



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
Updated:	October 2020		

Document coordinator	C. Mata (UPC), Elsa Pastor (UPC)
Contact	christian.mata@upc.edu , elsa.pastor@upc.edu
Authors	P. Vacca (UPC), A. Àgueda (UPC), G. Ballester (UPC)
Reviewed by	Pascale Vacca (UPC)

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

The content of this publication represents the views of the authors only and is their sole responsibility. The European Commission does not accept any responsibility for use that may be made of the information it contains.

Table of Contents

1.	About this document.....	4
2.	Use of the REPORT_Artificial_Fuels database.....	5
2.1.	How to operate the Access Database	5
2.1.1.	Open the database	5
2.1.2.	Query and report forms	5
2.1.3.	List of categories	7
2.1.4.	List of properties	7
2.1.5.	List of all objects	8
2.1.6.	Search object.....	9
2.1.7.	Search object files	11
2.1.8.	Search geometry	13
2.1.9.	Search geometry files.....	14

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.

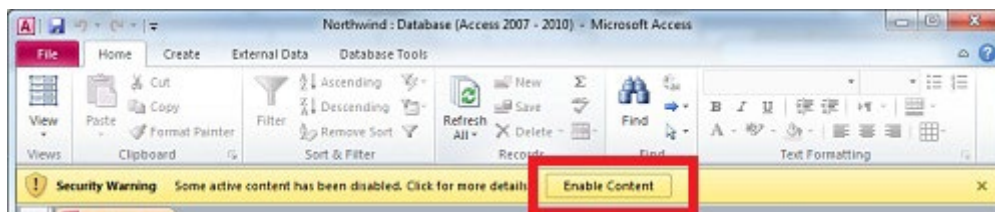


Figure 1. Security warning message to enable the content of the database

2.1.2. Query and report forms

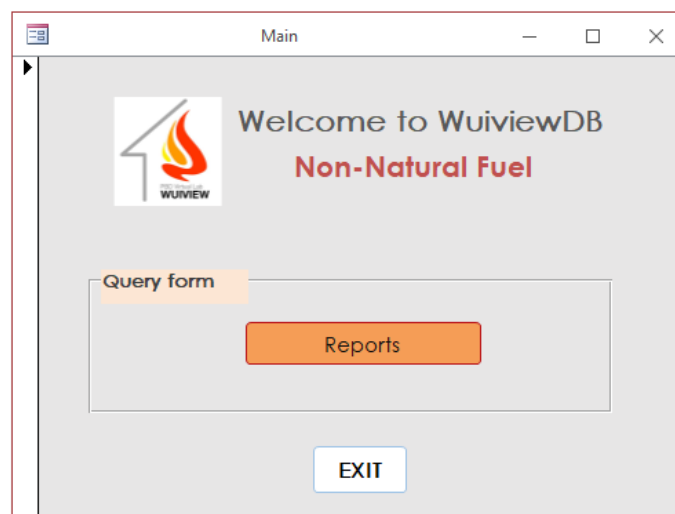


Figure 2. Welcome to WuiviewDB Non-Natural Fuel

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.

