**Indoor Air Quality Emissions & Modelling System (IAQ-EMS)**

**Overview**

This database is part of the work package 1 (WP1) of the Indoor Air Quality Emissions & Modelling Systems (IAQ-EMS) funded by Met Office (CONTRACT REF: DN517485).

The overall aim for WP1 is to develop indoor air pollution inventories focussing on 5 key UK indoor environments, i.e., residential home (kitchen, bedroom, living room and bathroom), school, nursery, care home and office.

To do so, WP1 aims to establish chemical and biological indoor emission sources, survey occupant behaviour & characteristics, environment parameters and ultimately develop a flexible tool/database of the indoor emission inventories of the key spaces experienced by the UK population.

The literature survey of indoor air quality measurements in the UK was carried out focusing on gaseous pollutants, particulate matter (PM) and bio aerosols (BioPM) along with occupants’ activities and environment characteristics.

For the 5 key environments, data obtained from literary review will be evaluated and complemented by tailored and dedicated measurements.

1. **IAQ-EMS Indoor Air pollutants Database**

The database of indoor air pollution produced by the WP1 of IAQ-EMS is made up of three individual excel datasets. These three files are conceived for individual consultation but contain information that are interconnected between them. The files are:

1. Literature survey (“iaqm\_wp1\_literary\_review\_\*.xls”)
2. Measured indoor concentrations in the UK (“iaqm\_wp1\_activity-concentrations\_\*.xls”)
3. Calculated indoor emission rates (“iaqm\_wp1\_activity-emissions\_\*.xls”)

This material is a self-consistent database, each row provides information about the content of each article and relative link for download and consultation. A beta-version of datasets relative to measured concentrations and emissions is provided for the residential environment. A general summary of the characteristics of each dataset is reported in the next sections.

*2.1 Literature survey*

The first datasets, called *“iaqm\_wp1\_literary\_review\_\*.xls”* contain the information from the available literature regarding indoor air pollution in the UK. The excel file is organised in sub-categories:

* **UK\_domestic:** field measurements of indoor air pollution in domestic environments. The species included are gaseous pollutants, aerosols, ultra-fine particles, radon, and bio aerosols.
* **UK\_non\_domestic:** research articles published in the UK relative to field measurements of indoor air pollution in non-domestic environment. These include offices, schools, transports, prisons, hospitals, and shops. The species included are gaseous pollutants, aerosols, ultra-fine particles, radon, and bio aerosols.
* **UK\_multi\_env:** research articles published in the UK where field measurements of indoor air pollution have been performed in more than an environment and compared. The species included are gaseous pollutants, aerosols, ultra-fine particles, radon, and bio aerosols.
* **UK\_modelling:** research articles published in the UK regarding numerical modelling for indoor air pollution simulations. Some of them also provide projected or assumed emission rates used for the modelling.
* **UK\_thesis:** thesis works from university relative to works made on the particular field of indoor air pollution.

In addition, other five sub-sections have been added, providing useful information relative to the methodological approach to the conversion of field measured concentrations to emissions and ancillary input data for the conversion. These sub-categories have been labelled in the database as:

* **General:** methodologies of analysis of concentrations parameters and their conversions into emissions
* **Emis\_rates:** comparative emission rates calculated in the UK and elsewhere
* **UK\_ventilation:** analysis of ventilation rates in different UK buildings
* **UK\_reports:** reports relative to representative English dwelling volumes and ventilation rates
* **UK\_times:** UK Time Use Survey (UKTUS) relative to year 2014-15 representative of time and duration of residential and occupational activities.

*2.2 Measured indoor concentrations in UK*

The second excel file called *“iaqm\_wp1\_activity-concentrations\_\*.xls”* contains concentrations of indoor air pollutants measured in the UK collected from the first database. Measurements for CO, CO2, NO, NO2, PM10, PM2.5, PM1.0, UFPs, Bioaerosols and VOCs (cropped and individual) from different environments (residential, schools, offices, transport) are included in this dataset.

Each column of the excel file provide information relative to the pollutant, the built environment, the relative micro-environment, and the possible activity associated with the measured concentrations. The values of concentrations are shown, when possible, in terms of minimum, maximum and mean values with relative standard deviation and unit. Additional information relative to the volume (size), and the article of origin are also reported for each value.

*2.3 Calculated indoor emission rates*

The third excel file called *“iaqm\_wp1\_activity-emissions\_\*.xls”* contains emission rates of indoor air pollutants. These are divided into two different sheets according to if they have been calculated from measured concentrations contained in the activity-concentration file (**emis\_cmb** sheet) or if they have been collected from Literature survey from within the UK and outside the UK (**emis\_lit** sheet. Both sheets contain information divided by pollutant name, built environment, micro-environment and associated activity and fuel.

The emission rates are from literature are reported including minimum, maximum, mean and standard deviation in their original unit. The emission rates calculated from measured concentrations in the UK are reported in the same unit (mg/min, particle number/min) and as mean value only. Finally, the article of origin of each row is reported in the last column.

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**Version History:**

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[20220930] database upload on UBIRA repository