Wildland-Urban Interface Virtual Essays Workbench

WUIVIEW

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WUIVIEW Artificial fuels database: Read Version

WP - Task	WP3 – Task 3.2	**Version** (1)	Final
Code (file name)	D3.2_WUIVIEW Non-Natural Fuel Read Version	**Dissemination level** (2)	Public
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Abstract	The database contains 46 entries of different objects typically present at the WUI microscale. Their geometry and burning characteristics are gathered according to FDS simulation setting needs. The database has been conceived as a live product, that can be further populated according to WP7 (Development of study cases) needs and to further requirements during the WUIVIEW exploitation phase. This document provides information on the readable Access database which corresponds to Deliverable D3.2 "Database on artificial fuels burning characteristics".

(1) *Draft / Final*
(2) *Public / Restricted / Internal*

Disclaimer

Table of Contents

1. About this document

This document explains the access and usability of the WUIVIEW database (readable version) on non-natural fuels burning characteristics. The information gathered in this database will serve as input in FDS (Fire Dynamics Simulator) simulations. This database is a readable version of the WUIVIEW Database presented in the Deliverable 3.2.

In the folder, users will find two files:

IMPORTANT:

Once unzipped the file WUIVIEW_DB_Artificial_Read_Version.ZIP, a folder called "WUIVIEW_DB_Artificial_Read_Version" will be created.

This folder should be copied into the path C:\ in order to execute the database. If the folder is not into the correct path, an error message will be displayed and the database cannot be executed.

The correct path is C:\WUIVIEW_DB_Artificial_Read_Version

- File 1: Database Report on thermal properties of species (**REPORT_Artificial_Fuels.accdb**). This file is *public* and users has access to the information of the reports. Users must use this file to query the non-natural fuel reports. Remember that the correct path to execute the file is: C:\WUIVIEW_DB_Artificial_Read_Version\REPORT_Artificial_Fuels.accdb

- File 2: Database on non-natural fuel burning characteristics. (**WUIVIEW_DB_Artificial_Fuels_READ.accdb**). The management and content of the database is private. To access this file a password is required.

In the next section, a detailed description of the REPORT_Artificial_Fuels database is explained.

2. Use of the REPORT_Artificial_Fuels database

In order to carry out the FDS simulations of WUI non-natural fuel-based fires it is key to develop a database where information of the different artificial fuels can be added and modified. In addition, this database will be a useful tool to exchange information between different parties using a standard format. To this end, UPC has developed an Access database to gather non-natural fuel properties. This database will enable us to consult useful information about non-natural fuels in a standardized format.

2.1. How to operate the Access Database

This database presents an intuitive user interface. Find below a brief explanation on how to use it.

2.1.1. Open the database

To work with this database, it is necessary to have the Microsoft Access database management system installed. Once this software has been installed, run the file called "REPORTS_Artificial_Fuels.accdb". Once the new database application has been opened, click on the "Enable content" button at the top of the start form (see Figure 1). This will enable code and unsafe macros in the database and reopen the database application in trusted mode. Depending of the computer and Microsoft access version, this step is activated by default.

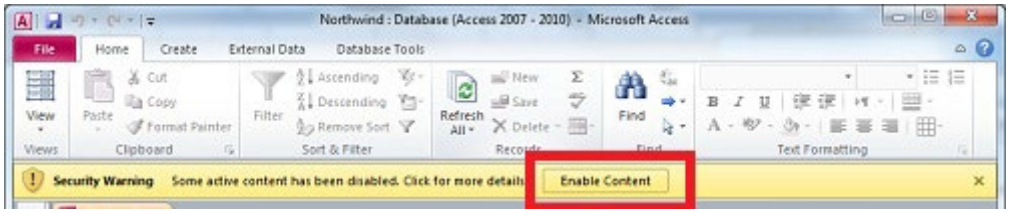


Figure 1. Security warning message to enable the content of the database

2.1.2. Query and report forms

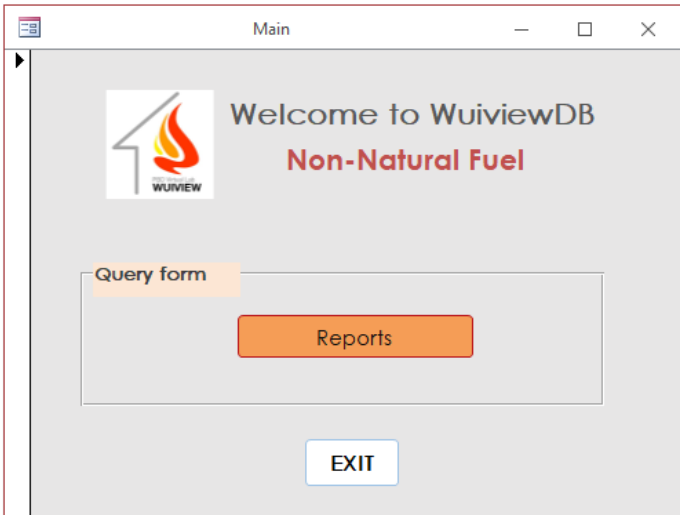


Figure 2. Welcome to WuiviewDB Non-Natural Fuel

Figure 2 shows the main menu window of the database. To access the query form and visualize all the reports, users should press the Reports button within the Query form panel. Next step consists on selecting the type of list to be consulted: a) a complete list of non-natural fuel types; b) a complete list of properties with their description; c) a complete list of objects sorted by non-natural fuel type gathered in the database. A search option is also available, composed by: a) a report containing all the information of a specific object; b) a list of the attached files related to a specific object; c) a report containing all the geometry of an object; d) a list of the attached files related to the geometry of an object.

