ÖKOBAUDAT Manual

Technical and formal information and rules for the ÖKOBAUDAT database

Version 1.1

Instructions for use/disclaimer

This document provides assistance for the use of ÖKOBAUDAT. This manual has been compiled with great care. However, no liability can be accepted for the correctness, completeness and currentness of the information. The authors and the publisher are not responsible for the contents of secondary sources.

Content

1. Introduction

1.1 ÖKOBAUDAT

1.1.1 The ÖKOBAUDAT platform

ÖKOBAUDAT is a platform with data, information and links related to the life cycle assessment (LCA) of construction works. The ÖKOBAUDAT platform is published in German and English at www.oekobaudat.de.

At the platform's core is the online database with LCA and EPD[1] datasets on building materials, construction, transport, energy and disposal processes. ÖKOBAUDAT is provided as a standardized database for life cycle assessment of construction works by the Federal Ministry of the Interior, Building and Community.

The datasets are in compliance with DIN EN 15804 „Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products"[2] and are subject to strict quality requirements. They can be used in many different building assessment systems. With the help of life cycle assessment tools, such as eLCA provided by the BBSR, the entire life cycle of a building can be reconstructed with the ÖKOBAUDAT database.

The database system with its search and filter functions enables user-friendly online searches of the datasets. New EPD datasets are included on an ongoing basis. Previous datasets are archived online to ensure no information is lost.

1.1.2 BNB-compliant data and additional data on the ÖKOBAUDAT platform

ÖKOBAUDAT is the mandatory database for the Assessment System for Sustainable Building (Bewertungssystem Nachhaltiges Bauen, BNB). To ensure consistency, BNB-compliant data must be based on the background database GaBi (see *Principles for the acceptance of LCA data in the online database ÖKOBAUDAT*[3]). The ÖKOBAUDAT platform also offers datasets based on ecoinvent background data. With this exception, this data fully adheres to the ÖKOBAUDAT requirements in terms of quality and data format and, in justified cases, can therefore be used for BNB life cycle assessments.

1.1.3 Data networking

At national level, the BBSR has established a consistent digitised infrastructure for the delivery of data to ÖKOBAUDAT and the transfer of data to associated tools such as the building life cycle assessment tool eLCA. The prerequisites for the digitised processes were the establishment of ÖKOBAUDAT as an online database, the development of the ILCD+EPD data format and the provision of suitable data interfaces (API). Furthermore, the BBSR provides the following tools developed through its research projects:

- EPD Editor (modelling or transfer of EPD to EPD datasets in ILCD+EPD data format
- validation tool (for checking the data format before data transfer to ÖKOBAUDAT

ÖKOBAUDAT is therefore the focal point of a comprehensive infrastructure consisting of data producers, data suppliers, databases and data users in a national and international context (Figure 1).

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[1] Environmental Product Declaration

[2] For all references to DIN EN 15804, the current version applies: DIN EN 15804:2012+A1:2014

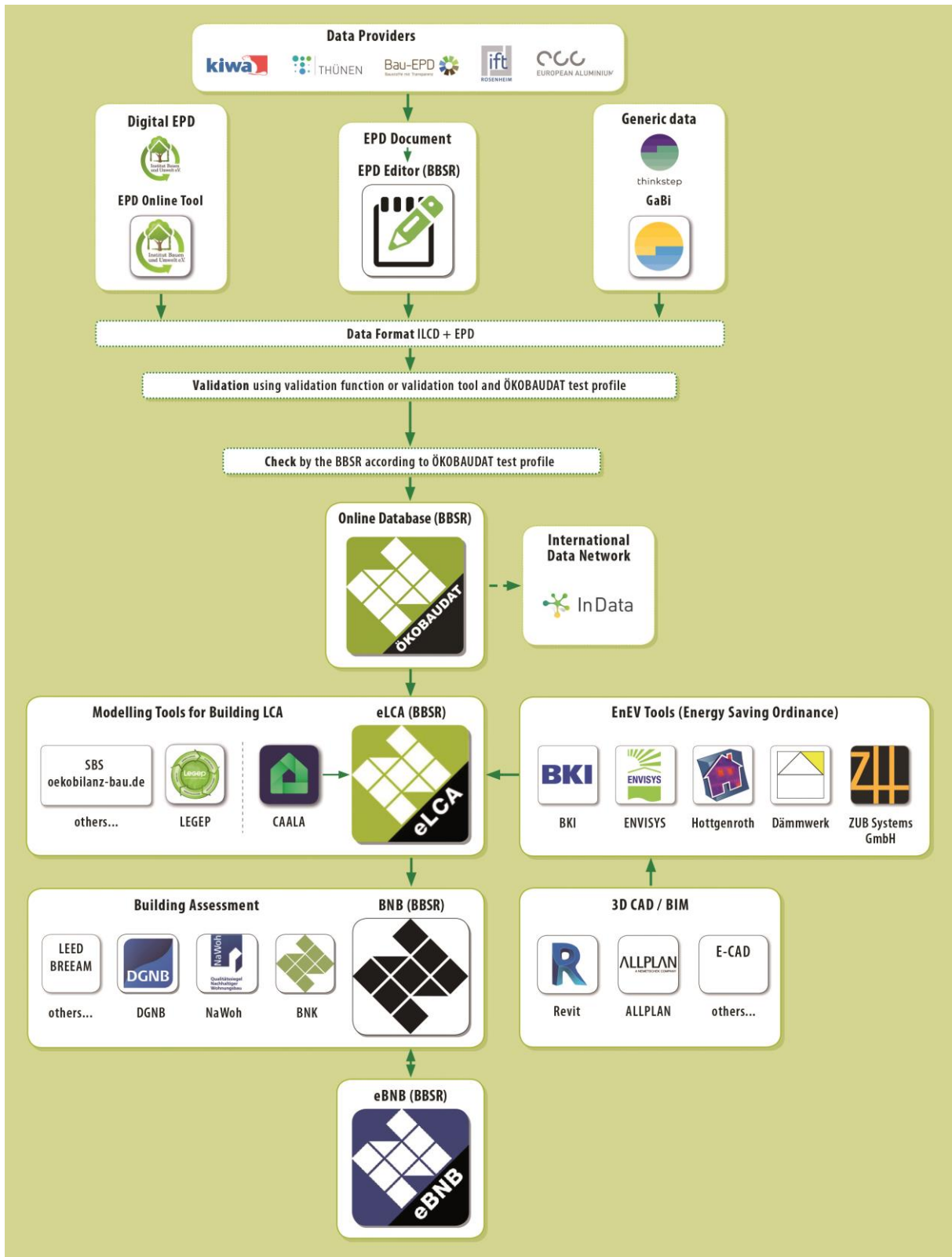[3] https://www.oekobaudat.de/en/service/downloads.html

Figure 1: Digital data exchange via standardised processes – data generation, delivery, distribution and use. Source: BBSR

1.1.4 International Network

The BBSR supports sustainable construction and broad use of life cycle assessments in the international context through various activities. The digitised infrastructure associated with ÖKOBAUDAT and provided by the Federal Government including a network of data and tools already envisages an international database structure. Compliance with internationally used standards and the open source-based tools facilitate global data exchange. With the development of the ILCD+EPD data format and the corresponding digital structures and tools, Germany has assumed a pioneering role and created the prerequisites and starting point for major international developments.

