gypsum Board has been added to the list.



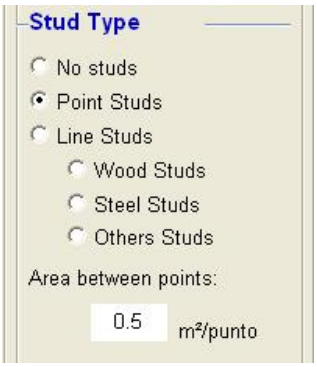

**N**ow we are going to calculate the unit formed by the Concrete Block and the double Gypsum Board.

**I**n the first window, we select the Concrete Block and in the second, the double Gypsum Board. In the ‘Cavity’ box, enter 4.8 cm.




**N**ow we must define the method of attachment.

**T**o do this, activate Point Attachment and enter the value 0.5 m2/point,

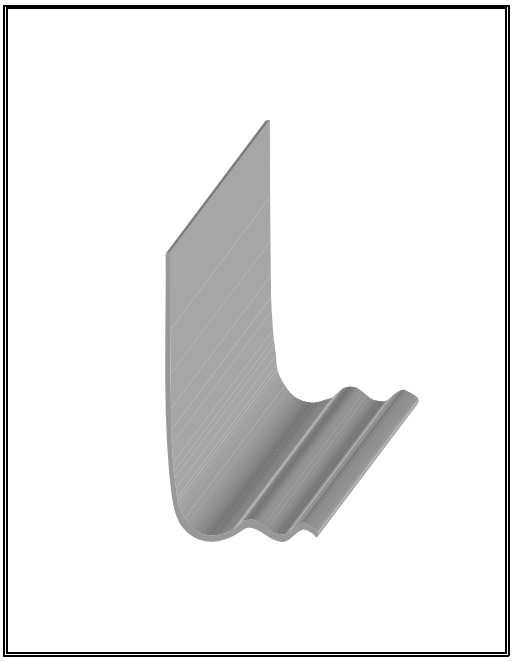



and then we can calculate 

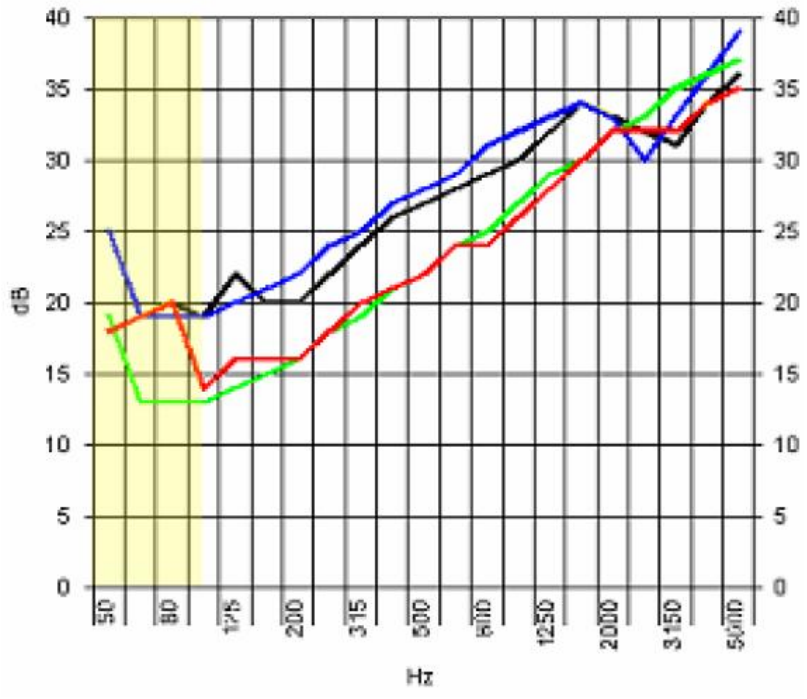
, thereby obtaining the final result.


