

PANDORA USER GUIDE

Author: M.O. Abadie (mabadie@univ-lr.fr)

PANDORA version: 1.2 (May 2014)

System requirement

The database has been developed under Microsoft Access 2007 or 2010. If you do not have the full version of Access 2010 installed on your computer, you can download the Microsoft Access 2010 Runtime from the Microsoft website.

Opening the database

By opening the PANDORA database, a **USERS login** prompt will show up (Figure 1), **click OK** without modifying the Username and password.

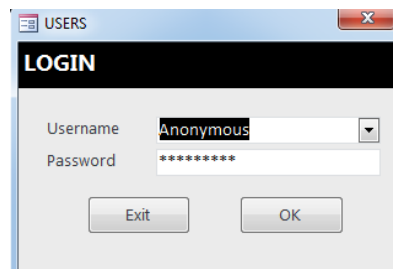


Figure 1 : USERS login.

The information regarding the version of the database and the contact information will be then displayed (Figure 2). **Press OK.**

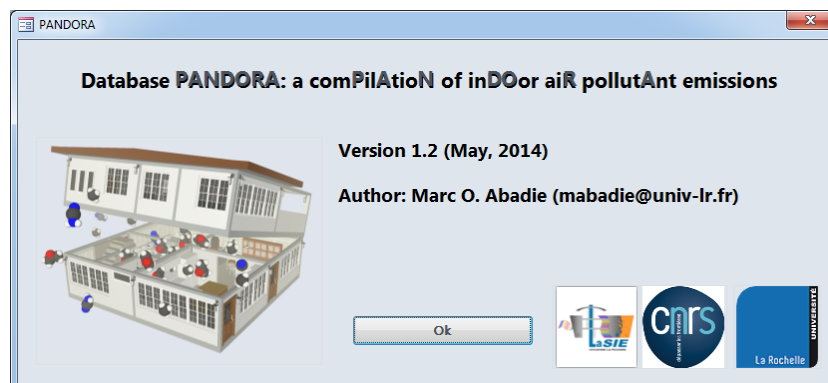
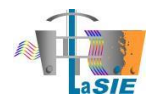


Figure 2 : PANDORA information.



Exploring the database

Main Interface

Figure 3 shows the main graphical interface of PANDORA. PANDORA is based on four levels:

1. CATEGORY: the database structure starts with 7 main categories (Occupants and Occupant Activities, Cleaning Products and Air Fresheners, Construction and Decoration Materials, Furniture, Heating and Cooking Appliances, Electrical Equipment, Others).
2. GLOBAL TYPE: for example, for sources of the "Occupants and occupant activities" category, different levels are found such as Cooking, smoking cigarettes, using candles...
3. TYPE: in the different Global Types, one last level is used to give additional information on the type of source (e.g. white, blue or traditional candles...), location (residence, office, hospital...), country of origin and complete reference of the study.
4. SOURCE: the definition of the pollutants generated by the source with their emission rates.

Each of those 4 levels can be explored by the use of the dedicated navigation bars located in the lower part of each level.

The screenshot displays the PANDORA software interface, titled "PANDORA: a compILatioN of inDOor air pollutAnt emissions". The interface is organized into four levels of navigation, each with a dedicated bar at the bottom. The top bar includes buttons for "Explore Database", "Pollutants", "Source Models", "References", and "Export Data to Excel".

Level 1: CATEGORY NAME. The selected category is "Occupants and Occupant Activities".

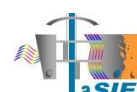
Level 2: GLOBAL TYPE NAME. The selected global type is "Using Incenses".

Level 3: TYPE NAME. The selected type is "Incense (traditional) 001". The description is "Stick L = 16.8cm, D = 1.5mm, Dark yellow, Estimated burning rate B = 2.28 g/h". The location is "Residence", the country is "China", and the reference is "2004_LEE". The estimated burning rate B is 2.28 g/h. The data entered by is "Marc Abadie".