With this background, BBSR initiated the "International Open Data Network for Sustainable Construction" (InData) in 2015.[4] InData is an informal, non-profit working group of interested stakeholders led by the BBSR. Its main objective is to establish an international network structure for EPD/LCA data in the building sector – online-based and using open source software. The InData initiative uses the ILCD+EPD data format developed for ÖKOBAUDAT.

1.1.5 Who is responsible for ÖKOBAUDAT?

The publisher of ÖKOBAUDAT is the German Federal Ministry of the Interior, Building and Community (BMI). Responsibility under the Press Act lies with the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) in the Federal Office for Building and Regional Planning (BBR).

ÖKOBAUDAT and its related tools were developed with support from the German building materials industry and within the framework of research projects as part of the Future Building (Zukunft Bau) innovation programme, in which, amongst others, beibob medienfreunde, greendelta, IBO - Österreichisches Institut für Bauen und Ökologie GmbH, KIT - Institute for Applied Computer Science, Oliver Kusche Research & Consulting, Online Now! GmbH and thinkstep were involved.

The BMI provides the ÖKOBAUDAT data free of charge and without any restrictions for the purpose of performing life cycle assessment of buildings. Responsibility for content and values remains with the owner of the records.

1.2 Aim and contents of this document

1.2.1 Aim of this document

The manual at hand is an explanatory supplement to the ÖKOBAUDAT database. It serves as a reference work that summarizes all relevant technical and formal rules for the ÖKOBAUDAT database – independently from the content-related and methodological requirements on EPD programmes and data, which can be found in the document *Principles for the acceptance of LCA data in the online database ÖKOBAUDAT*[5]. New agreements shall be incorporated on an ongoing basis. Important changes and news are also announced in the news section of the ÖKOBAUDAT website.

1.2.2 Contents of this document

Chapter 2, 'ILCD+EPD Data format', illustrates the basic principles of the ILCD+EPD data format. A detailed description of the data fields in the ILCD+EPD data format can be found in *"Table of definitions, ILCD+EPD Data format"*[5]. Chapter 2 also contains specifications of the data structure, which are not laid down in the ILCD+EPD data format itself. This currently applies to the declaration of indicator values and life cycle modules as well as the reference product and the material properties.

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[4] https://www.indata.network/

[5] https://www.oekobaudat.de/en/service/downloads.html

ÖKOBAUDAT data management is presented in chapter 3. This comprises information on ÖKOBAUDAT updates and archiving of old data stocks, valid time of datasets and handling of expired datasets as well as data changes. Overmore, the technical/formal rules for data delivery to ÖKOBAUDAT are described. Finally, an overview about the various ways to use or access ÖKOBAUDAT data is given.

2.   ILCD+EPD Data format

2.1   Overview

Syntactically, ÖKOBAUDAT datasets correspond to the ILCD data format[6] with extensions for EPD data that cannot be presented in the ILCD format. For certain data fields, the ILCD definition was further specified or simplified, respectively, if the detailed descriptions were not relevant for EPD datasets. This adapted ILCD format is called 'ILCD+EPD data format'.

A detailed description of the data fields in the ILCD+EPD data format can be found in *'Table of definitions, ILCD+EPD Data format'*[7]. The table contains the field names and their respective definitions and explanations. Additional columns indicate which data fields have been added to or modified from the ILCD format and if input is **m**andatory or **o**ptional. Further explanations on the contents of complex data fields are compiled in '*FAQ: ILCD+EPD format, CPEN2018 InData Compliance*'[7].

Table 1 gives an overview of the data fields defined in the 'ILCD+EPD data format'. The definitions and explanations as well as the indication of the data type, which are given in the published table, are missing here. In the column „EPD Extension of ILCD format" new data fields, compared to ILCD format, are marked with an 'x'.

The following chapters explain rules for certain fields of the 'ILCD EPD data format' that are specific to the ÖKOBAUDAT.

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[6] http://eplca.jrc.ec.europa.eu/LCDN/developerILCDDataFormat.xhtml

[7] https://www.oekobaudat.de/en/service/downloads.html

Feldname (DE)	Field name (EN)	EPD extention to ILCD-Format	Input mandatory (m) or optional (o)	Specific explanations	Additional expla-nation in chapter
Prozess-Information	**Process information**				
Kerninformationen des Datensatzes	**Key Data Set Information**				
UUID des Datensatzes	UUID of data set		m	x	
Name	Name		m		2.2.2
Klassifizierung	Classification		m	x	2.2.3
Allgemeine Anmerkungen zum Datensatz	General comment on data set		o		
Hintergrundbericht / Ökobilanzbericht	Data set LCA report, background information		o		
Sicherheitszuschläge	Uncertainty margins	x	o	x	
Beschreibung der Sicherheitszuschläge	Description of uncertainty margins	x	o		
Szenarien	**Scenarios**	x			
Szenario	Scenario	x	o		
Name	Name	x	o		
Standardszenario	Default	x	o		
Gruppe	Group	x	o		
Beschreibung	Description	x	o		
Module	**Modules**	x			**2.3.1**
Modul	Module	x	o		
Name	Name	x	o		
ID des Produktsystems	Product system ID	x	o		
Quantitative Referenz	**Quantitative reference**				
Referenzfluss(flüsse)	Reference flow(s)		m	x	2.3.3
Funktionale Einheit, Produktionsperiode oder anderer Parameter	Functional unit, Production period, or Other parameter		o		
Zeitliche Repräsentativität	**Time representativeness**				
Referenzjahr	Reference year		m		
Datensatz gültig bis	Data set valid until		m		
Erläuterungen zur zeitlichen Repräsentativität	Time representativeness description		o	x	
Geographische Repräsentativität	**Geographical representativeness**				
Ort	location		m		
Erläuterungen zur geografischen Repräsentativität	Geographical representativeness description		o		
Technologische Repräsentativität	**Technological representativeness**				
Technische Beschreibung inklusive der Hintergrundsysteme	Technology description including background system		m	x	
Technisches Anwendungsgebiet des Produkts oder Prozesses	technical purpose of product or process		m	x	
Piktogramm	Pictogram of technology		o		
Flussdiagram(me) oder Abbildung(en)	Flow diagram(s) or picture(s)		o		
Modellierung und Validierung	**Modelling and validation**				
LCA-Methodenbericht	LCA methodology report		m		
Subtyp	Subtype	x	m		2.2.4
Datenquellen, Behandlung und Repräsentativität	**Data sources, treatment, and representativeness**				
Für diesen Datensatz verwendete Datenquelle(n)	Data sources used for this data set		m		
Anwendungshinweis für Datensatz	Use advice for data set		m	x	
Validierung	**Validation**				
Art der Prüfung	Type of review		m	x	
Prüfungsdetails	Review details		o		
Name von Prüfer und Prüfinstitution	Reviewer name and institution		o		
Vollständiger Prüfbericht	Complete review report		o		
Konformitätsdeklarationen	**Compliance declarations**				
Name des Konformitätssystems	Compliance system-name		m		2.2.6
Administrative Information	**Administrative information**				
Dateneingabe	**Data entry**				
Zeitstempel (zuletzt gespeichert)	Time stamp (last saved)		m		
Datenformat	Data set format(s)		m		
Dateneingabe durch	Data entry by		o		
Veröffentlichung und Eigentum	**Publication and ownership**				
Zeitpunkt der letzten Änderung	Date of last revision		o		
Datensatzversion	Data set version		m	x	
Herausgeber	Issuer		m		
Registrierungsnummer	Registration number		m		
Eigentümer des Datensatzes	Owner of data set		m		
Copyright	copyright		m	x	
Inputs and outputs	**Exchanges**				
LCIA results	**LCIA results**				
Indikator	Indicator		m		2.3.2
Modul/Phase	Module/Phase	x	m		
Szenario	Scenario	x	o		
Wert	Value	x	m		
Einheit	Unit	x	m		