Green curve - Calculation
Red curve – Measured by LGAI

## XI. V.- EXAMPLES OF RESULTS (1)



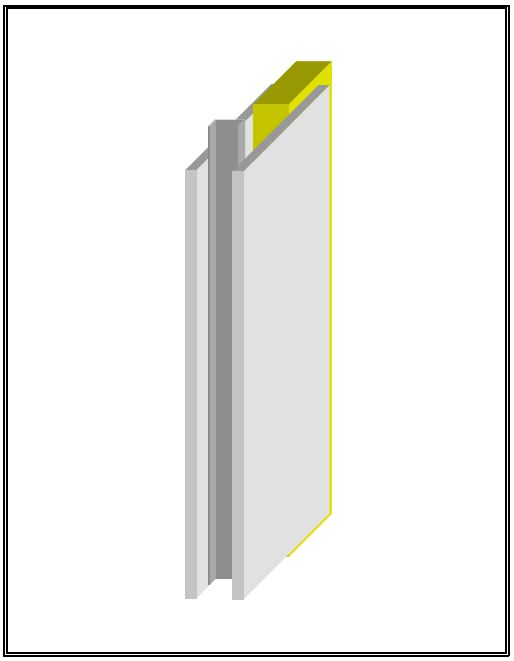
LA 5 and LA 10 insulation materials with low Young Modulo
LA 5: 5 Kg/$m^2$
LA 10: 10 Kg/$m^2$