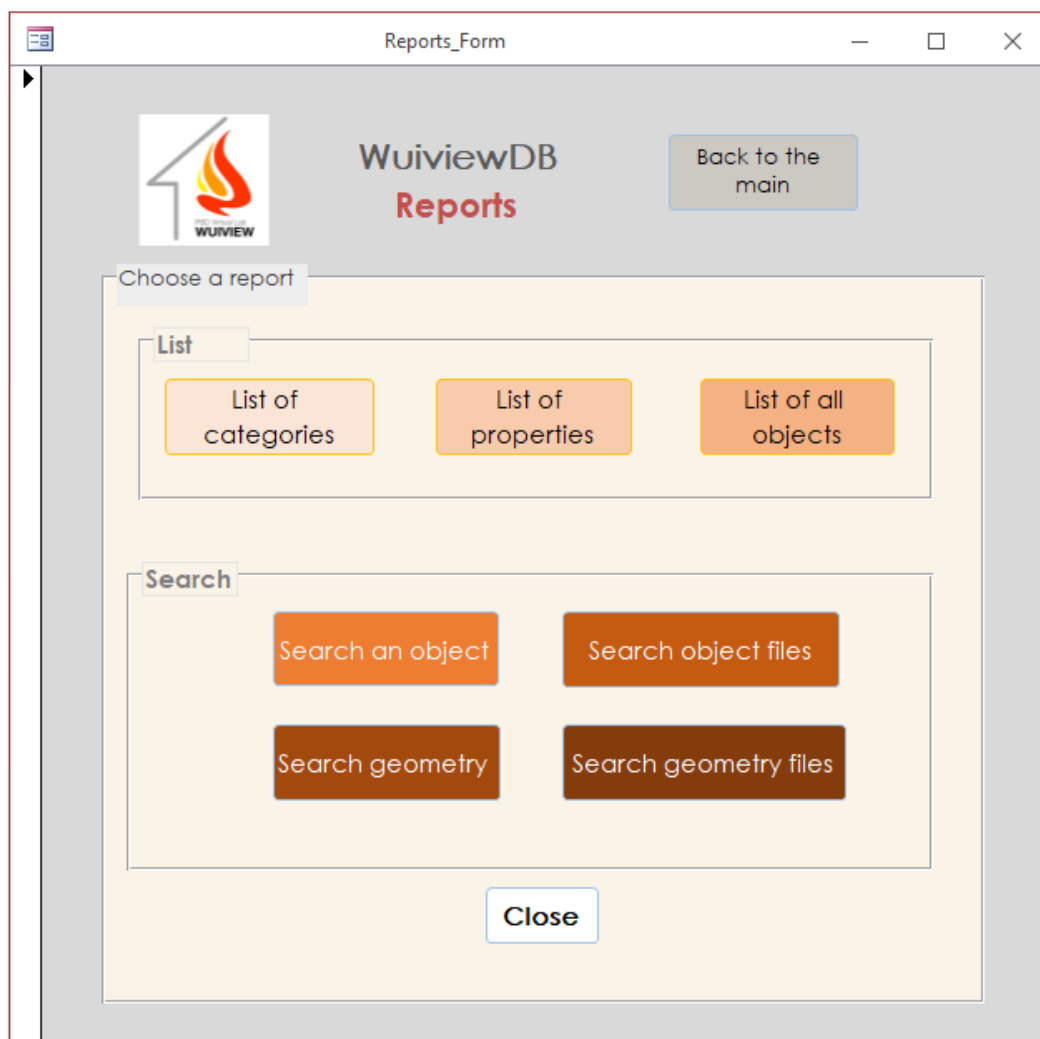
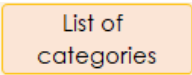


Figure 3. Options to generate a report form on the WuiviewDB on non-natural fuels

2.1.3. List of categories

By pressing the  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).