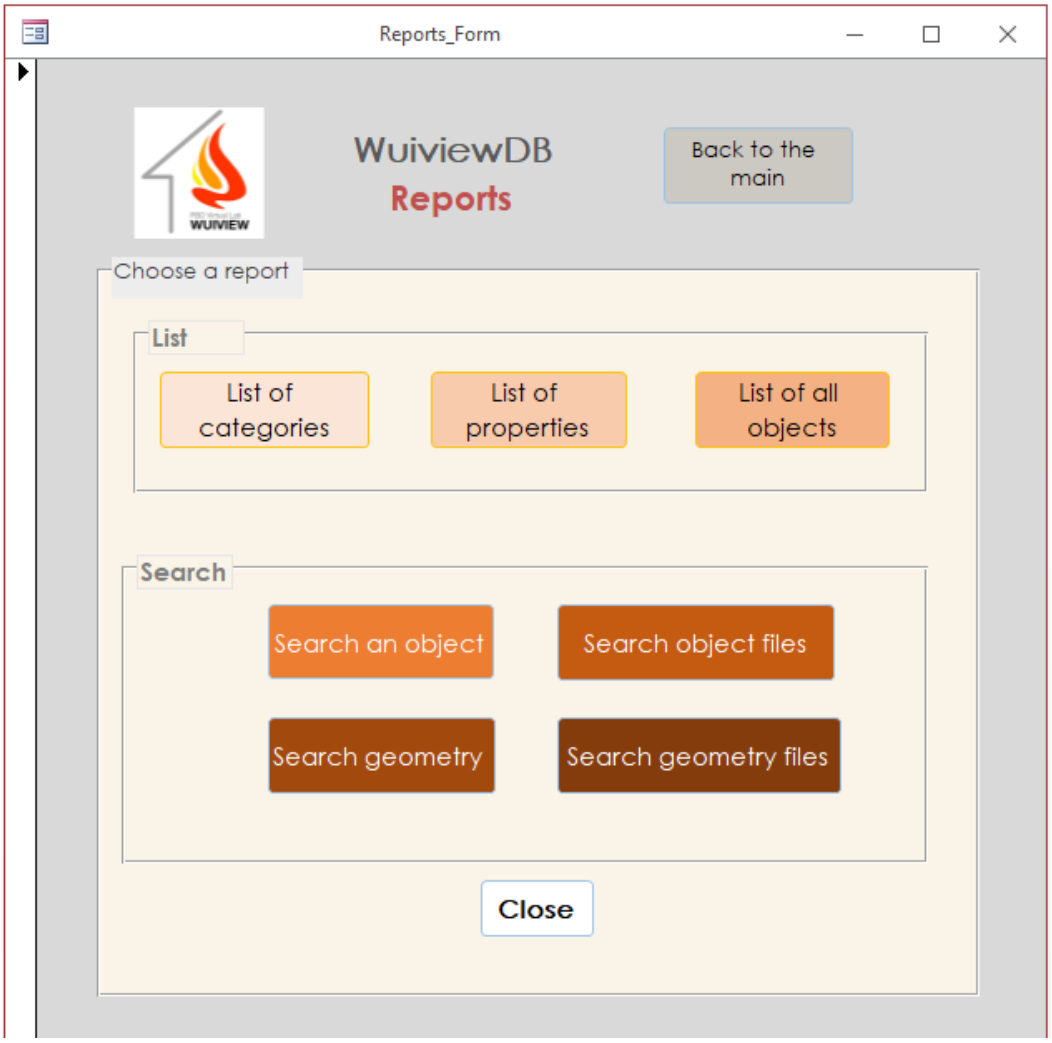


Figure 3. Options to generate a report form on the WuiviewDB on non-natural fuels

2.1.3. List of categories

By pressing the List of categories button, a list of all the categories is automatically generated. Figure 4 shows an example of the window format with the generated report. At the moment, six different categories are stored in the database (appliance, furniture, chemical products, decoration, transports and other).