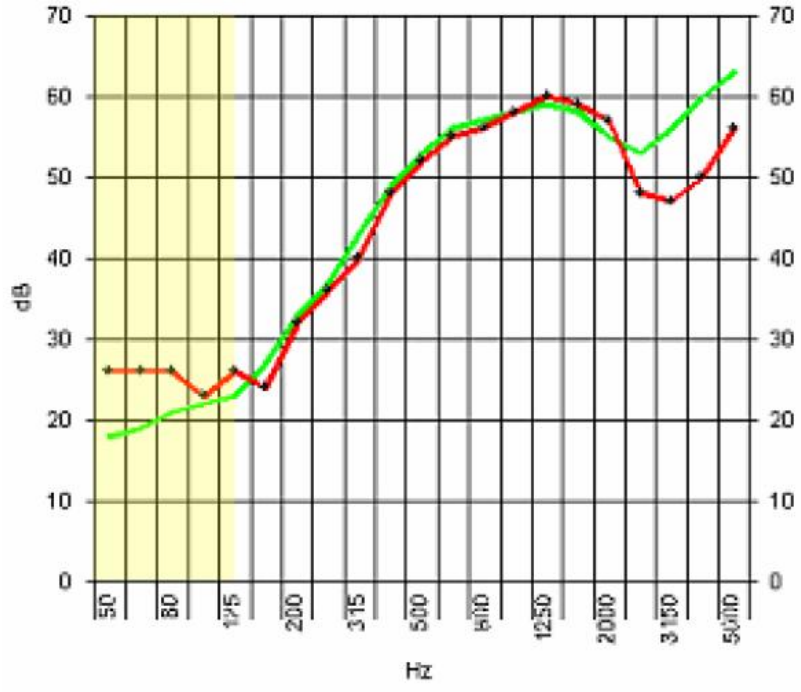

Green LA5 and Blue LA10 - Calculation

Red LA5 and Black LA10 – Measured by LGAI

## XI. VI. - EXMPLES OF RESULTS (2)

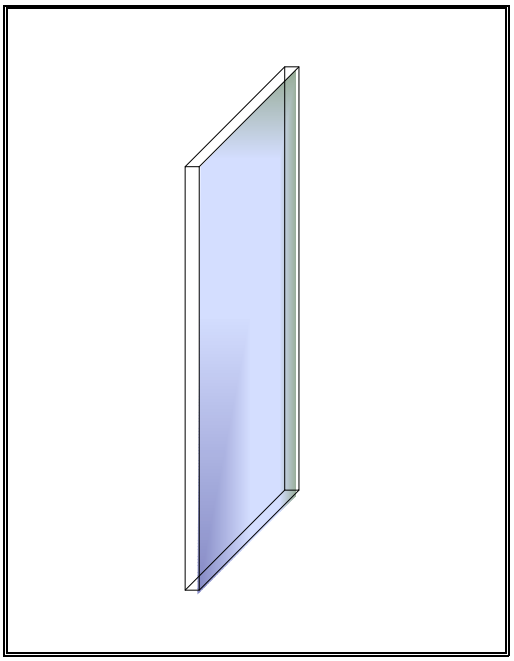


Gypsum board 13 mm +
cavity 48 mm +
Gypsum board 13mm

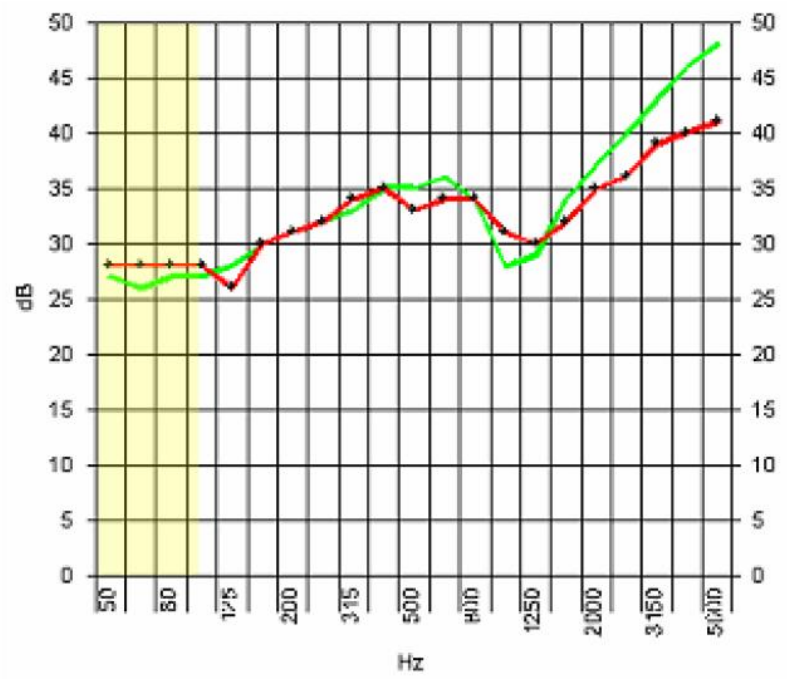



Green curve - Calculation
Red curve – Measured CSTB