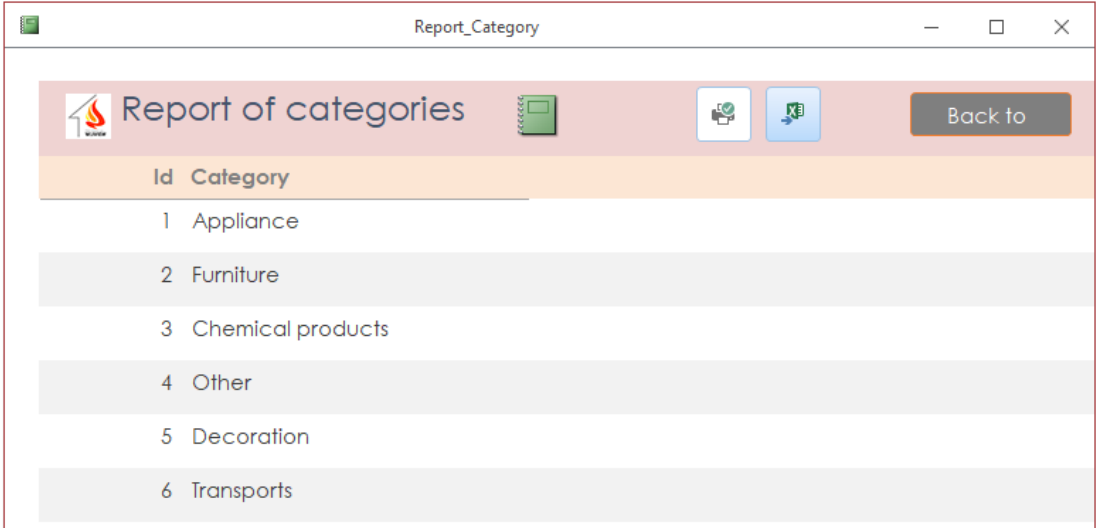

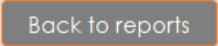


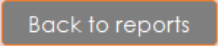


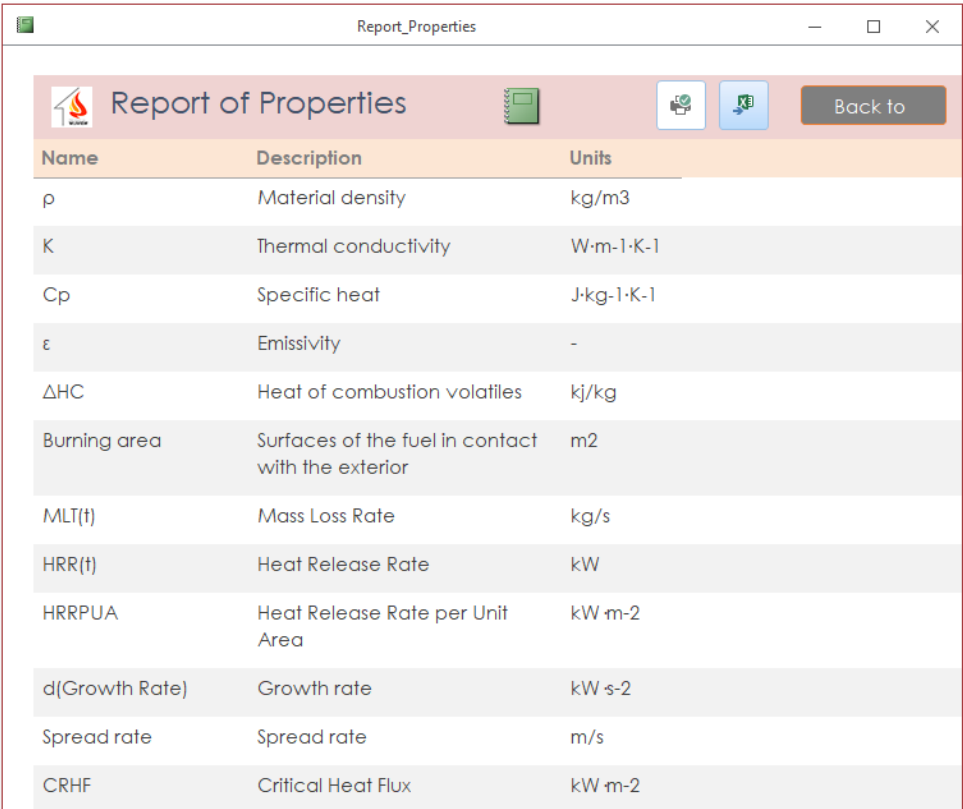
Figure 4. Example of the generated report with the list of categories.

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  button instead of closing the window.

2.1.4. List of properties

By pressing the  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  button instead of closing the window.

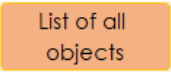




The screenshot shows a window titled 'Report_Properties'. Inside, there's a header 'Report of Properties' with a fire icon on the left and a 'Back to' button on the right. Below the header is a table with three columns: 'Name', 'Description', and 'Units'. The table lists various material properties and their units.