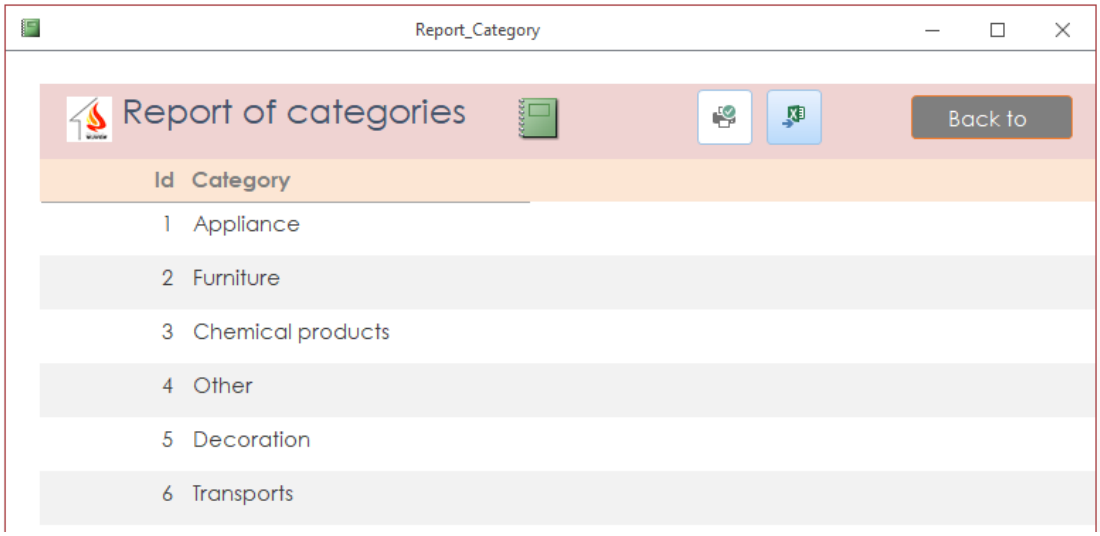


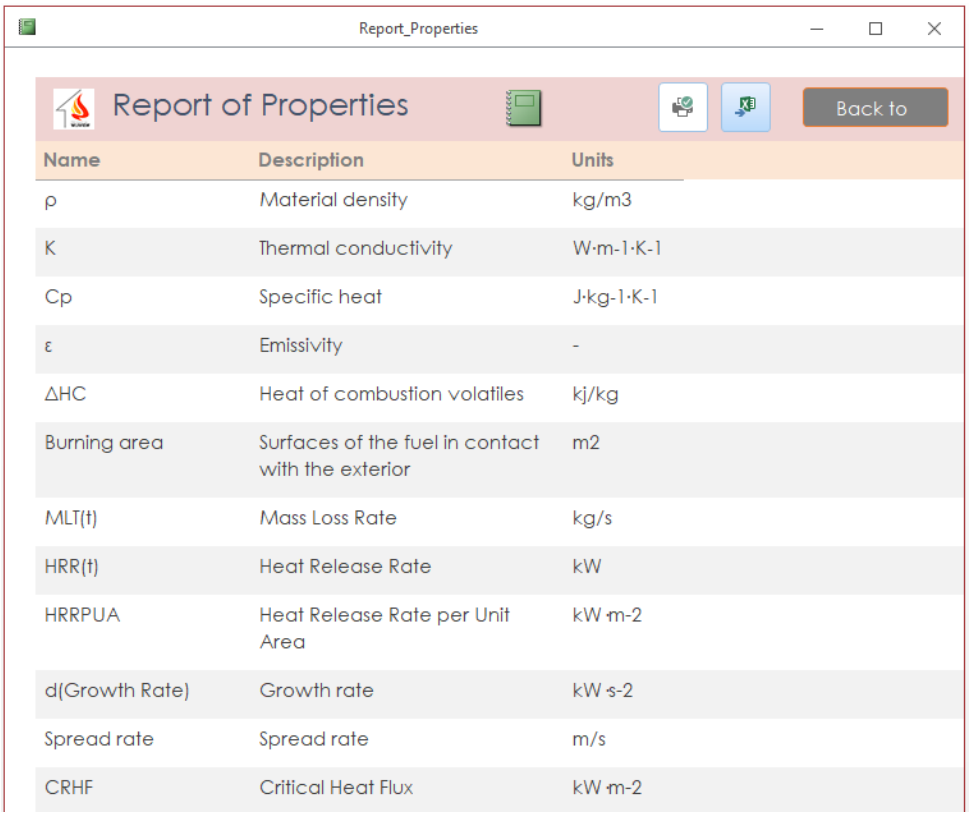
Figure 4. Example of the generated report with the list of categories.

On the top menu of the window, two options allow the users to export this information: printing and generating the content in a file. After pressing the corresponding button, users must select the format file such as EXCEL file, TXT file, PDF file among others. To go back to the main menu, it is preferable to use the Back to reports button instead of closing the window.

2.1.4. List of properties

By pressing the List of properties button, a list of all the properties stored in the database is automatically generated. Figure 5 shows an example of the window with the generated report.

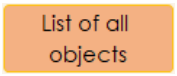
On the top menu of the window, two options allow the users to export this information: printing and generating the content in a file. After pressing the corresponding button, users must select the format file such as EXCEL file, TXT file, PDF file among others. To go back to the main menu, it is preferable to use the Back to reports button instead of closing the window.



Name	Description	Units
ρ	Material density	kg/m3
K	Thermal conductivity	W·m-1·K-1
Cp	Specific heat	J·kg-1·K-1
ε	Emissivity	-
ΔHC	Heat of combustion volatiles	kj/kg
Burning area	Surfaces of the fuel in contact with the exterior	m2
MLT(t)	Mass Loss Rate	kg/s
HRR(t)	Heat Release Rate	kW
HRRPUA	Heat Release Rate per Unit Area	kW·m-2
d(Growth Rate)	Growth rate	kW·s-2
Spread rate	Spread rate	m/s
CRHF	Critical Heat Flux	kW·m-2

Figure 5. Example of the generated report with the list of the properties of the database.

2.1.5. List of all objects

By pressing the 

button a list of all the objects sorted by category is automatically generated. Figure 6 shows an example of the window with the generated report.

On the top menu of the window, two options  allow the users to export this information: printing and generating the content in a file. After pressing the corresponding button, users must select the format file such as EXCEL file, TXT file, PDF file among others. To go back to the main menu, it is preferable to use the 

button instead of closing the window.