Level 4: SOURCE. The pollutant group name is "Particles", the pollutant name is "PM2.5", and the emission model is "Particles - Transient - Steps (mg/h)". The description includes the equation $S = a_i \text{ if } t(i-1) < t \leq t(i), t(0)=0$ and the unit (mg/h). The parameters are: $a_1 = 227.6$ (mg/h), $t_1 = 26$ (min), $a_2 =$ (mg/h), $t_2 =$ (min), $a_3 =$ (mg/h), $t_3 =$ (min), $a_4 =$ (mg/h), $t_4 =$ (min), $a_5 =$ (mg/h), $t_5 =$ (min).

The bottom navigation bars show the current position in each level: "Enr: 1 sur 26", "Enr: 1 sur 14", "Enr: 1 sur 8", and "Enr: 1 sur 7". Each bar includes a search button labeled "Rechercher".

Figure 3 : Main graphical interface.



PANDORA Explorer

The explorer (Figure 4) helps the user to easily navigate through the data implemented in PANDORA. This tool is available by clicking on the “**Explore Database**” button located in the upper part of the main interface.

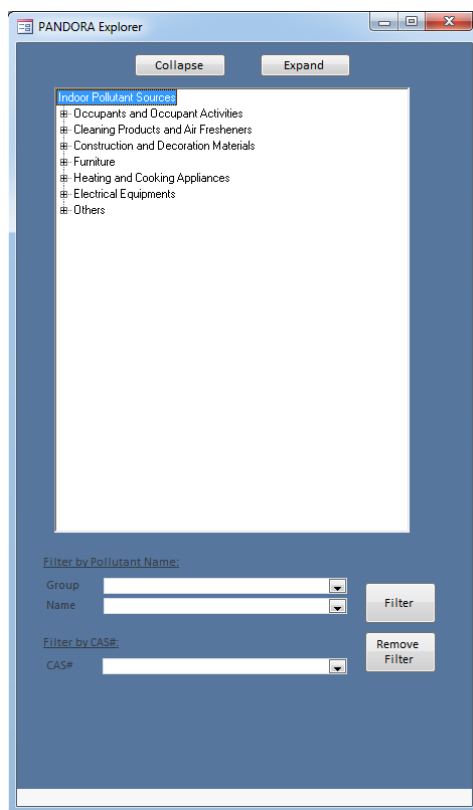


Figure 4 : PANDORA explorer.

There are two ways of using this tool:

- **By clicking in the main window:** the last level will display the names of the pollutant for the chosen source. **By clicking on the name**, the emission rates (equation and parameters) will be updated in the main interface (see example in Figure 5).
- **By filtering the data with a specific pollutant:** the user can either **specify the name** of the pollutant (**by firstly selecting its group** e.g. VOC) or type its CAS number. By **pressing the “Filter” button**, the list of the sources that emit the selected pollutant will be displayed in the main window (Figure 6). **By selecting a source and clicking on the pollutant name**, the emission rates will be updated in the main interface (Figure 7).

Note: because pollutants usually have various names, the user may need to use the NIST Chemistry WebBook (webbook.nist.gov/chemistry/) to find the name currently used in PANDORA. As a convention, the pollutant name used in PANDORA is the one mentioned in the NIST Chemistry WebBook when searching with the CAS number.