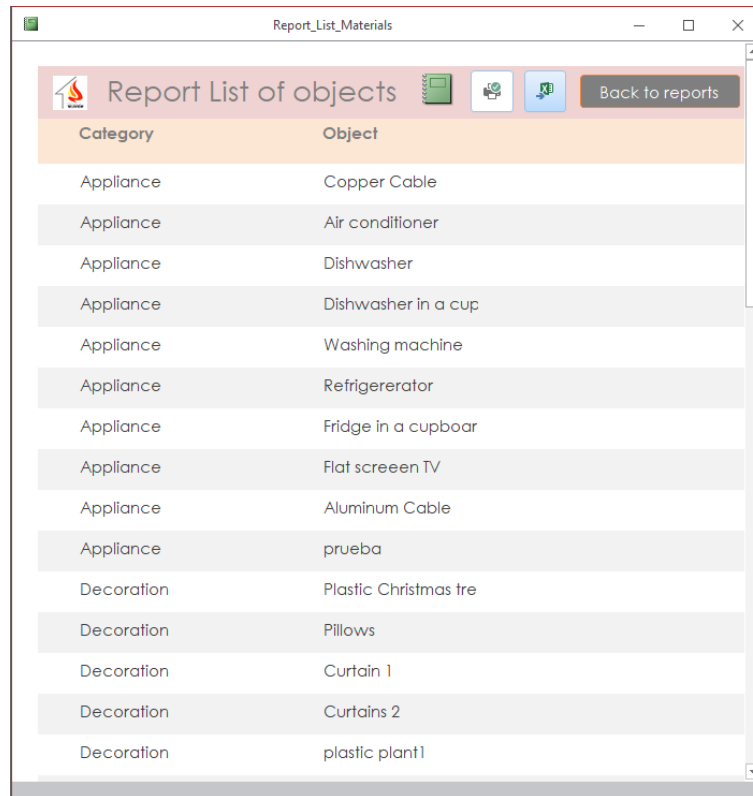
Name	Description	Units
ρ	Material density	kg/m3
K	Thermal conductivity	W·m-1·K-1
Cp	Specific heat	J·kg-1·K-1
ϵ	Emissivity	-
ΔH_C	Heat of combustion volatiles	kJ/kg
Burning area	Surfaces of the fuel in contact with the exterior	m2
MLT(t)	Mass Loss Rate	kg/s
HRR(t)	Heat Release Rate	kW
HRRPUA	Heat Release 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.



The screenshot shows a web application window titled 'Report_List_Materials'. Inside, there's a header bar with a logo, the title 'Report List of objects', and a 'Back to reports' button. Below the header is a table with two columns: 'Category' and 'Object'. The table lists various objects, grouped by category: 'Appliance' (Copper Cable, Air conditioner, Dishwasher, Dishwasher in a cup, Washing machine, Refrigerator, Fridge in a cupboard, Flat screen TV, Aluminum Cable, prueba) and 'Decoration' (Plastic Christmas tree, Pillows, Curtain 1, Curtains 2, plastic plant 1).

Category	Object
Appliance	Copper Cable
Appliance	Air conditioner
Appliance	Dishwasher
Appliance	Dishwasher in a cup
Appliance	Washing machine
Appliance	Refrigerator
Appliance	Fridge in a cupboard
Appliance	Flat screen TV
Appliance	Aluminum Cable
Appliance	prueba
Decoration	Plastic Christmas tree
Decoration	Pillows
Decoration	Curtain 1
Decoration	Curtains 2
Decoration	plastic plant 1

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.