## XI. VII.- EXAMPLES OF RESULTS (3)

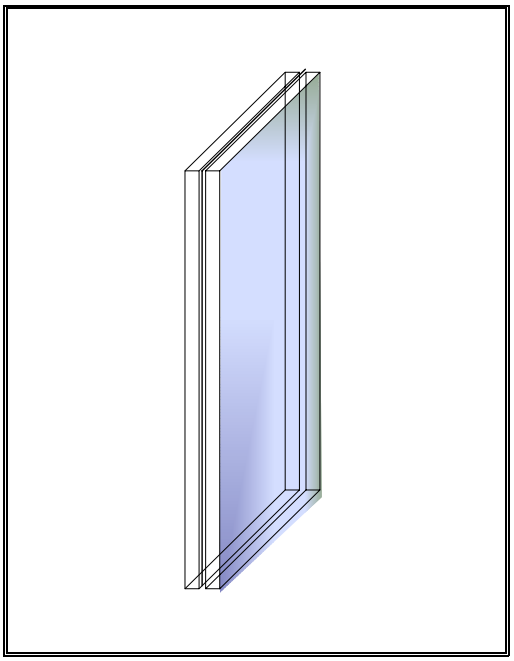


Glass 12 mm and 2 x 1.2

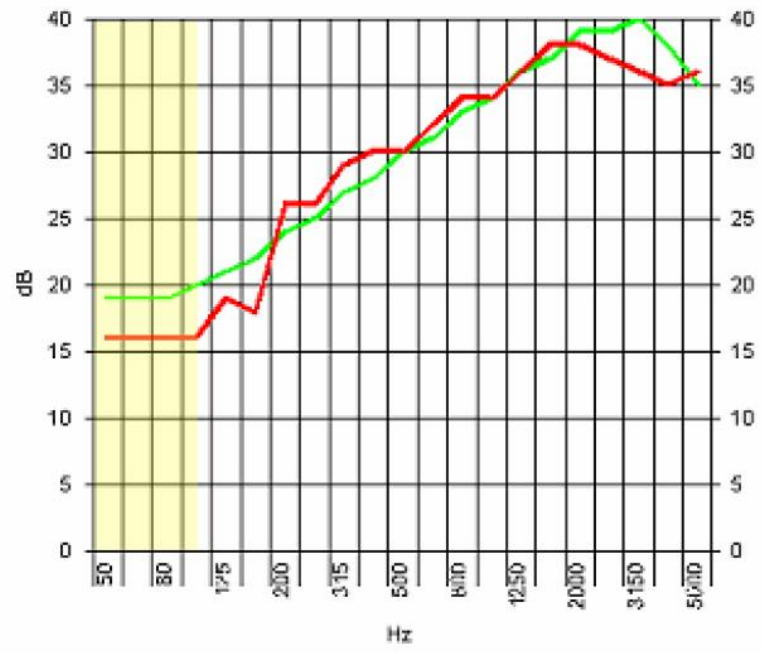



Green curve - Calculation
Red curve – Measured by CSTB

## XI. VIII.- EXAMPLES OF RESULTS (4)

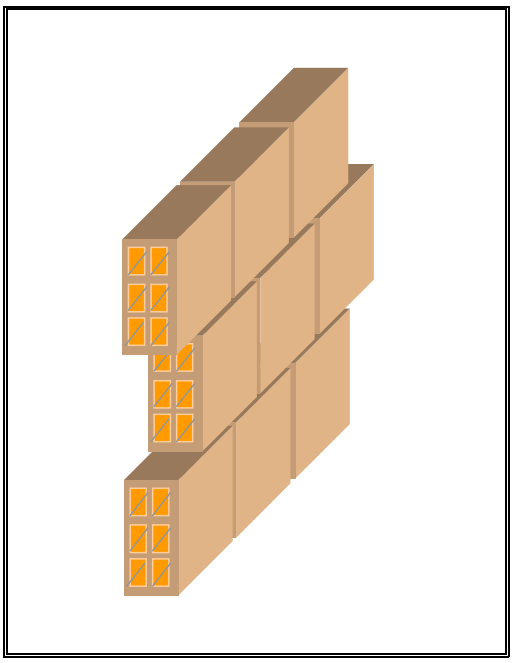


Double Glass 2.5 mm and 2 x 1.2
0.76 mm of Polyethylene between glasses.