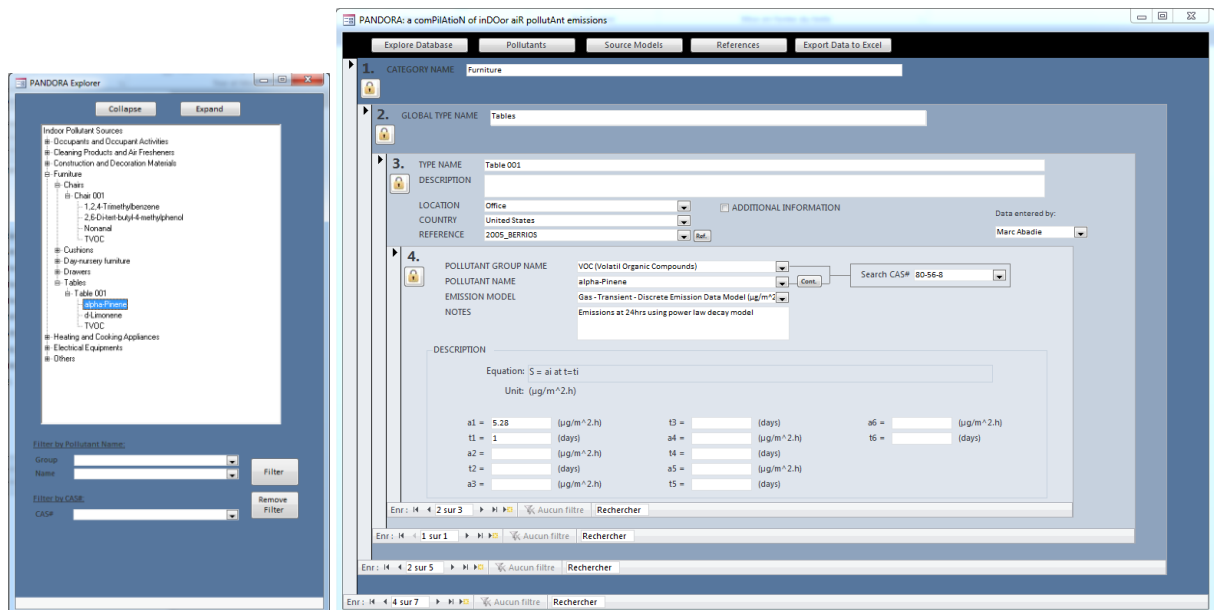
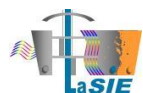


Figure 5 : Displaying the emission rates of α -pinene for a Table.

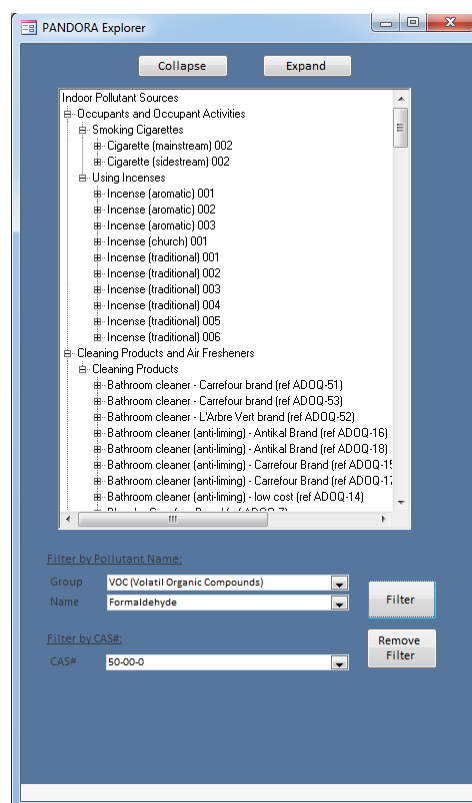


Figure 6 : List of sources that emit formaldehyde.