Table 1: Overview of data fields in the ILCD+EPD data format

2.2 ÖKOBAUDAT-specific rules for the ILCD+EPD data format

2.2.1 Multilingual datasets

In ÖKOBAUDAT, datasets can be displayed in several languages whereas all contents in the different languages are always contained in one physical dataset. The language can be recognized by the flag symbol (search table).

Note 1: The data supplier is responsible for the correct reproduction of the dataset contents in all languages in which a dataset is to be published.

Note 2: In the field of federal responsibility, datasets available in German should be used preferably. However, datasets and corresponding textual information only available in English are acceptable in ÖKOBAUDAT since mid-2018. For English EPD or LCA datasets it would be desirable for the core information of each description field to be delivered in German language. Also abbreviated versions with links to more detailed information in English are appropriate.

Note 3: The data fields "Name" (of dataset) and "Technical purpose of product or process" should be delivered bilingually in English and German, since only in this case the dataset can be made available in the international network node of InData (International Open Data Network for Sustainable Construction; prerequisite for "CPEN2018 Compliance").

2.2.2 Names of datasets

There are no strict guidelines for the naming of datasets in ÖKOBAUDAT. To make it easier to find the datasets in ÖKOBAUDAT, the designation of EPD datasets is recommended in the suggested order:

Brand_name Product_name General_product_name_if_applicable Characteristics_if_applicable

Example: Ensinger Thermix TX Pro Spacers

Re. Brand name: This is the brand name, alternatively the company name. The name does not have to be complete, but the company should be clearly recognisable. The brand name should be the same for all EPD datasets of the same brand.

Re. Product name: The product name does not have to be complete, but as clear as possible.

Re. General product name if applicable: Since users can find ÖKOBAUDAT datasets in various environments, the associated ÖKOBAUDAT category is often only visible after viewing the data set. Some ÖKOBAUDAT categories are also so broad that the specific product type cannot yet be read from them. Therefore, if the product name does not indicate which product the EPD dataset applies to, it is recommended to include a general construction product name (e.g. "spacer", "adhesive") in the data set name. For products with standardised or common product type designations (e.g. "Type X" for fire resistant gypsum boards") it is recommended to use these.

Re. Characteristics if applicable: If the EPD dataset has certain technical or other properties that are relevant for the application of the dataset or for the selection of the product, it is recommended to include these in the dataset name. An example of such a property could be the thickness of a product if the declared unit is one square meter. The user can read the dimension directly from the name without having to look at the dataset beforehand. Non-identifying properties of the product, such as gross density without reference to the declared unit, etc., which are created as reference flow properties anyway, should not be mentioned in the name.

There are no restrictions on the use of special characters.
BBSR reserves the right to point out misleading designations of datasets to data providers and claim a renaming.

2.2.3 Product categories (‚classification')

The datasets must be assigned to one of the given product categories in ÖKOBAUDAT. The current product categories can be found on the ÖKOBAUDAT website[8].

1. Mineral building products
1.1. Binder
1.1.01 Cement
1.1.02 Lime
1.1.03 Gypsum
1.1.04 Clay

Figure 2: Example of product categories in ÖKOBAUDAT. Source: BBSR

New product categories can only be established by the BBSR (see 3.3.5 Workflow for data delivery in detail). The product category file available for download on ÖKOBAUDAT is updated automatically as soon as the new category has been created.

2.2.4 Dataset types in ÖKOBAUDAT ('subtype')

ÖKOBAUDAT differentiates between the following dataset types ('subtypes' in the ILCD+EPD data format) in order to express the representativity of life cycle assessments:

- *specific dataset* – manufacturer/manufacturing company-specific dataset for a specific product of one factory
- *average dataset* – average datasets provided by industrial associations, several companies, several works or several products (i. e. on the basis of data on the industrial production of companies)
- *representative dataset* – data that is representative for a country/region (for example average for Germany)
- *template dataset* – unspecific datasets for specific products created on the basis of a "template EPD"
- *generic dataset* – generic datasets in accordance with EN 15804 and other data that is not modelled on the basis of industrial data (for example on the basis of literature, expert knowledge, etc.)

The type of dataset must be indicated for every dataset (in the "Subtype" field). The dataset type is of decisive importance for the applicability of life cycle assessment datasets and is therefore displayed in a separate column next to the dataset's name in the data browser on the ÖKOBAUDAT website.

Besides, in the *Principles for the acceptance of LCA data in the online database ÖKOBAUDAT*[8], three categories of data which are accepted in ÖKOBAUDAT are defined:

- Category A - Verified EPD according to DIN EN 15804 and generated in an EPD programme according to DIN EN ISO 14025
- Category B - Verified EPD data (B1) or LCA data with external critical review (B2), according to DIN EN 15804
- Category C - LCA data compliant to DIN EN 15804, non-reviewed (no external verification or critical review, "generic datasets")

The type of "conformity check" required depends on the data category. It is <u>not</u> indicated in the data format.

Depending on what is being viewed, ÖKOBAUDAT data can also be divided into the groups: construction products and other life cycle data.

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[8] https://www.oekobaudat.de/en/service/downloads.html

Table 2 shows the possible variations of data categories and dataset types occurring in ÖKOBAUDAT.

Group	Cate-gory	Description	Database	Conformity check	Dataset type ("subtype")
Construction product datasets	A	Construction product EPD in programme operation	Manufacturer, works location	Independent external verification via programme operation	specific dataset
			Association, country		average dataset
					template dataset
	B1	Construction product EPD without programme operation	Manufacturer, works location	Independent external verification without programme operation	specific dataset
			Association, country		average dataset
					template dataset
	B2	Construction product dataset (no EPD)	Manufacturer, works location	Independent external critical review	specific dataset
			Representative data for a country/region		representative dataset
Other life cycle data	C	Construction product dataset (no EPD)	Replacement data for a country/region	No	generic dataset
		Transport processes			
		Use processes			
		General end-of-life processes			
		Energy supply			

Table 2: Data categories and dataset types in ÖKOBAUDAT

2.2.5 Uncertainty penalties for generic datasets

ÖKOBAUDAT provides generic data for the calculation of life cycle assessments of buildings or constructions, e.g. in the framework of the Assessment System for Sustainable Building (Bewertungssystem Nachhaltiges Bauen, BNB). These can be used in the planning phase if the specific products are not yet known or if no specific data is available.