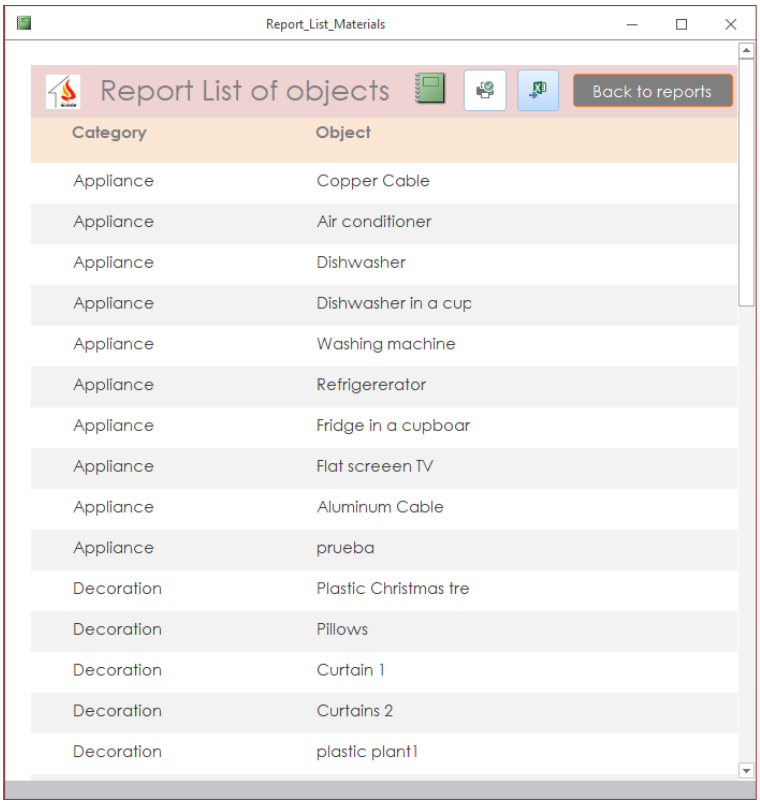


Figure 6. Example of the generated report with the list of all objects sorted by category.

2.1.6. Search object

This option allows the users to obtain a detailed content of an object. After pressing the Search an object button, a pop-up window is displayed (Figure 7). As it can be seen, a list of all the objects contained in the database, sorted by category is shown. Users must select an object on the listbox and all the information related with the object will be displayed. Figure 8 shows an example of the generated form once the object is selected from the pop-up window. This form is structured in two sections: a) description of the object; b) list of all the associated properties with their content. Not all the information fields are filled when it comes to the different properties. In the example in Figure 8, it is important to visualize the number of associated properties. In this case, "Cooper cable" has one. There is not numerical information when it comes to the property *HRRPUA*. This means that this object contains properties within associated files. For this reason, in order to visualize them, users should use a "search object files" button of the main panel option (see Fig. 3). This option is explained in the next section *2.1.7*.

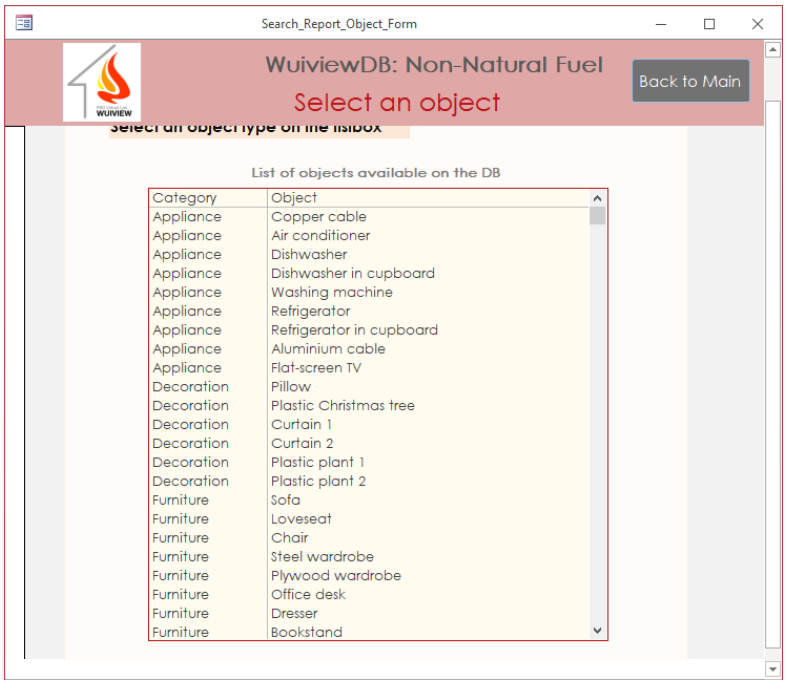


Figure 7. An example of the pop-up window with the list of objects sorted by category

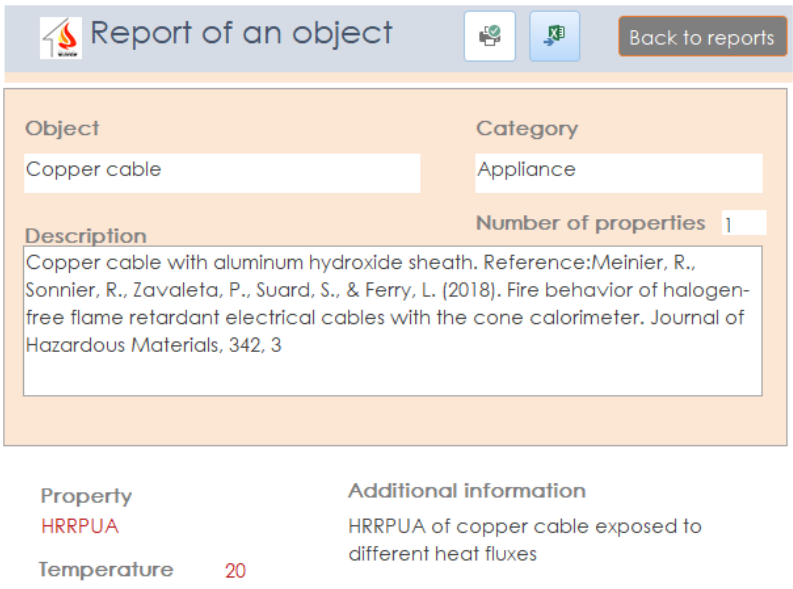
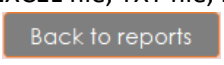


Figure 8. Example of the information related to the object and a list of all the associated properties.