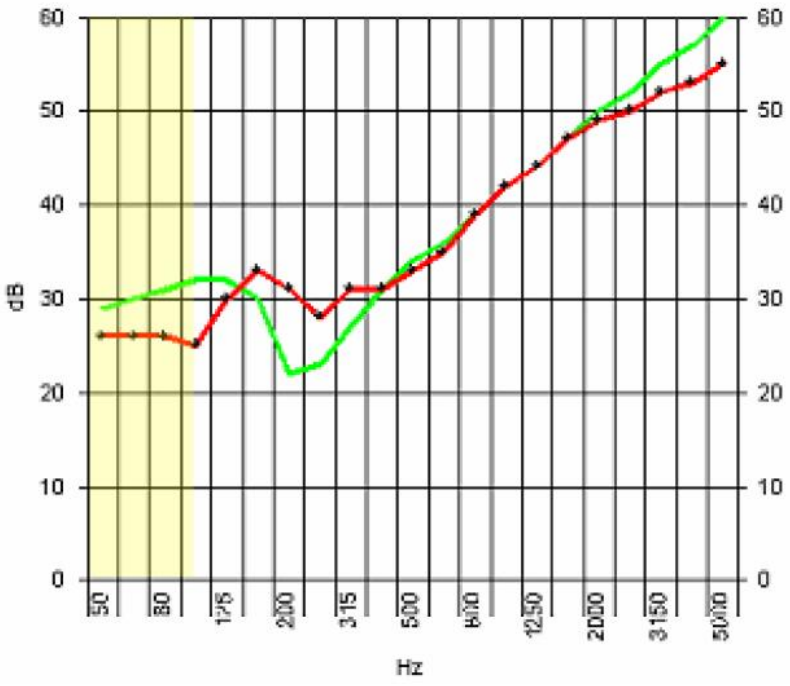



Green curve - Calculation
Red curve – Measured CSTB

## XI. IX.- EXAMPLES OF RESULTS (5)

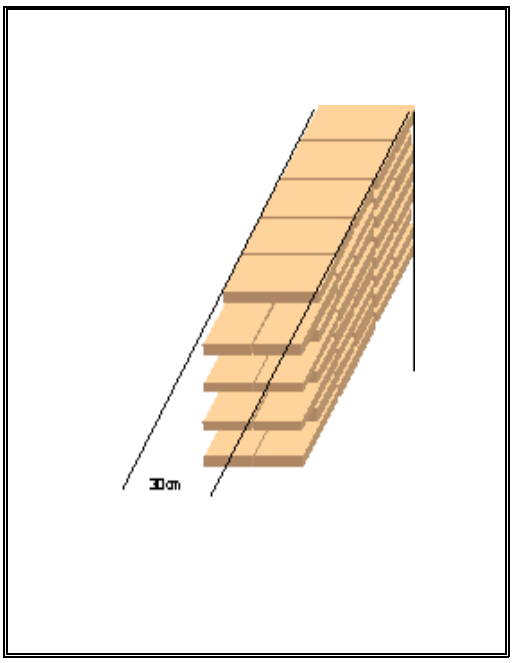


Partition of 9.5 cm
Catalonia format

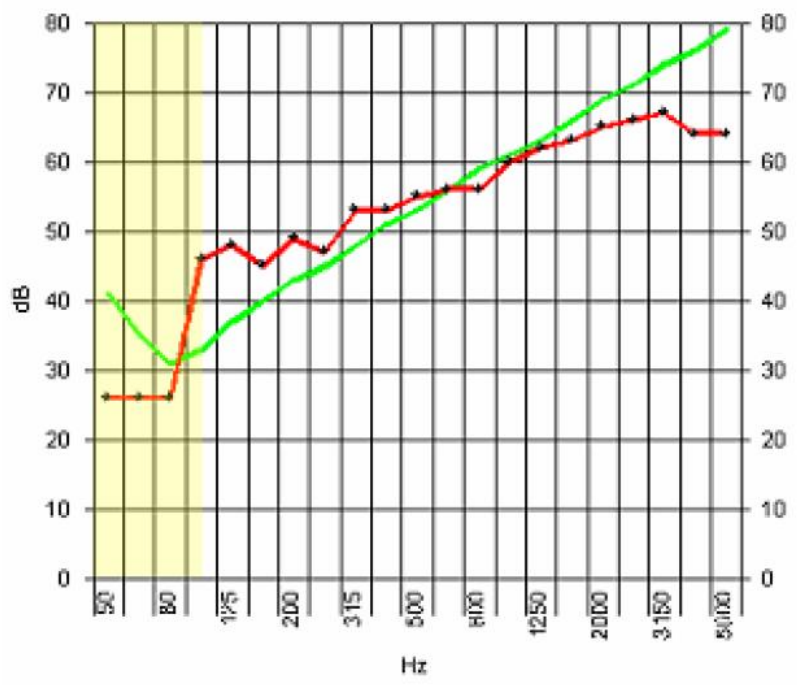



Green curve - Calculation
Red curve – Measured by LGAI

## XI. X.- EXAMPLES OF RESULTS (6)



Brick wall of 30 cm




Green curve - Calculation
Red curve – Measured by LGAI

# XI.- Appendix II: Calculation Methods

Explanation of the calculation methods used:

dBKAisla offers the possibility of calculating insulation either in single or multiple walls. It also offers the possibility of calculating mixed insulations with different types of surfaces. For the calculation of **single walls** from which to implement multiple or combined walls, the programme includes two types of calculation:

- Mass Law:

Single walls are considered to be those formed by a single isotropic and homogeneous layer, or those formed by different layers which are rigidly attached to each other. Single walls oppose incident acoustic energy through their mechanical inertia, which hinders vibration and therefore sound. The parameter that mainly determines mechanical inertia is the weight of the wall itself, that is, the surface mass. Therefore, the mass law only takes into consideration the mass of the surface in question. This law basically indicates that the larger the surface mass, i.e. the heavier it is, and the greater the frequency, the greater the sound insulation of the sample. This is a first approximation when the necessary physical parameters for a more accurate calculation are unknown.