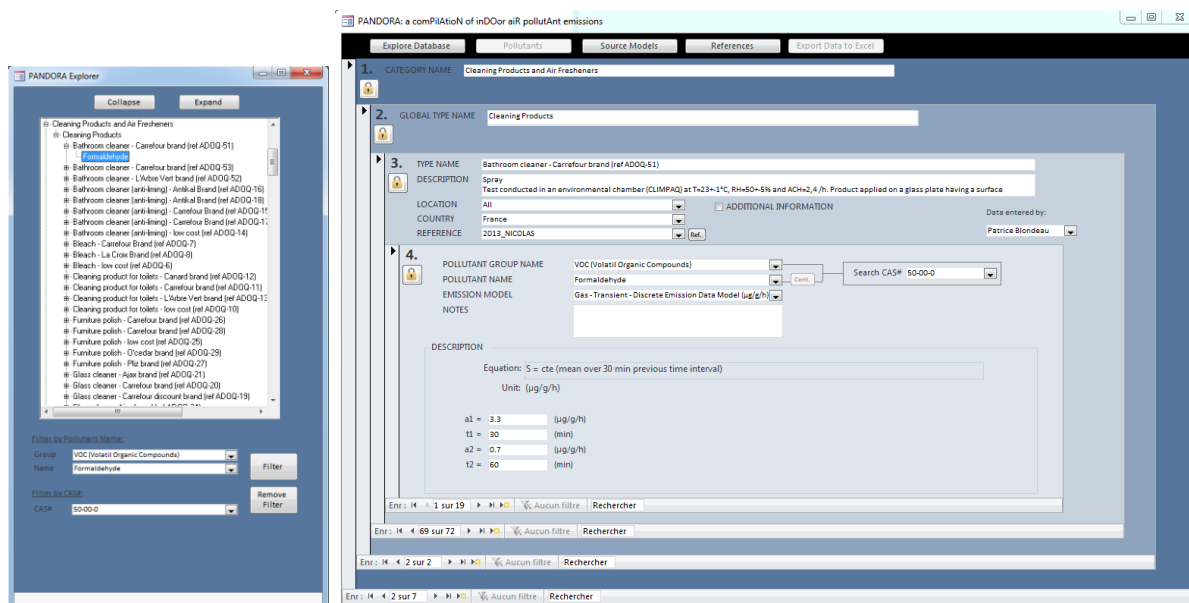
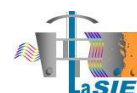


Figure 7 : Displaying the emission rates of formaldehyde for a bathroom cleaner after filtering the database.

Data availability

More the 8000 emission rates of pollutant have been implemented in PANDORA. Those data have been taken from existing databases, scientific reports, published articles from scientific journals and conferences. In particular, some of the existing databases are already freely available on the internet (BUMA, MEDB-IAQ...) so **PANDORA will not display the emission rates for those data** and will show the following message “Copyrights – see original reference” (Figure 8). The user will have to **press the “Ref.” button** located close to the level 3 – reference field to look at the detailed original reference (Figure 9) and search for it on the internet.

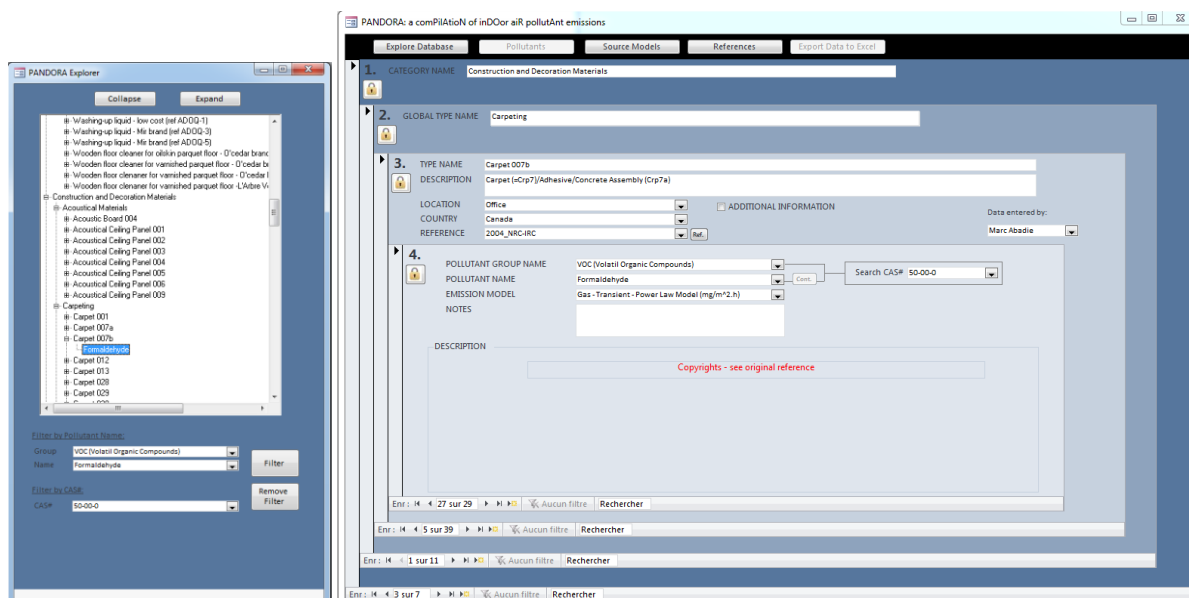
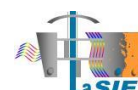