Finally, on the top menu of the window, two options  allow users to export this information: printing and generating the content in a file. After pressing the corresponding button, users should select the format file such as EXCEL file, TXT file, PDF file among others. To go back to the main menu is preferable to use the  button instead of closing the window.

2.1.7. Search object files

This option allows the users to obtain a detailed content of an object. After pressing the Search object files button, a pop-up window is displayed (Figure 9). A list of all the objects contained in the database and sorted by category is shown. Users must select an object on the listbox and all the information related to the object will be displayed. Figure 10 shows an example of the generated form once the object is selected from the pop-up window. In order to facilitate this task, only the objects with associated files are displayed on the list form. This form is structured in two sections: a) description of the object; b) list of all the associated properties with their content. In the example of Figure 10, a "Hard suitcase" object of the category "other" is selected. This object has one associated file concerning the HRR(t) properties. It is possible to open them after clicking on the list panel (Figure 11). An example of an Excel file associated with the property HRR(t) of the selected object is depicted in Figure 12.

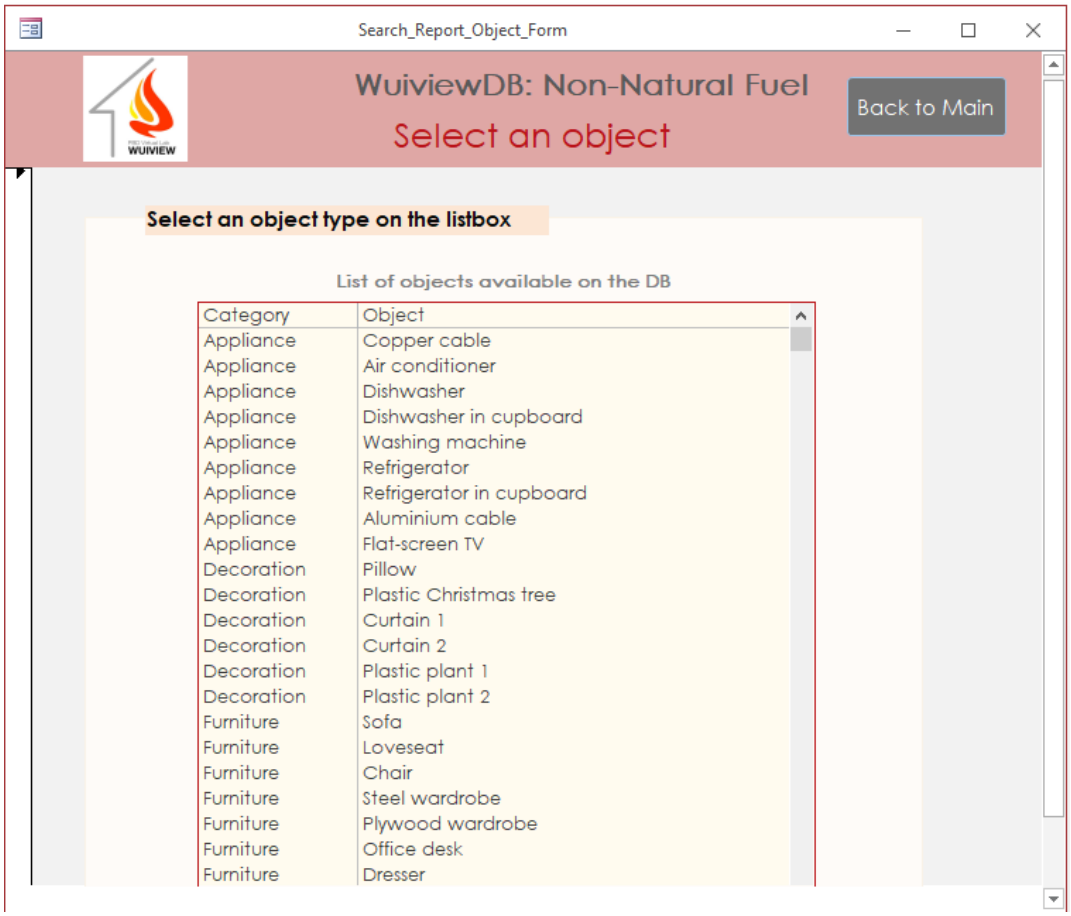


Figure 9. An example of the pop-up window with the list of objects sorted by category

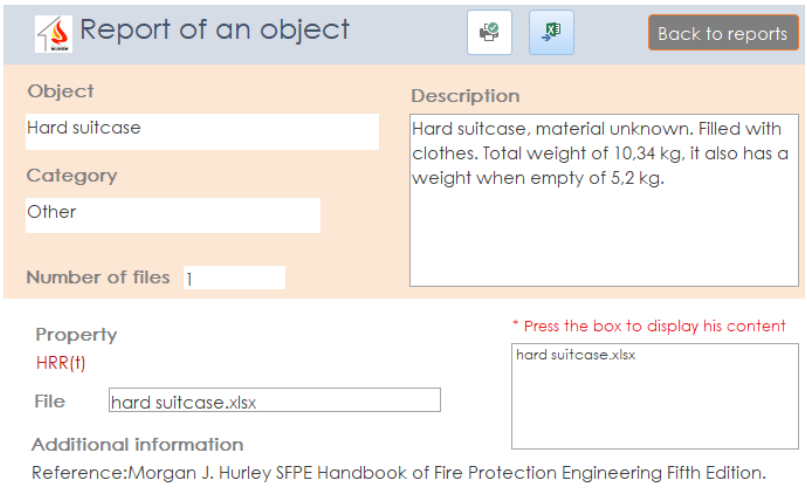


Figure 10. Example of the information related to the object and a list of all the associated properties.