- Corrected mass law:

Apart from the surface mass, the corrected mass law requires the coincidence frequency, the internal damping coefficient and the surface of the wall. These data can either be entered manually or by entering the database of walls calculated with standard materials. Unlike the simple mass law, the slope of the insulation curve of the sample varies according to three regions differentiated on the basis of the coincidence frequency:

- One region, below the coincidence frequency, where the curve follows a slope of around 6 dB per octave.
- A second region, with a considerable loss of insulation, which corresponds to the zone of influence of the coincidence phenomenon.

- And a third region, above the coincidence frequency, in which the curve follows a growth of around 9 dB per octave.

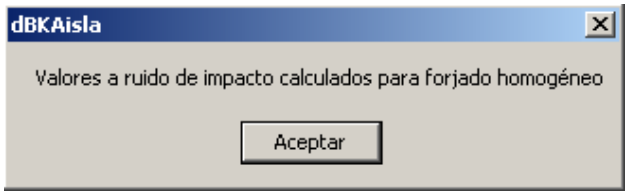
With regard to the calculation of **multiple walls**:
In acoustics, a multiple wall (double wall in this case) is considered to be a wall formed by two simple walls separated by an elastic medium. The physical principle underlying the acoustic effectiveness of this type of wall is the out-of-phase vibration between the faces of the multiple wall. The programme assumes the existence of elastic material of high sound absorbing capacity inside the cavity. The determining parameter in this type of construction is the resonance frequency, which should be as low as possible.

The calculation used to obtain the insulation of each of the aforementioned types of wall is regulated by the empirical formulae developed in different analyses by Sewell, Cremer and Sharp.

# XII.- Appendix III: Explanation of informational messages

Explanation of some of the informational messages that may be found when running the programme:

## XII.- I. Values calculated for homogeneous slabs




This message will appear when the materials used do not have the *standardized impact sound pressure level* ($L_n$) value. It informs you that it has been calculated as indicated by the ISO 12354 Regulations (Appendix B) for homogeneous slab.

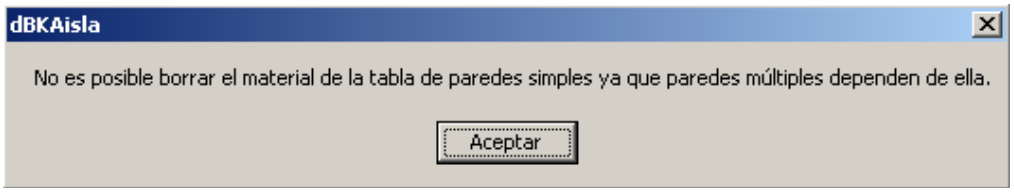
## XII.- II. DeltaR for multiple panels from the Aisla Database


The materials from the Insulation Database (company materials) do not contain the information about the improvement of the sound reduction index. Therefore, the DeltaR value of these materials (multiple or otherwise) will be zero.

## XII.- III. Open sessions prior to dBKAisla 3.0

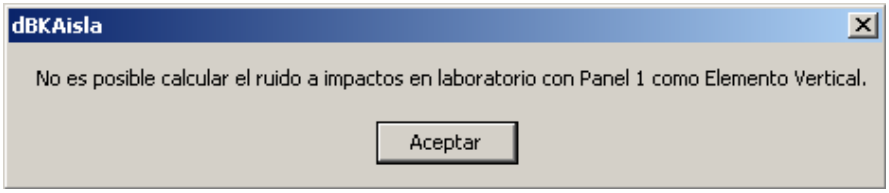

On opening a session prior to the dBKAisla 3.0, the deltaR and Laboratory Impact Sound values have not been calculated because they are new to this version. Their values, represented in the single and multiple panel information tables, will be zero.

## XII.- IV. Delete a single panel




To be able to use multiple walls in ISO calculations, it is necessary to keep the single walls of which they are formed in the database. Therefore, you cannot delete a single wall that has been used to form a multiple wall.

