

Data preparation and contribution instructions for the indoor air quality database

First of all, thank you for your time and effort in submitting your data. Collectively, we are creating the first global pilot IAQ database that will allow for answering crucial research questions towards a better and more sustainable built environment. This document provides instructions on how to prepare metadata and IAQ data.

1. Instructions on submitting metadata

The aim of collecting metadata is to label the actual IAQ data with relevant information related to buildings, spaces, occupancy, and instruments, so the end user can filter and analyze the data according to their interest. Also, information related to your study will be optionally collected to facilitate attribution. Metadata are classified into three levels of importance.

Mandatory: metadata that are crucial for creating a structured database, without which data submission will not be accepted.

Recommended: metadata that are highly useful for end users exploring the database.

Optional: metadata that are useful but difficult to collect, or metadata purely for acknowledging data contributors.

1.1 Two approaches to provide metadata

1.1.1 Using the online data entry form

The recommended approach is to fill in metadata using the web tool:

<https://iaqdb-dev.epfl.ch/#/contribute>

The tool contains three main pages. It will always save your input locally on your browser until you clear your caches.

- 1) Study information. Here, mandatory information includes name of your study and at least one contributor with a valid email address, for the database management team to contact you in case further information is needed. You can choose whether to disclose your email to the end users.

Fill in description of your study for visibility and impacts.

The IAQ data were collected in the context of a study. In this step you will provide as much as possible information about the motivation of this study, its time frame, an information contact, the license to use the data and the research publication details for further reference.

The screenshot shows a web form with the following fields:

- Name**: A text input field containing the word "Test".
- Test**: A text input field, currently empty.
- Name of the project**: A text input field, currently empty.
- Description**: A large text area containing the number "1".

Below the form, there is a small text label: "Detailed description of the project and of its motivations." and a small icon of a pencil in the bottom right corner of the description area.


Click "Add Contributor" to add name and email address. Up to two contributors can be added per study.

Data contributors

Information about the data contributors who may be contacted for further details.

No contributors defined yet.


+ ADD CONTRIBUTOR

- 2) Buildings and spaces information.
Please start from “Add Building”. Mandatory information includes identifier (must be unique within your study, for associating actual IAQ data), Country, City, and Building type. It is also possible to duplicate information for similar buildings by clicking the  icon.

In this step, you will describe each building and spaces where the IAQ was measured. At a minimum, for each building you will provide its approximate location and all the associated spaces/spaces where measurement devices were in operation.

No buildings defined yet.

+ ADD BUILDING

Within a building, you may add multiple spaces. Adject outdoor space or personalized monitoring is also considered a “space” here. However, only add them if there is an adjacent indoor space where IAQ data are available. Mandatory information includes identifier (must be unique within the building, for linking with actual IAQ data) and space type. It is also possible to duplicate information for similar spaces by clicking the  icon.

- 3) Instrument information. Please add instruments used in the study and provide information about detection/analysis method and uncertainty. All fields are optional but highly recommended as provide information about reliability of measurement for the end users.

Identifier
1

Instrument unique identifier in the study.

Manufacturer

Instrument manufacturer.

Model

Instrument model.

Equipment grade rating
Unknown

Instrument grade rating.

Placement
Unknown

Instrument placement.

Parameters

No parameters defined yet.

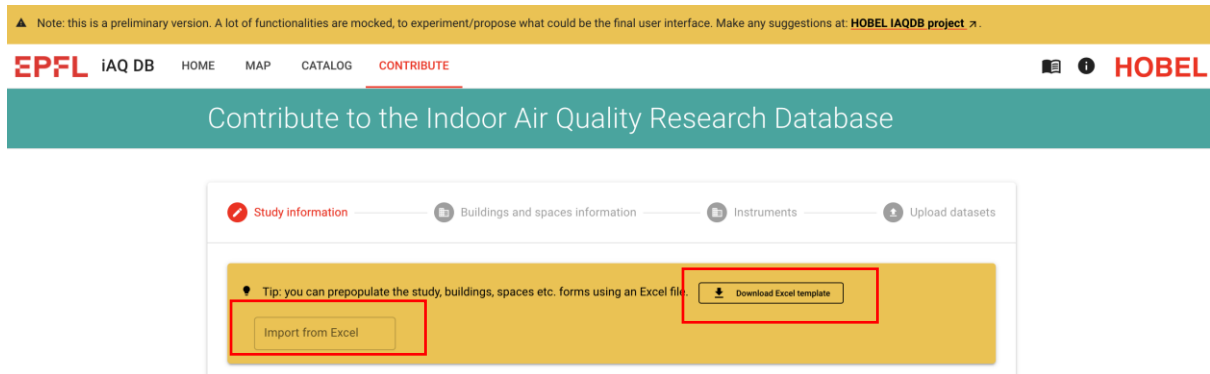
+ ADD PARAMETER

- 4) Afterward, please proceed to upload your actual IAQ data.

1.1.2 Using the spreadsheet template

For larger studies consisting of data from many buildings, it is also possible to fill in information in the provided excel spreadsheet and the upload it to the web tool. Information will be automatically recognized and filled in corresponding fields.

The template uses macro functions so please choose to enable macros when opening the file.



An example is provided to illustrate the expected input format. Please **delete** the existing rows when filling in the sheets. **Please do not add or delete columns or change their names.**

Please fill in the first five sheets **in order**, ranging from Study to Instrument.