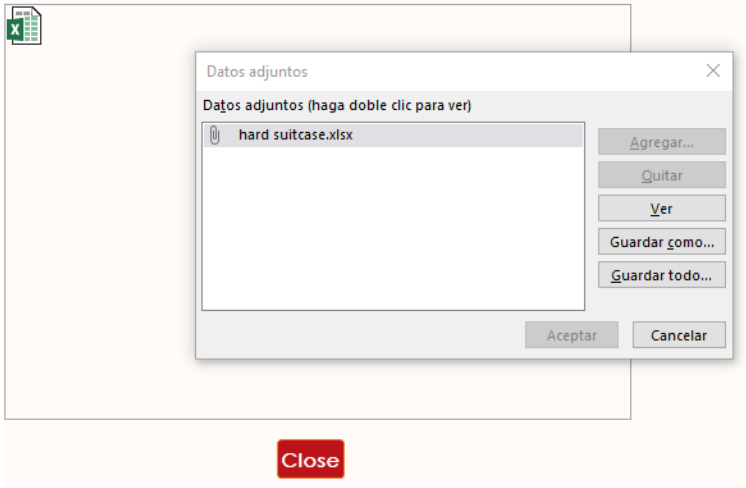
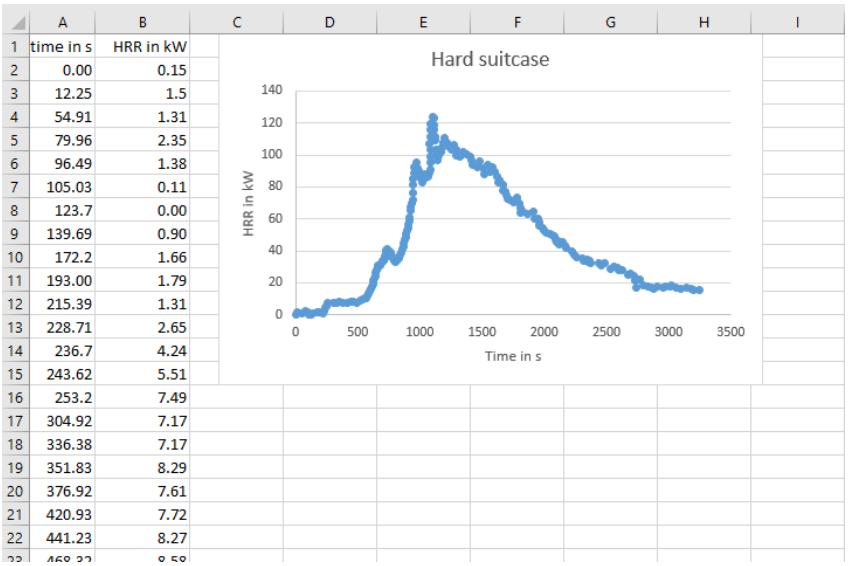


Figure 11. Example of the pop-up window to open an attached file of a property



	A	B
1	time in s	HRR in kW
2	0.00	0.15
3	12.25	1.5
4	54.91	1.31
5	79.96	2.35
6	96.49	1.38
7	105.03	0.11
8	123.7	0.00
9	139.69	0.90
10	172.2	1.66
11	193.00	1.79
12	215.39	1.31
13	228.71	2.65
14	236.7	4.24
15	243.62	5.51
16	253.2	7.49
17	304.92	7.17
18	336.38	7.17
19	351.83	8.29
20	376.92	7.61
21	420.93	7.72
22	441.23	8.27

Figure 12. Example of an associated excel file related with the property of an object

Finally, on the top menu of the window, two options  allow users to export this information: printing and generating the content in a file. After pressing the corresponding button, users should select the format file such as EXCEL file, TXT file, PDF file among others. To go back to the main menu is preferable to use the 

button instead of closing the window.

2.1.8. Search geometry

This option allows the users to obtain a detailed content of the geometry of the objects. After pressing the 

button, a pop-up window is displayed (Figure 13). As it can be seen, a list of all the objects contained in the database and sorted by category is shown. Users must select an object in the listbox and all the information related with the geometry of each object will be displayed. Figure 14 shows an example of the generated form once the object is selected from the pop-up window. This form is structured in two sections: a) description of the object; b) list of all the associated geometries with their content. Two different types of geometries are defined: simple or complex geometry. An example of a simple geometry of the object "Hard suitcase" is depicted in Figure 14. Complex geometries are shown in attached files. For this reason, users should use the option "search geometry files" to obtain all the complex geometries saved in an external file (see section 2.1.9).