In ÖKOBAUDAT, an uncertainty penalty is added to the indicator values for the product stage (modules A1-A3) of the generic datasets. These uncertainty penalties shall give a conservative estimate of the environmental impact, assuming worst case conditions and compensating for uncertainties in data quality.
In order to determine these uncertainty margins, the datasets are classified into three levels regarding completeness of the model and representativeness (in terms of technology, time and geography; see Table 3). Depending on the completeness and representativeness of data, uncertainty penalties of 10 %, 20 % or 30 %, respectively, are added. Datasets that do not meet the requirements of level 3 in terms of completeness and representativeness cannot be accepted in ÖKOBAUDAT or have to be improved.

Level	Completeness	Representativeness
1	**Product system largely complete**	**Representative** (in terms of technology, time and geography)
2	**Few processes / flows are missing** The generator of the dataset has documented during modelling that not all products / processes have been completely recorded (e.g. use of auxiliary materials or supplies, in-house transports, small parts of system products, packaging estimated) or not all flows have been fully captured (e.g. certain emissions into waste water or air are incomplete, waste quantities are not fully recorded). In principle, errors that arise should be less than 5% deviation from a complete modelling and occur at most twice in a system model.	**Partly representative** (in terms of technology, time and geography) For the system model either only the technological, only the temporal or only the geographical representativity can be documented. For instance, the very latest data of one plant with one type of production may be available for a product. Or a country's technology mix for a production type is used, but it's outdated. In principle, it should be ensured that no significant deviations (less than 10% in environmental impacts) can be expected from more up-to-date data, other types of production / technologies or geographical details (e.g. import mixes). The assessment is usually done by experts only.
3	**Important processes / flows are missing** The generator of the dataset has documented during modelling that due to lack of information, processes relevant for the results (with regard to mass and environmental indicators) were ignored or result-relevant flows in air, water or soil are missing. Even though important processes or flows are missing in the system model, the resulting error should be less than 10% deviation from a complete modelling and should occur at most twice in a system model.	**Ignorance of representativeness** Neither technology nor currentness nor geographical representation of the situation can be assessed. Deviations should be within the range of less than 20% with regard to environmental impacts. This classification is usually done by experts only.

Table 3: Classification of datasets regarding completeness and representativeness

For determining the uncertainty penalty, the lower rating is decisive (Table 4).

Uncertainty penalty		**Classification completeness**		
		Level 1	**Level 2**	**Level 3**
Classification representative-ness	**Level 1**	+ 10%	+ 20%	+ 30%
	Level 2	+ 20%	+ 20%	+ 30%
	Level 3	+ 30%	+ 30%	+ 30%

Table 4: Uncertainty penalties

The uncertainty penalties are determined by the data provider (thinkstep) and are already included in the indicator values in ÖKOBAUDAT. The level of uncertainty penalties, including an explanatory statement for uncertainty penalties of 20 % or 30 %, is documented in the corresponding datasets.

There are no uncertainty penalties imposed on data for scenarios (modules B, C and D).

2.2.6 Name of conformity system

The name of the conformity system should always correspond to the current version of the standard. In the current data format only "DIN EN 15804" has been implemented as source data set. Pending the adaptation of

the data format to EN 15804:2012+A2:2019, "DIN EN 15804" refers to the current version (EN 15804: 2012 + A1: 2014).

2.3 Data structures beyond ILCD+EPD data format

The life cycle stages and environmental indicator values are not part of the ILCD+EPD data format, nor are the reference flow and the material properties contained therein.

2.3.1 Life cycle modules in accordance with DIN EN 15804 in ÖKOBAUDAT

In DIN EN 15804 the life cycle of building products is divided into modules A to D (Figure 3).

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment			De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling - potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5			C1	C2	C3	C4	D
					B6	Operational energy use										
					B7	Operational water use										

Figure 3: Life cycle modules in accordance with DIN EN 15804

The ÖKOBAUDAT datasets list only those modules for which data are available.

As in DIN EN 15804, Modules A1 to A3 (product stage) may be indicated individually and/or in aggregated form; all other modules must be presented individually. The total of A1 to A3 must be calculated from the individual values A1 to A3 (no rounded data).

2.3.2 Indicators

Basically, the environmental indicators required in accordance with EN 15804 are shown in ÖKOBAUDAT.

All indicators that are assessed in the BNB[9] must be present in all cases, these are:

Effects on the global environment
1.1.1 Global warming potential (GWP)
1.1.2 Ozone depletion potential (ODP)
1.1.3 Photochemical ozone creation potential (POCP)
1.1.4 Acidification potential (AP)
1.1.5 Eutrophication potential (EP)

Resource use
1.2.1 Primary energy requirement (PENRT, PENRE, PENRM, PERT, PERE, PERM)

If no data is available for individual indicator values, the value must be indicated with a dash ("–"); "0" means a calculated or proven "0".

At least three significant decimal places must be entered.

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[9] see: https://www.bnb-nachhaltigesbauen.de/bewertungssystem.html

2.3.3 Reference product ("Reference flow")

An EPD dataset contains the environmental parameter values for all life stages of the product as well as the relevant metadata (description of processes, material properties). This is composed of two physical datasets: the actual "EPD dataset" ("process dataset" of ILCD+EPD data format) and the product flow dataset of the reference product ("flow dataset" of ILCD format).

Each EPD dataset is assigned exactly one "reference flow". In contrast, a "reference flow" can be assigned to several EPD datasets. The separation of the different product information allows the modelling of product hierarchies, in which several concrete process datasets can represent a "reference product".
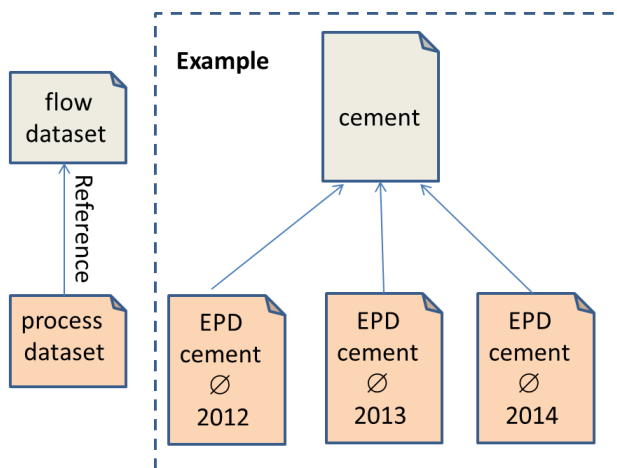

Figure 4: Every product dataset is composed by a flow dataset and a process dataset.

The reference flow stores the characterizing properties of the product. These are: name, classification (i.e. ÖKOBAUDAT main product categories), version, UUID, last change, flow type (here always "product") and flow properties (i.e. declared unit). The flow properties comprise a number of possible properties (e.g. technical properties as mass and heating value – see 2.3.4 Material properties – or "environment-oriented ones" like primary energy content), which can be extended as desired.