Special notes:

- 1) Under sheet Study, the form asks for whether the study investigated any indoor environmental impact on occupants (e.g., comfort and health) and any other environmental parameters. These two questions allow for multiple selection. However, for removing an answer, you will need to clear the cell and start again (the cell doesn't allow for removing an answer).

Name	Description	Website	Start year	End year	Duration	Occupant impact	Other indoor parameter	Citation	DOI	Funding information	Ethics approval(s)	License
Mandatory	Recommended	Optional	Recommended	Recommended	Recommended	Recommended	Recommended	Optional	Optional	Optional	Optional	Mandatory
Name of the study	A paragraph describing the study design	Link to the webpage if the study has one			The duration of the study in months	What impact on occupant was measured? (multiselection)	What other environmental parameters were measured? (multiselection)	For credit	If available	For credit	From which authority the study received ethical approval.	Data use licensing (in progress, ignore for now)
Example	multifactorial issues associated with air quality	NA	2021	2023	24	NA	Thermal, Acoustic	Rey et al 2023 J. Phys.: (10.1088/1742-6596/260/HEIA-FR research program prog	NA		NA	NA
							Thermal					
							Acoustic					
							Visual					
							NA					

- 2) Under sheet Contributor, up to two names can be provided. Please provide at least one email address for us to contact you in case of incomplete data. You can indicate whether you hope to have your email address available to end users or not here.

- 3) Under sheet Building, please assign a unique identifier to each of the buildings in the study, which can be string or numeric.
- 4) Under sheet Space, please carefully check to which building each of the spaces belong. Then, please assign a unique identifier to each of the spaces within the building, which can be string or numeric. Then, please match the building type according to building identifier using the provided “VLOOKUP” function. The building type will determine the list of space types available to choose from.

Building identifier	Building type	Space identifier	Space types	Occupancy status	Mechanical ventilation system type	If other, specify mechanical ventilation type	Mechanical ventilation system status	Windows status	Ventilation rate, m3/h	Air change rate, /h	Particle filtration rating	Cooling system type	If other, specify cooling system type	Cooling system status	Heating system type
1	Mandatory	Matched	Mandatory	Mandatory	Recommended	Recommended	Optional	Recommended	Recommended	Optional	Optional	Optional	Optional	Recommended	Recommended
2	Building identifier from the "Building" sheet	Automatically matched based on building identifier	Unique identifier of the space within the building	Whether the space was occupied during the measurement	The type of the mechanical ventilation system (if applicable) in the space		The status of the mechanical ventilation system (if applicable) during measurement	The status of the operable windows during measurement	Average ventilation rate during measurement, if known	Average outdoor air change rate during measurement, if known	Rating of the filter in the mechanical ventilation system, if applicable and known	The type of the cooling system (if applicable) in the space		The status of the cooling system (if applicable) during measurement	The type of the heating system (if applicable) in the space
3															
4	01	+VLOOKUP(A4,	EXT	Outdoor	Combined	Mixed		Mixed	Unknown	Unknown	Unknown	NA		Unknown	Unknown
5	01	School	NBA	Classroom	Combined	Mixed		Mixed	Unknown	Unknown	Unknown	NA		Unknown	Unknown
6	01	School	NBA	Classroom	Combined	Mixed		Mixed	Unknown	Unknown	Unknown	NA		Unknown	Unknown
7	02	School	EXT	Outdoor	Combined	NA		NA	Unknown	Unknown	Unknown	NA		Unknown	Unknown
8	02	School	NBA	Classroom	Combined	NA		NA	Unknown	Unknown	Unknown	NA		Unknown	Unknown
9	02	School	NBA	Classroom	Combined	NA		NA	Unknown	Unknown	Unknown	NA		Unknown	Unknown

- 5) Under sheet Instrument, please try your best to provide complete information about the sensors used for measurements.

After you upload the spreadsheet template, the web tool will capture the relevant metadata. You will be able to upload actual data after confirming the metadata are complete and correct, before proceeding to upload actual IAQ data.

2. Instructions on standardizing IAQ data

To facilitate data collection and database construction, we use the true long format to store data, including four columns of data (Timestamp, Parameter, Value, and Unit) and three columns of identifiers (Building_ID, Space_ID, and Instrument_ID, with the first two being mandatory). An example is given below.

Timestamp	Parameter	Value	Unit	Building_ID	Space_ID	Instrument_ID
18.03.2018 13:22	Ozone	35.4	ppb	1	OA	Dasibi 2
18.03.2018 13:22	Ozone	35.4	ppb	1	OA	Dasibi 2
18.03.2018 13:22	Ozone	35.4	ppb	1	OA	Dasibi 2
18.03.2018 13:22	Ozone	35.4	ppb	1	OA	Dasibi 2
18.03.2018 13:22	Ozone	35.5	ppb	1	OA	Dasibi 2
18.03.2018 13:22	Ozone	35.3	ppb	1	OA	Dasibi 2
18.03.2018 13:22	Ozone	35.4	ppb	1	OA	Dasibi 2
18.03.2018 13:22	Ozone	35.4	ppb	1	OA	Dasibi 2

Note: for time-integrated measurement such as VOC concentration from samplers, please use the end of measurement as timestamp.

We strongly suggest that you standardize your IAQ data according to the provided long format before uploading the data file, which significantly facilitates the scalability of the database. However, we will accept other data formats as long as such information is complete and easily identifiable.

Contact information

Dr. Bowen Du

Human-Oriented Built Environment Lab ([HOBEL](#))

School of Architecture, Civil and Environmental Engineering

École polytechnique fédérale de Lausanne ([EPFL](#))

bowen.du@epfl.ch