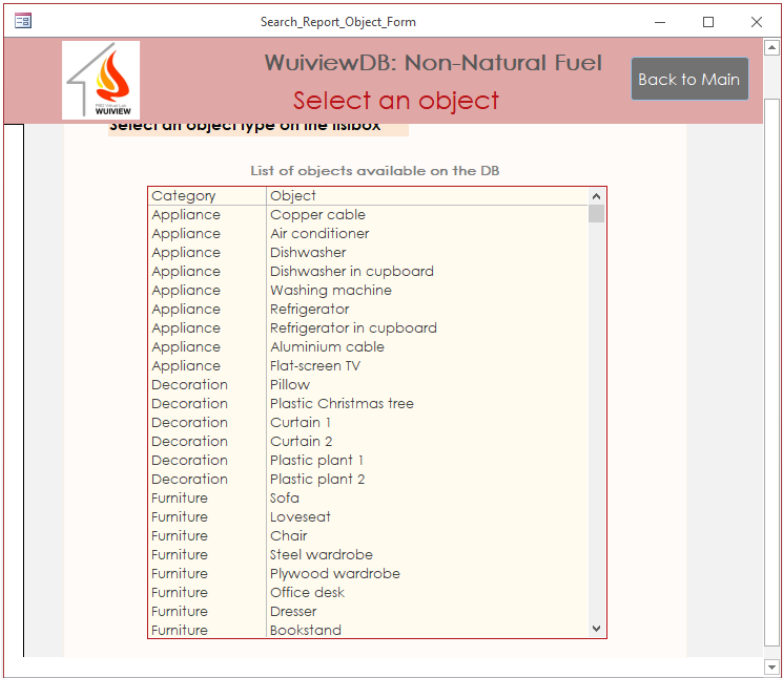


Figure 7. An example of the pop-up window with the list of objects sorted by category

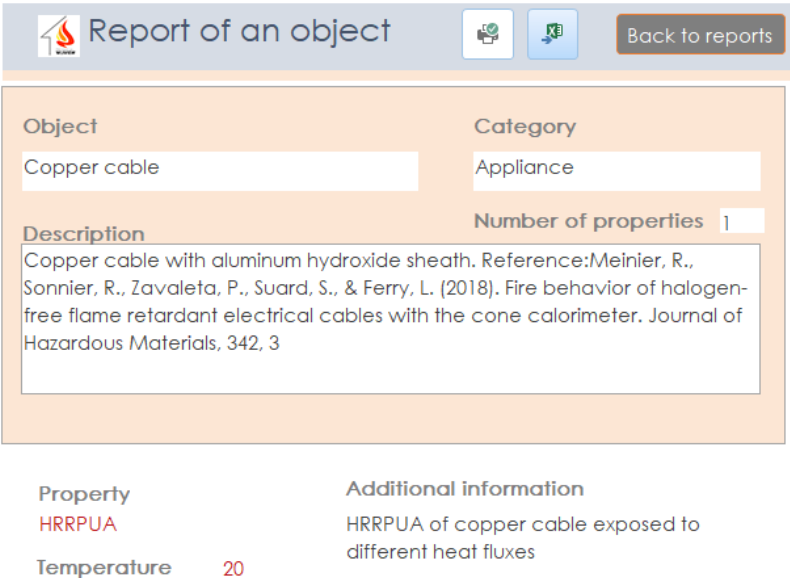




Figure 8. Example of the information related to the object and a list of all the associated properties.

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.