If characteristic properties of the product change, such as the declared unit or the gross density, a new reference flow must be created.

2.3.4 Material properties

The following material properties are currently supported by the technical infrastructure:

Property	Unit	Remarks
Bulk density	kg/m^3	Kilograms per cubic meter
Surface weight	kg/m^2	Kilograms per square meter
Gross density	kg/m^3	Kilograms per cubic meter
Layer thickness	m	Meter
Spreading rate	m^2	Square meter
Linear density	kg/m	Mass per meter
Conversion factor into 1 kg	-	Mandatory according to EN 15804

Table 5: Material properties

In the document „ÖKOBAUDAT-Anleitungen für Materialangaben" (ÖKOBAUDAT Instructions on material specifications, German only) the material specification required for building life cycle assessment with eLCA is formulated.

Note: In the ILCD+EPD format the material property is defined in the product flow and not in the EPD dataset (see section "Reference flow" above).

2.4   References

All product, contact and source datasets referenced from the actual EPD dataset and, if necessary, connected external documents ("external_docs" like for example PDF documents and diagrams) must be provided if these are not already contained in ÖKOBAUDAT. Alternatively this data can also be provided on a publicly accessible internet web server. The corresponding links must be specified in the dataset. It must be ensured that these documents are available there permanently and long-term and in the appropriate version.

Several datasets can also be summarized in a ZIP archive. This must be structurally compliant with the ILCD standard for ZIP archives, i.e. contain an "ILCD" folder with subfolders for each dataset type, as shown in the following figure:
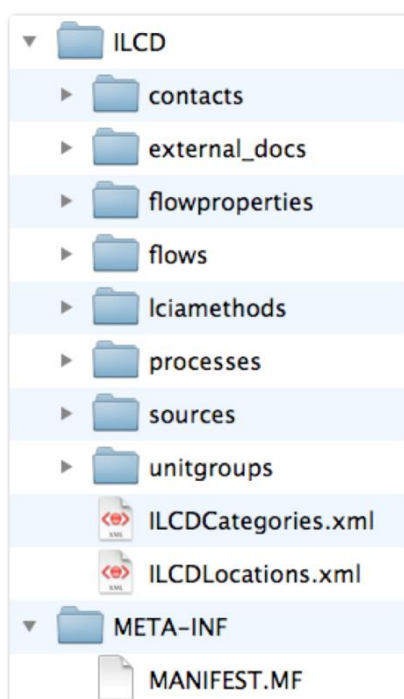

Figure 5: ILCD standard for ZIP archives

The file names of external documents should also be unique (e.g., include dataset name, UUID, or equivalent). Blank spaces, umlauts or special characters (except for hyphens and underscores) should not be used in the names of external documents.

3. Data management

3.1 Updates, changes and archiving

3.1.1 Updates and archiving

In mid-2018, the specifications for the release of a new ÖKOBAUDAT version were changed: Accepted EPD programme operators can now transfer datasets to ÖKOBAUDAT on an ongoing basis. A new ÖKOBAUDAT release still takes place approx. once a year with the update of the generic datasets.
On-going minor additions or corrections are dated and documented in a correction list. At regular intervals the current version is documented in the archive.

These ÖKOBAUDAT database versions are uniquely identified by the year number, issue number of the corresponding year and date, e.g. ÖKOBAUDAT 2019-I of 27.02.2019. Data from previous versions is archived online to ensure no information is lost. These databases can be accessed via the "Database / Archive" tab and downloaded in XML format as ZIP or as CSV datasets. Browsing through these databases on the ÖKOBAUDAT platform is no longer possible.

3.1.2 Valid time of datasets and handling of expired datasets

Upon initial delivery the datasets are checked formally (all) and contentwise (random samples) for conformity with the ÖKOBAUDAT requirements. The successful inclusion of data in the ÖKOBAUDAT is then valid until its expiry date according to the EPD. The data providers are integrated into the further development of ÖKOBAUDAT through the ÖKOBAUDAT Users Advisory Group and thus directly learn about adaptations of the ÖKOBAUDAT requirements. The datasets must be adapted to the latest ÖKOBAUDAT requirements as soon as possible, but at the latest after expiry of the valid time.

EPD datasets are in principle removed from ÖKOBAUDAT upon expiry of the valid time. In exceptional cases, i.e. in the event of impending elimination of crucial datasets in the context of building LCA, BMI / BBSR reserves the right to keep these datasets in ÖKOBAUDAT in order to ensure calculations of building life cycle assessments.

The user can filter datasets by year of expiry in the product search. The expiration year is also noted in the data sheet under "Data set valid until".

3.1.3 Modifications in datasets

As the operator of the ÖKOBAUDAT database, BMI and BBSR do not make any changes to datasets, but instead put the respective data provider (e.g. EPD programme operator) in charge. Modified datasets get a new version number and are listed as "New Datasets".

3.2 Software and interfaces

3.2.1 Soda4LCA

In technical terms, the ÖKOBAUDAT database is based on the software soda4LCA and is equipped with a standardised interface (API) for data exchange. Via the interface, other applications and software tools can read datasets from ÖKOBAUDAT and import them directly into ÖKOBAUDAT with the corresponding authorisations. The API documentation is provided on the ÖKOBAUDAT website[10] in HTML and PDF formats.

Further information for programmers and the software repository for soda4LCA can be found at
http://www.iai.kit.edu/soda4LCA

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[10] https://www.oekobaudat.de/en/service/downloads.html

3.2.2 EPD Editor

In the EPD Editor, a stand-alone software tool, datasets in the ILCD+EPD format can be generated. Alternatively data can be delivered to the ÖKOBAUDAT backend directly via the online interface.

Note: The EPD Editor is based on the previously available plugin for openLCA and has replaced it since 2017. While the EPD Editor is constantly being developed, the further development of the openLCA plugin was discontinued.

The link to the EPD Editor and the download of the corresponding manual can be found on the ÖKOBAUDAT website under [Downloads](#)[11].

3.2.3 Validation

Compliance of datasets with ILCD+EPD format can be validated using a standalone, cross-platform validation tool which is available on the ÖKOBAUDAT website under [Downloads](#)[11]. It is important to always ensure that the current check profile (which can also be found on the website) is used.

3.3 Data delivery to ÖKOBAUDAT

3.3.1 Content requirements for importing datasets into ÖKOBAUDAT

ÖKOBAUDAT usually sources its data from EPD programme operators. Before datasets are read into ÖKOBAUDAT, authorisation must be given by the BBSR. Details on the content requirements and the procedure for importing datasets can be found in *[Principles for the acceptance of LCA data in the online database ÖKOBAUDAT](#)*[11].

3.3.2 Ways to import data

If the check of the contents for the acceptance of life cycle assessment data has been successfully completed, corresponding access data for importing the data can be requested from the BBSR. The programme operator is responsible for the EPD generation and verification and then transfers the data to the ÖKOBAUDAT.