Figure 8 : Displaying the emission rates of formaldehyde for a bathroom cleaner after filtering the database.



PANDORA: a compILatioN of inDOor aIR pollutAnt emissions

List of References

REFERENCE_id	2004_NRC-JRC	JOURNAL	Report
TITLE	Investigation of Building Materials as VOC Sources in Indoor Air	VOLUME	
AUTHOR 1	Won D.	ISSUE	
AUTHOR 2	Shaw C.Y.	PAGES	
AUTHOR 3		YEAR	2004
AUTHOR 4		DOI	
AUTHOR 5		CITATION in text	(Won and Shaw, 2004)
AUTHOR 6		ABSTRACT	Source control using low emission building materials followed by ventilation has been considered as one of the most effective strategies for controlling volatile organic compounds (VOCs) indoors. To apply this strategy, it is necessary to have a decision-making tool for assessing the impact of material emissions on indoor air quality under various ventilation conditions. Therefore, a multi-year, client-supported project on material emissions and indoor air quality modelling was launched from 1996 to 2000 to develop such a tool, known as Material Database and Indoor Air Quality Simulation Program (MADRA-IAQ). On the project's sponsor's NRC-JRC Report: NRCC-47056
AUTHOR 7		NOTES	Other documents:
AUTHOR 8		FILE	Files:2004_Investigation of building materials as VOC sources in indoor air.pdf
		COPYRIGHTS	Yes

Entr : 14 1 sur 1 Filtre Rechercher

Figure 9 : Information about the original reference of the data.

If necessary, the user can access to the definition of the models used to describe the emission rates (Figure 10) by **clicking on the “Source Models” button** located at the top of the main interface.

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List of Source Models

ID	8	Equation	$S = a1 \cdot t^{a2} \cdot (-a2) \text{ if } t < tp; S = a1 \cdot t^{a2} \cdot (-a2) \text{ if } t > tp$	UNITS	mg/m ³ ·2.h
Description	Gas - Transient - Power Law Model (mg/m ³ ·2.h)	Coefficient 1	a1		mg/m ³ ·2.h
Source Model Type	Power Law	Coefficient 2	a2		-
Example Uses	Dry material emissions	Coefficient 3	tp		h
Number of Coefficients	3	Coefficient 4			
Notes		Coefficient 5			
		Coefficient 6			
		Coefficient 7			
		Coefficient 8			
		Coefficient 9			
		Coefficient 10			
		Coefficient 11			
		Coefficient 12			
		Coefficient 13			
		Coefficient 14			
		Coefficient 15			

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Figure 10 : Information about the equation used to model the emission rate of a pollutant.

Final words

The aim of the PANDORA project is to compile the available data regarding the emission rates of both gaseous and particulate pollutants in a systematic way into a database to provide **useful information for IAQ modelers**. Do not hesitate to report any problem to use the database, to suggest improvements of PANDORA (structure, navigation, research...) or to add new data.