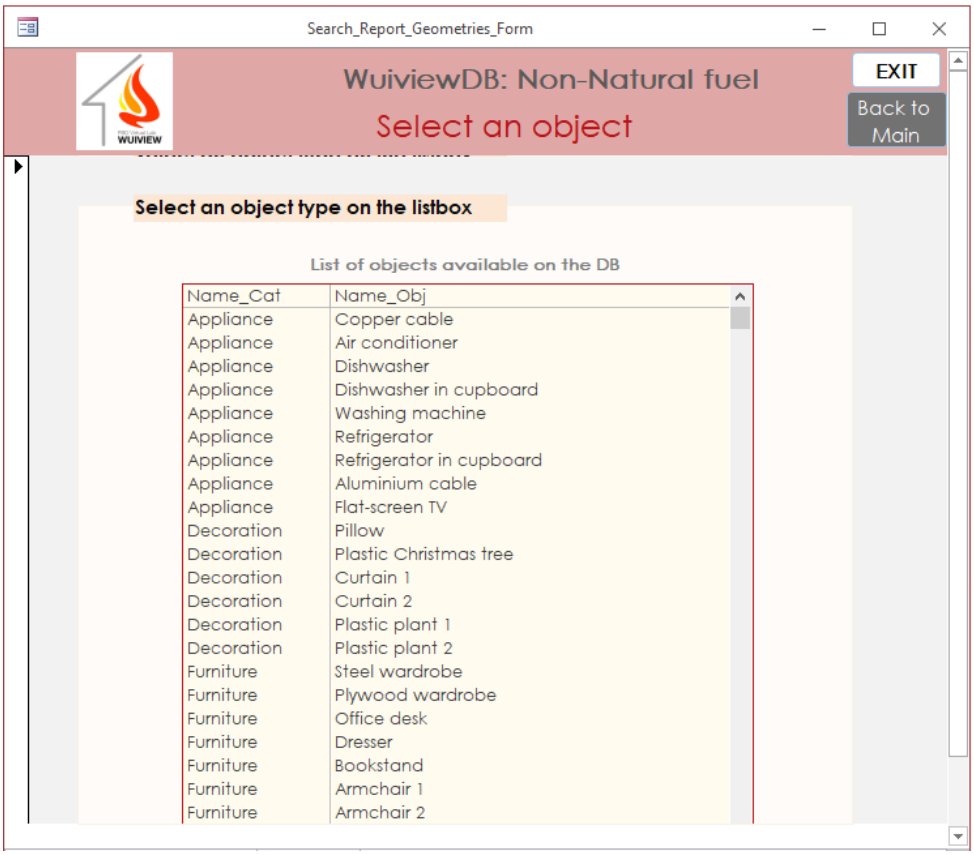


Figure 13. An example of the pop-up window with the list of objects sorted by category

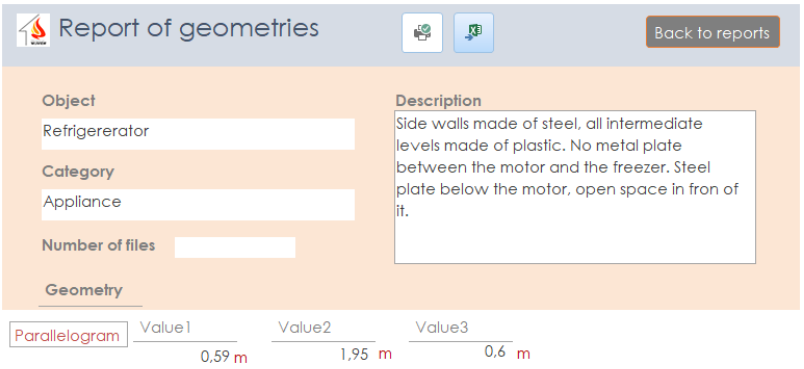


Figure 14. Example of the information related to the geometry of an object

Finally, on the top menu of the window, two options  allow users to export this information: printing and generating the content in a file. After pressing the corresponding button, users should select the format file such as EXCEL file, TXT file, PDF file among others. To go back to the main menu is preferable to use the Back to reports button instead of closing the window.

2.1.9. Search geometry files

This option allows the users to obtain a detailed content of an object's geometry. After pressing the Search geometry files button, a pop-up window is displayed (Figure 15). As it can be seen, a list of all the objects contained in the database and sorted by fuel type is shown. In this list, only the species that contain associated files are displayed. It is easier for users to visualize rapidly only the objects that have complex geometries. Then users must select an item on the listbox and all the information related with the specie will be displayed. Figure 16 shows an example of the generated form once the object is selected from the pop-up window. This form is structured in two sections: a) description of the object; b) list of all the associated geometry files with their content. Figure 17 shows an example of the content related with the object "Office desk". As can be seen, this object contains a complex geometry which is detailed in the attached file.