There are in essence two ways to import data:

1. Import via the EPD editor
2. Direct import via an interface

In any case, prior validation of the datasets is required (see section 3.3.4)

1. Import via the EPD editor

The LCA data can be entered in the freely available "EPD editor" and imported from there into the ÖKOBAUDAT backend.
Currently the following data providers transfer their LCA datasets into ÖKOBAUDAT in this way:

- [Bau EPD GmbH](#) (EPD data)
- [European Aluminium](#) (EPD data)
- [ift Rosenheim](#) (EPD data)
- [KIWA BCS Öko Garantie GmbH](#) (EPD data)
- [Thünen Institute](#) (representative LCA data for wood and wood-based materials in Germany)

The EPD editor including operating instructions is available under [Downloads](#)[11].

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[11] https://www.oekobaudat.de/en/service/downloads.html

2. Direct import via an interface

EPD programme operators can import life cycle assessment data directly into ÖKOBAUDAT online from their own database systems via a suitable interface. Institut Bauen und Umwelt e. V. follows this route: Suitable life cycle assessment data from IBU environmental product declarations, which meets the ÖKOBAUDAT requirements, is imported into ÖKOBAUDAT via the IBU's EPD online tool.

Generic data is supplied by thinkstep via an export interface integrated in the GaBi software. The data supplied in this way is then imported into the ÖKOBAUDAT backend.

3.3.3 Selection of a product category

If there is no suitable product category available in ÖKOBAUDAT, the responsible data provider (EPD programme operator) can propose to the BBSR the establishment of a new category. The proposal must include the German and English designation of the category. If necessary, the data provider coordinates with the dataset owner. If the BBSR accepts the category (categories), it will be added by BBSR and the data provider will be informed. The dataset can now be imported.
If the BBSR does not accept the proposal, the data supplier will deliver a new proposal. If this proposal is also not accepted, further coordination is required. The datasets cannot be submitted until an acceptable solution for the product category is found.

The BBSR is responsible for a timely implementation.

3.3.4 Validation of datasets

Before datasets are transferred to the ÖKOBAUDAT, the data format and product category assignment must be validated for correctness.

The check profile comprises:

- Check against the requirements of the data format: Are all mandatory data fields filled out? In particular:
  - Are the ÖKOBAUDAT categories incl. ÖKOBAUDAT category number ("Classification" according to ILCD+EPD data format) given?
  - Check for the presence of an essential material property
- Automated plausibility checks of the indicator values, currently:
  - Negative values warning for modules A1-A3 (except GWP/POCP /CRU/MFR/MER/EEx indicators).
- Check whether an indication is given in module C if values have been declared in module D. If not, this will be treated as an error.[12]

There are two alternatives for validation:

- The validation function integrated in the EPD Editor
- A stand-alone validation tool

The latest version of the stand alone validation tool as well as a short user manual is available under Downloads[13]. The stand-alone validation tool runs on a cross-platform basis, is highly user-friendly and intuitive.

In order to check the files against the specific format extensions and categories of ÖKOBAUDAT, the check profile must be stored in the validation function or tool respectively. This can also be downloaded from the ÖKOBAUDAT website[13].

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[12] In the current data stock, there are still datasets of the IBU with module D from A5, which were imported into ÖKOBAUDAT before the requirement to split module D according to the feeding life phases (module D from A5, module D from C3, etc.) was formulated in the acceptance principles. They will be deleted on expiry of the valid time of the respective EPD or replaced by new data.

[13] https://www.oekobaudat.de/en/service/downloads.html

Only after successful validation can the data provider export the data to the backend of ÖKOBAUDAT.

3.3.5 Workflow for data delivery in detail

1. Data provider generates ÖKOBAUDAT compliant datasets. This means:

a) The data provider only submits datasets that comply with the ÖKOBAUDAT principles. The data supplier must check this conformity for each dataset before handover ("content-related check")

b) The data provider submits the datasets in the current ÖKOBAUDAT format (ILCD + EPD).

c) Prior to data transfer, the data provider checks the datasets with the tools provided by the BBSR in the latest version (validation tool).

2. Data provider takes action if the check report shows incorrect datasets:

a) "Category" error: select existing product category or, if necessary, propose new product category to BBSR (see 3.3.3)

b) "Module D without C" error: Datasets with a module D without a module C are no longer accepted since 2019.

c) "Forbidden negative Value" error: Data provider checks the displayed indicator values for non-permitted negative values and carries out corrections. Datasets with this error will not be accepted.

d) "No material properties declared" error: The data provider prepares a list of the relevant datasets with a supplementary proposal and hands it over to the BBSR in advance. The BBSR informs the data provider which properties are missing or to be supplemented (specific to each dataset).

3. Data provider transfers data:

a) The data provider prepares a final check report[1] and sends this to the BBSR.

b) The data provider transfers the data to the BBSR.

4. BBSR checks the delivered data:

a). The BBSR checks the data technically in the ÖKOBAUDAT INBOX.
   i. Detected errors are reported to the data provider; if the errors are not corrected or resolved, the datasets will not be published.
b) The BBSR checks randomly selected datasets in content[2].
   i. Error-free datasets are published.
   ii. Datasets with errors are not published.
   iii. The data provider has the possibility to correct and re-deliver the datasets.

1) e.g. screen shot

2) Random check of datasets:
The period of time from the delivery of error-free datasets to the release and publication by the BBSR is estimated at approx. 6 weeks.

3.4 Using ÖKOBAUDAT datasets

3.4.1 Use of the ÖKOBAUDAT datasets in life cycle assessment tools

With the help of life cycle assessment (LCA) tools, the entire life cycle of a building can be reconstructed with the ÖKOBAUDAT database. BBSR provides the eLCA[14] online LCA tool free of charge in German, English and Spanish. Here the basis for the calculation and assessment is the calculation rules in the BNB system, which basically follow the European building LCA standard EN 15978. eLCA always contains the constantly updated ÖKOBAUDAT data. To ensure that ÖKOBAUDAT building material datasets that do not represent the entire life cycle can also be used directly in life cycle calculations, the missing data is completed in eLCA with the aid of generic disposal datasets (and the required ÖKOBAUDAT version is selected here in each case).

Other LCA tools and BIM applications worldwide have read in the ÖKOBAUDAT datasets.

3.4.2 Terms of use

The BMI provides the ÖKOBAUDAT data free of charge and without any restrictions. They are primarily intended for performing life cycle assessment of buildings.

Data in ÖKOBAUDAT are provided with great care. The data providers undertake to comply with the conditions of admission. The data is subjected a random check for conformity, completeness and consistency. However, BMI/BBSR assume no responsibility for the accuracy of the data. Responsibility for content and values remains with the owner of the records. A liability for deficiencies in the data, in particular also for consequential damages, is not taken over by BMI/BBSR. This also applies in the case of the transfer of data to data users (third parties).The free distribution of unmodified data is permitted, provided that the source is named.

With regard to the correct use of the ÖKOBAUDAT datasets for construction products, reference is made to DIN EN 15804: "[…] comparison of the environmental performance of construction products […] shall be based on the product's use in and its impacts on the building, and shall consider the complete life cycle (all information modules)."

ÖKOBAUDAT is not designed for performing life cycle assessment of building products.