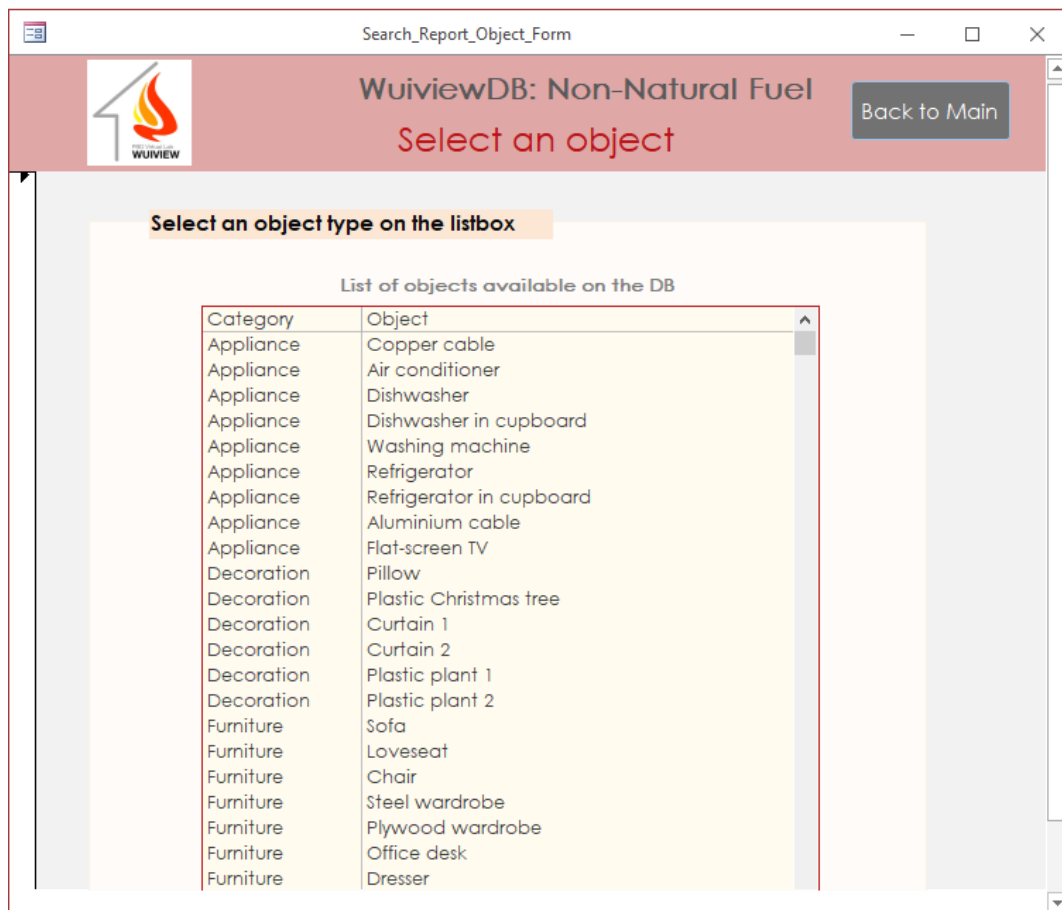





Figure 9. An example of the pop-up window with the list of objects sorted by category

**Report of an object**



Back to reports

Object
Hard suitcase

Category
Other

Number of files 1

Description
Hard suitcase, material unknown. Filled with clothes. Total weight of 10,34 kg, it also has a weight when empty of 5,2 kg.

Property
HRR(t)

File hard suitcase.xlsx

Additional information
Reference:Morgan J. Hurley SFPE Handbook of Fire Protection Engineering Fifth Edition.