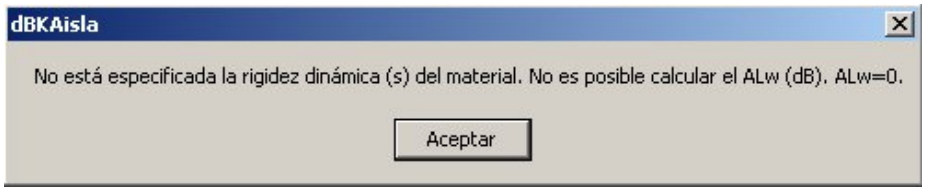
## XII.- V. Horizontal multiple panel with vertical base element




For the calculation of a *Horizontal Element* multiple wall formed by a base element which is, in turn, a *Vertical Element* multiple wall, the standardized impact sound cannot be calculated because the vertical element does not

contain the dynamic stiffness information. A horizontal element must be used as base element.

## XII.- VI. DeltaL calculation with vertical multiple wall

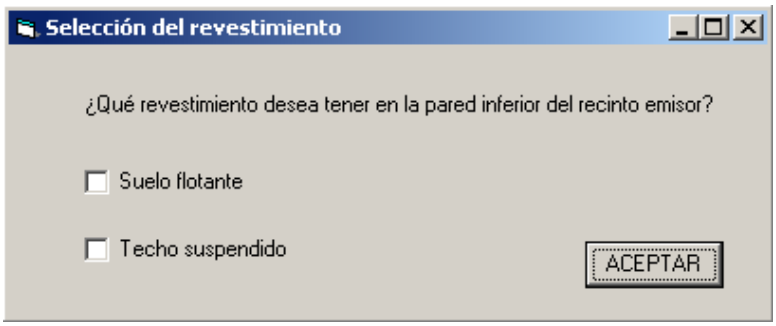



For calculating the ISO, if the bottom panel (floor) is a multiple wall calculated as a *vertical element,* it will not have the dynamic stiffness (s) information and, therefore, its DeltaL cannot be calculated. The value of zero will be taken to make the calculation.

## XII.- VII. DeltaR for Aisla Database materials (Companies)


If we use materials from the Insulation Database which do not contain information about the sound reduction index improvement (DeltaR), it will be impossible to calculate it. Therefore, the value of zero will be taken. This message informs us about this.

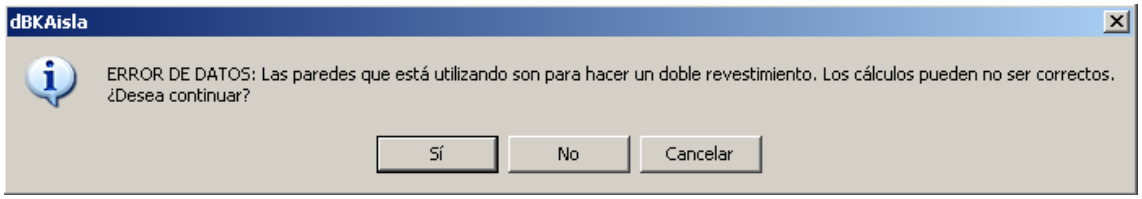
## XII.- VIII. Selection of cladding type (superimposed sites)




When we have a superimposed site and the separating wall (floor) is multiple, we have to select the type of cladding, according to the characteristics of the same.

This will only appear in *superimposed* sites, since in *adjacent* and '*one edge in common'* sites, it will only affect the cladding as *floating floor* (as indicated in the regulations).

## XII.- IX. Cladding error




The wall used as a floor has a double cladding and the user has previously indicated for it to be processed as floating floor or suspended ceiling. For the type of wall, both should be selected. If you continue, the results could be erroneous since the calculation process will not process the panel correctly. You can select *No* or *Cancel* to stop the calculation.

## XII.- X. Floating floor and suspended ceiling is not possible


If the separating wall has a just one cladding (double) and we indicate that we want a floating floor and suspended ceiling cladding, the calculation of the impact sound level reduction will not be possible.

The value of zero will be taken to make the calculation.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