3.4.3 Browsing the ÖKOBAUDAT database

The ÖKOBAUDAT database can be found on the website under the "Database"[15] tab. In the start setting you can see the two databases "ÖKOBAUDAT" and "Additional datasets" (based on ecoinvent), in which the user can alternatively browse. To ensure consistency, BNB-compliant data must be based on the background database GaBi. These data can be found under "ÖKOBAUDAT". The "additional datasets" were generated on the basis of the background database "ecoinvent". With this exception, this data fully adheres to the ÖKOBAUDAT requirements in terms of quality and data format and, in justified cases, can therefore be used for BNB life cycle assessments.

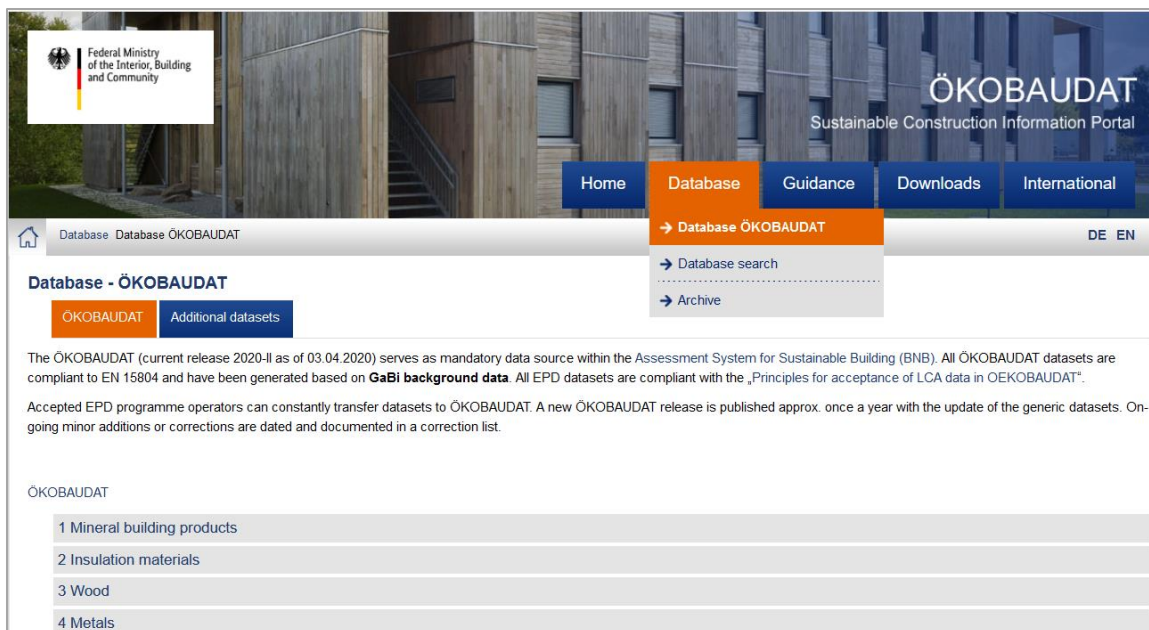
[14] https://www.bauteileditor.de/

[15] https://www.oekobaudat.de/en/database/database-oekobaudat.html

Figure 6: Start setting in the "Database" tab

3.4.4 Data search

The ÖKOBAUDAT database system with its search and filter functions enables user-friendly online searches of the datasets. With the URL https://www.oekobaudat.de/en/database/database-search.html or by selecting "Search" in the "Database" tab, the data search in the ÖKOBAUDAT is called up (Figure 7).
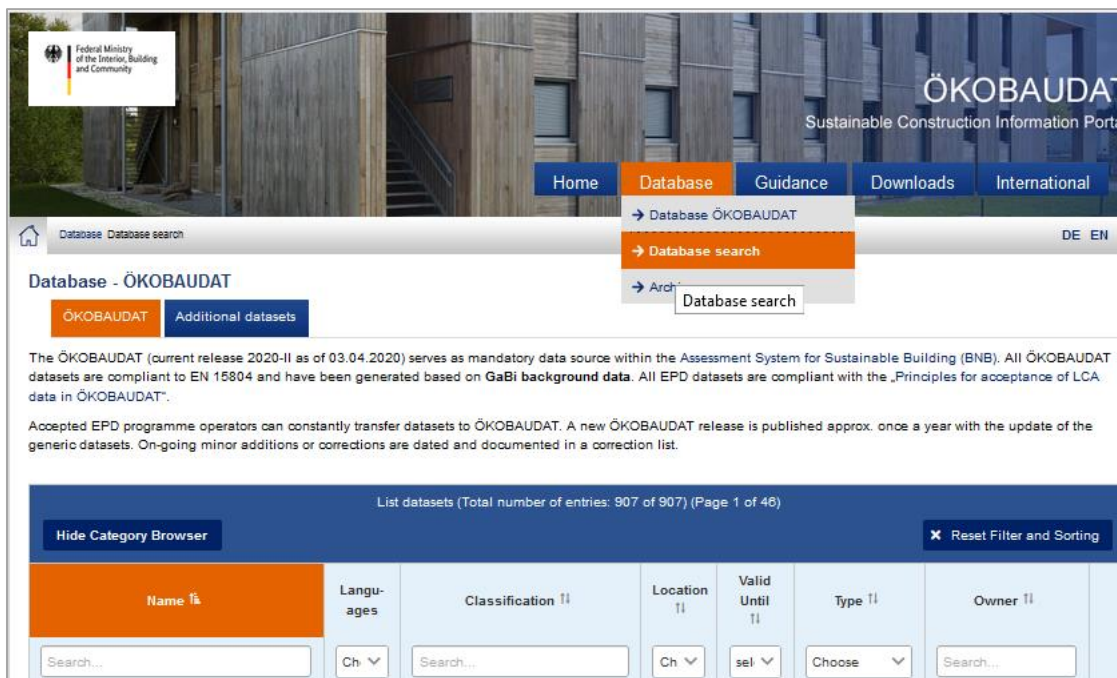

Figure 7: Data search and filtering in ÖKOBAUDAT

For targeted searching, the database can be searched and filtered according to the following criteria:

- name of dataset (free text search)
- available language
- ÖKOBAUDAT category (free text search)

- geographical representativeness (country or region code)
- valid time (year of expiration)
- dataset type ("subtype")
- owner of dataset (free text search)

The search results list then contains all datasets matching the specified search criteria. All columns can be sorted in ascending or descending order.

By clicking on the name of the dataset or the link "View" in the column "Export" the familiar detail view of the respective dataset can be called up. Downloading is possible by selecting the link "Download".

Moreover, by selecting the "Show Category Browser" button, an overlay window can be displayed in which the user can navigate through the category structure by folding and unfolding the category trees, in order to select a specific category or even just to see the existing categories. If a specific category is selected, the corresponding datasets are displayed in the data browser. Clicking on the "Reset" button in the category browser returns the data browser to the display of all datasets (see Figure 8).