* Press the box to display his content

hard suitcase.xlsx

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

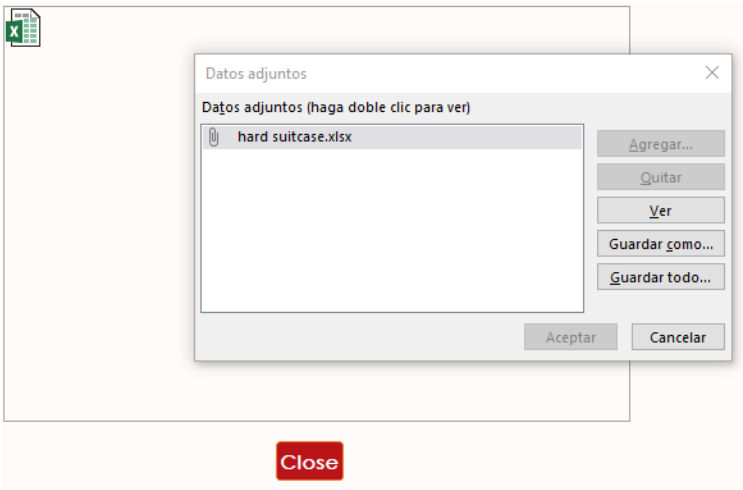


Figure 11. Example of the pop-up window to open an attached file of a property

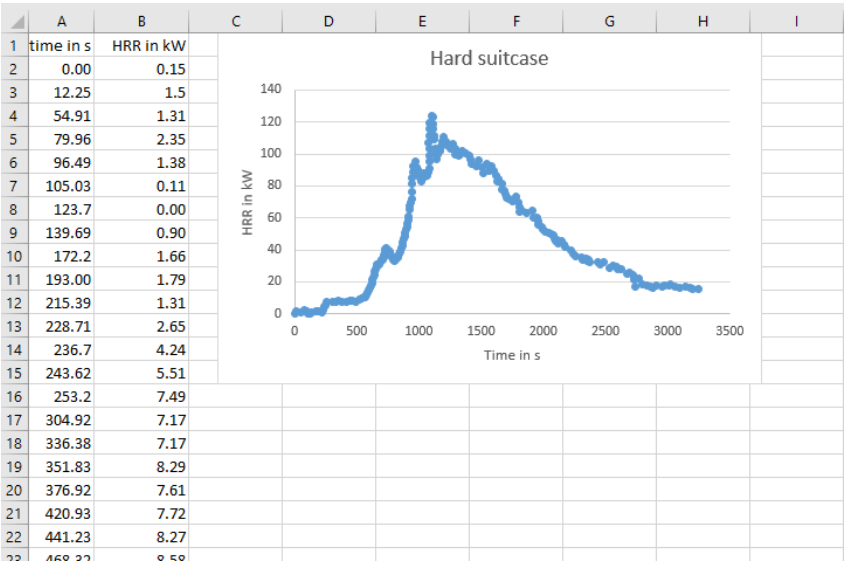


Figure 12. Example of an associated excel file related with the property of an object



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 **Back to reports** 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 **Search geometry** 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).