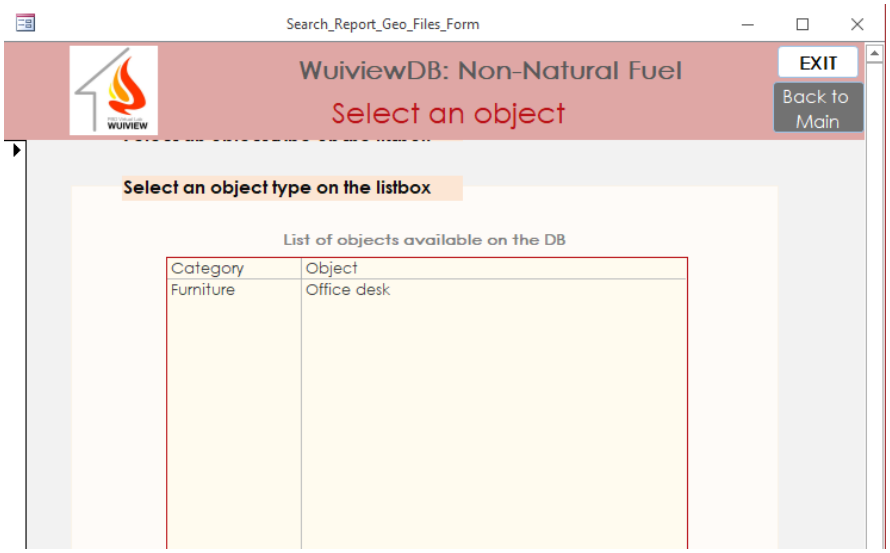


Figure 15. Example of the information related to the geometry of an object

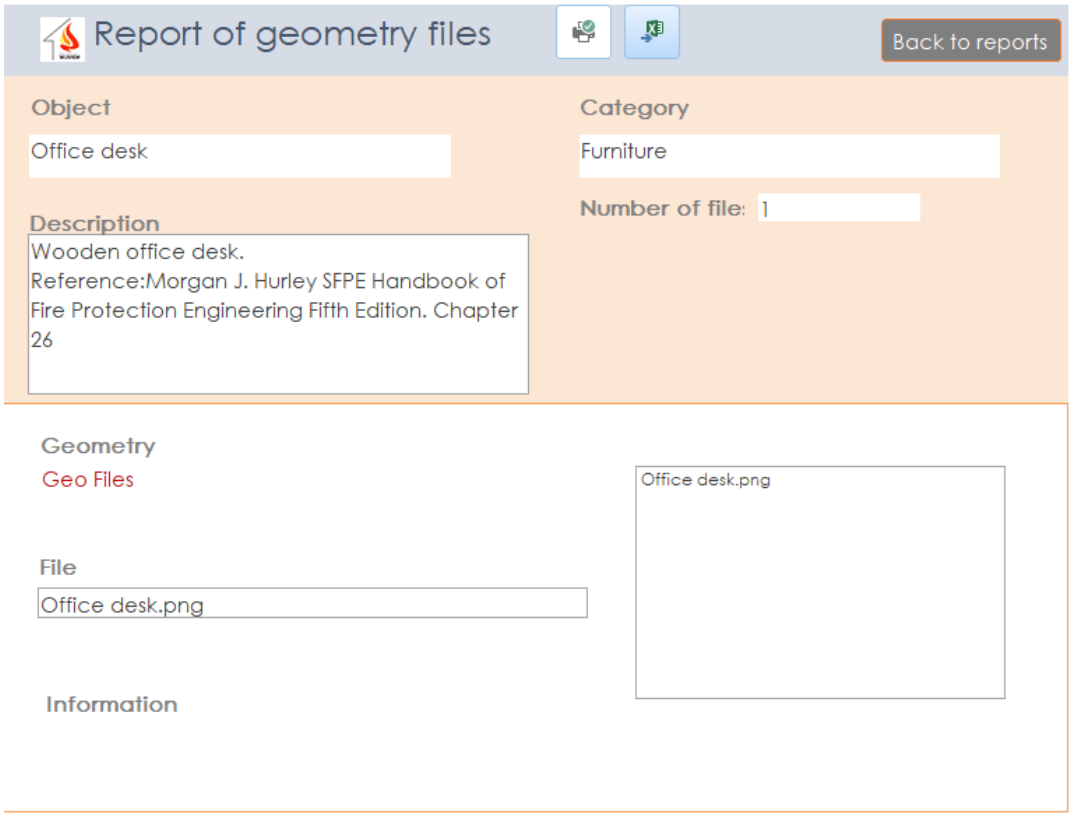


Figure 16. Example of the geometry information of an office desk

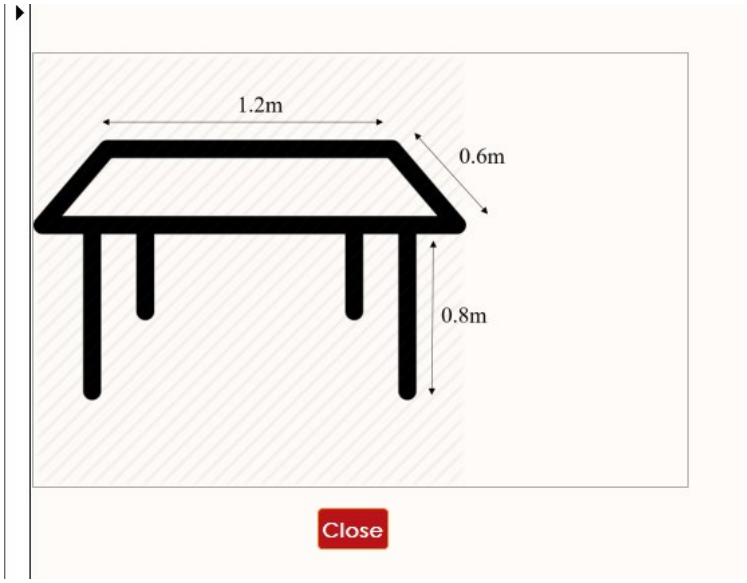


Figure 17. Example of the geometry of an office desk

Finally, on the top menu of the window, two options  allow users to export this information: printing and generating the content in a file. After pressing the corresponding button, users should select the format file such as EXCEL file, TXT file, PDF file among others.

To go back to the main menu, it is preferable to use the  button instead of closing the window.