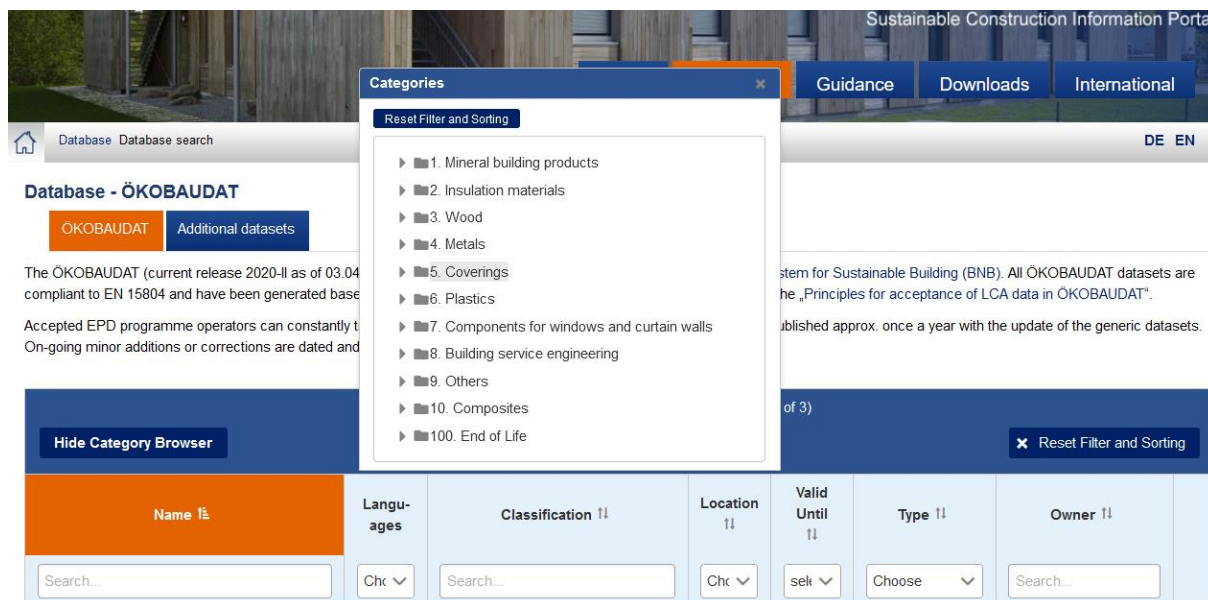To reset all filters and sorts, the global button "Reset Filter and Sorting" can be used.

Figure 8: Overlay window for selection of construction product category

3.4.5 Access to the ÖKOBAUDAT database

For read access to ÖKOBAUDAT via the service interface, the base URL https://www.oekobaudat.de/OEKOBAU.DAT/resource has to be entered as the address in the software tool. The identification numbers for different ÖKOBAUDAT versions can be provided on request[16].

The complete ÖKOBAUDAT database can be downloaded in XML format as a ZIP file or as a CSV extract.

The ÖKOBAUDAT versions released in recent years can also be found under the "Database/Archive" tab.

No authorisation is required to export data from the database.

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[16] referat-2-6@bbr.bund.de

4. References

4.1 Links to further software and instructions

- ÖKOBAUDAT: www.oekobaudat.de
- eLCA: https://www.bauteileditor.de/
- Link to the EPD editor and manual: https://www.oekobaudat.de/en/service/downloads.html
- Link to the validation tool: https://www.oekobaudat.de/en/service/downloads.html

4.2 Links to documents

On the ÖKOBAUDAT website, the following additional descriptions and instructions are published under Downloads[17], each in the current version:

- Principles for the acceptance of LCA data in the online database ÖKOBAUDAT
- Table of definitions, ILCD+EPD Data format
- FAQ: ILCD+EPD format, CPEN2018 InData Compliance
- ÖKOBAUDAT Instructions on material information (currently in German only)
- Brochure "ÖKOBAUDAT - Basis for the building life cycle assessment"

4.3 Standards

DIN EN ISO 14020	Umweltkennzeichnungen und -deklarationen - Allgemeine Grundsätze (ISO 14020:2000); German version EN ISO 14020:2001, February 2002 *(Environmental Labels and Declarations - General principles)*
DIN EN ISO 14025	Umweltkennzeichnungen und –deklarationen – Typ III Umweltdeklarationen – Grundsätze und Verfahren (ISO 14025:2006), German and English version EN ISO 14025:2011 *(Environmental Labels and Declarations – Type III Environmental Declarations – Principles and Procedures)*, October 2011
DIN EN ISO 14040	Umweltmanagement – Ökobilanz – Grundsätze und Rahmenbedingungen (ISO 14040:2006); German and English version EN ISO 14040:2006 *(Environmental Management – Life Cycle Assessment – Principles and Framework)*
DIN EN ISO 14044	Umweltmanagement – Ökobilanz – Anforderungen und Anleitungen (ISO 14044:2006); German and English version EN ISO 14044:2006 *(Environmental Management – Life Cycle Assessment – Requirements and Guidelines)*
DIN EN 15804	Nachhaltigkeit von Bauwerken – Umweltproduktdeklarationen – Grundregeln für die Produktkategorie Bauprodukte, German version EN 15804:2012+A1:2014. Date of issue: 2014-07 *(Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products)*
DIN EN 15978	Nachhaltigkeit von Bauwerken – Bewertung der umweltbezogenen Qualität von Gebäuden – Berechnungsmethode, German version EN 15978:2011, January 2012 *(Sustainability of construction works – Assessment of Environmental Performance of Buildings – Calculation Method)*

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[17] https://www.oekobaudat.de/en/service/downloads.html

5.   Table of figures

6.   List of tables

7. Glossary

ILCD data format	International Reference Life Cycle Data System, Joint Research Centre (JRC) of the European Commission
ILCD+EPD data format	Adaptation of the ILCD data format with extensions for EPD data that cannot be presented in the ILCD format
specific dataset	Manufacturer/manufacturing company-specific dataset for a specific product of one factory
average dataset	Average datasets provided by industrial associations, several companies, several works or several products (i. e. on the basis of data on the industrial production of companies)
representative dataset	Data that is representative for a country/region (for example average for Germany)
template dataset	Unspecific datasets for specific products created on the basis of a "template EPD"
generic dataset	Generic datasets in accordance with EN 15804 and other data that is not modelled on the basis of industrial data (for example on the basis of literature, expert knowledge, etc.)
Life Cycle Assessment/LCA	Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle (definition according to EN 15804)
EPD	Environmental product declarations (EPDs) provide environmental data on the basis of predetermined parameters. An EPD contains life cycle assessment data as an essential element.
EN 15804	EN 15804 "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products" provides the key rules for drawing up environmental product declarations (EPDs) for construction products.
eLCA	Online software provided by the BBSR for building life cycle assessment
BNB	Assessment System for Sustainable Building (Bewertungssystem Nachhaltiges Bauen) of the Federal Ministry of the Interior, Building and Community; integral quantitative assessment method for office, administrative, teaching and laboratory buildings
InData	"International Open Data Network for Sustainable Construction"; informal, non-profit working group of interested stakeholders with the main objective of establishing an international 'Open Data Network' for EPD/LCA data
Users Advisory Group	Advisory body for ÖKOBAUDAT on topics like the enhancement of ÖKOBAUDAT, recommendations regarding the inclusion of LCA data, role of ÖKOBAUDAT within the Assessment System for Sustainable Building or digitalisation