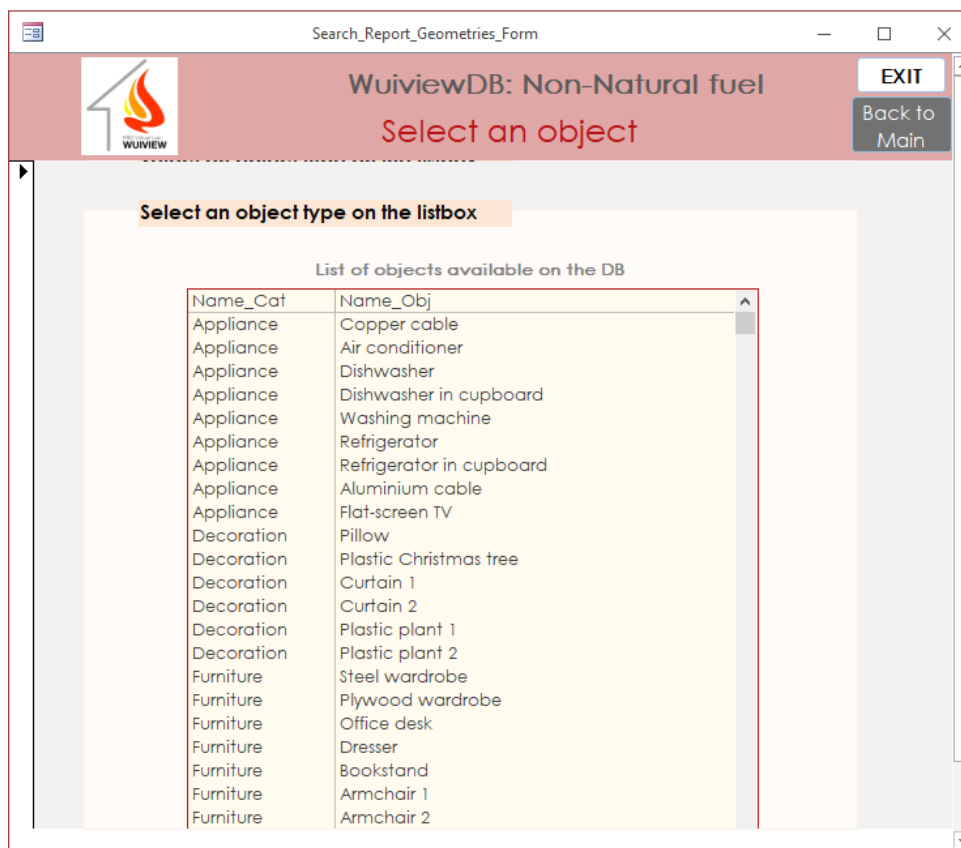




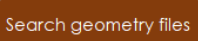
Figure 13. An example of the pop-up window with the list of objects sorted by category

The screenshot shows a web application window titled "Report of geometries". It contains several input fields and a description box. The "Object" field is filled with "Refrigerator". The "Category" field is filled with "Appliance". The "Number of files" field is empty. The "Description" box contains the text: "Side walls made of steel, all intermediate levels made of plastic. No metal plate between the motor and the freezer. Steel plate below the motor, open space in front of it." Below the input fields, there is a "Geometry" section with a "Parallelogram" shape and three dimensions: "Value1" (0,59 m), "Value2" (1,95 m), and "Value3" (0,6 m). A "Back to reports" button is located in the top right corner.

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  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  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.



The screenshot shows a web application window titled "Search_Report_Geo_Files_Form". It has a red header bar with the WUIVIEW logo and the text "WuiviewDB: Non-Natural Fuel". Below the header, there is a "Select an object" prompt. A listbox titled "List of objects available on the DB" contains the following data:

Category	Object
Furniture	Office desk

Buttons for "EXIT", "Back to Main", and "Select an object type on the listbox" are visible.

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

 **Report of geometry files**



Back to reports

Object
Office desk

Category
Furniture

Description
Wooden office desk.
Reference:Morgan J. Hurley SFPE Handbook of
Fire Protection Engineering Fifth Edition. Chapter
26

Number of file: 1

Geometry
Geo Files

File
Office desk.png

Information

Office desk.png

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

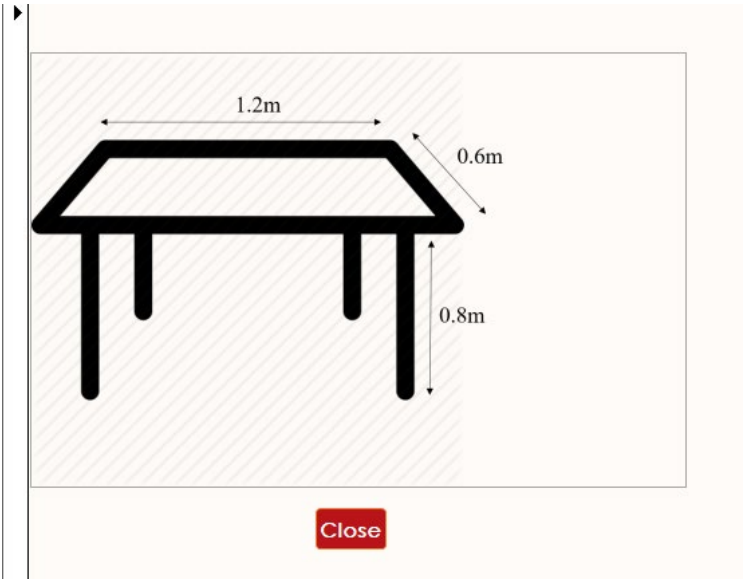


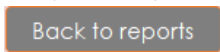


Figure 17. Example of the geometry of an office desk

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.