



BSI Standards Publication

Sustainability of construction works — Data quality for environmental assessment of products and construction work — Selection and use of data

National foreword

This British Standard is the UK implementation of EN 15941:2024. It supersedes PD CEN/TR 15941:2010, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/558, Sustainability of construction works.

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English Version

**Sustainability of construction works - Data quality for
environmental assessment of products and construction
work - Selection and use of data**

Contribution des ouvrages de construction au
développement durable - Qualité des données pour
l'évaluation environnementale des produits et des
ouvrages de construction - Sélection et utilisation des
données

Nachhaltigkeit von Bauwerken - Datenqualität für die
Erfassung der Umweltqualität von Produkten und
Bauwerken - Auswahl und Anwendung von Daten

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European foreword

This document (EN 15941:2024) has been prepared by Technical Committee CEN/TC 350 “Sustainability of construction works”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2024, and conflicting national standards shall be withdrawn at the latest by August 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TR 15941:2010.

In comparison with the previous edition, the following technical modifications have been made. The document:

- addresses both specific and generic data;
- addresses the assessment of data quality in relation to time, geography, technology, precision, completeness, consistency and sources of data;
- addresses the selection of data based on the assessment of data quality through guidance on the generation of a hierarchy;
- addresses the assessment, selection and use of data at both product and building level, and its applicability to all construction works including civil engineering works;
- addresses the avoidance of double counting through the selection of data, particularly in relation to electricity;
- addresses the reporting of data quality at product level in the Project Report and in the Environmental Product Declaration (EPD);
- addresses ease of data transfer at product level by addressing the use of a common Life Cycle Inventory (LCI) – nomenclature;
- addresses the reporting and communication of data quality information at building level;
- addresses the responsibilities of data providers to make data quality information available;
- no longer provides guidance on the pre-verification of generic data.

This document has been prepared under a Mandate given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies the data quality assessment and selection of data for Environmental Product Declarations (EPD) according to the core product category rules of EN 15804 and for the environmental performance assessment of buildings according to EN 15978 in a consistent way. It can also be used to assess and select data for the environmental assessment of civil engineering works according to EN 17472.

It defines data quality requirements with respect to temporal, technological and geographical representativeness for the data used to calculate the Life Cycle Assessment (LCA) based indicator results of the EPD and for construction works when applying EPD, life cycle inventory data or other LCA based information, and gives guidance for the generation of a hierarchy to support the selection of the most appropriate data regarding data quality. It also addresses the reporting of data quality at product and building level.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15804:2012+A2:2019, *Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products*

EN 15978, *Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method*

CEN ISO/TS 14071, *Environmental management — Life cycle assessment — Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006 (ISO/TS 14071)*

EN ISO 14021, *Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling) (ISO 14021)*

EN ISO 14044, *Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044)*

EN ISO 14067:2018, *Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification (ISO 14067:2018)*

ISO 21930:2017, *Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services*

European Commission — Joint Research Centre — *Institute for Environment and Sustainability. International Reference Life Cycle Data System (ILCD) Handbook — Nomenclature and other conventions*. 2010. EUR 24384 EN. Luxembourg. Publications Office of the European Union; 2010, ISBN 978-92-79-15861-2

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

NOTE Annex A provides an overview of how the definitions in this document differ from those in EN 15804, PEF and Level(s).

3.1

average data

calculated mean of data based on a representative sample for a construction product or construction service, provided by one or more manufacturer, either from their multiple plants or based on multiple similar construction products of the manufacturer(s)

[SOURCE: ISO 21930:2017, 3.5.6, modified – reference to calculated mean has been added, the term “supplier” has been changed to “manufacturer”, the term “fully” has been deleted and note 1 to entry has been deleted]

3.2

average EPD

EPD based on average data (3.1)

Note 1 to entry: The term collective EPD is equivalent to average EPD of more than one manufacturer.

[SOURCE: ISO 21930:2017, 3.1.12, modified – Note 1 to entry has been added]

3.3

construction element

building component

building element

component or a set of assembled components incorporated in a building or construction works

[SOURCE: EN 15643:2021, 3.15]

3.4

downstream process

process that follows a given life cycle process

[SOURCE: EN 15804:2012+A2:2019, 3.34, modified – upstream process has been deleted and the term “stage” has been changed to “process”]

3.5

driving process

product, material or process contributing significantly to at least 80 % of any environmental indicators included in the building or civil engineering works assessment, over the life cycle modules assessed

3.6**generic data**

data that is not site or enterprise specific

Note 1 to entry: This refers to data that is not directly collected, measured, or estimated by a company, but sourced from a third party LCI database or other sources. Generic data includes industry average data (e.g. from published production data, government statistics, and industry associations), literature studies, engineering studies and patents, and may also be based on financial data, and contain proxy data, and other generic data.

3.7**product system**

collection of unit processes with elementary and product flows, performing one or more defined functions, and which models the life cycle of a product

[SOURCE: EN ISO 14040:2006, 3.28]

3.8**raw data**

data determined by direct measurement, estimation or calculation from the original source

[SOURCE: Sonnemann & Vigon (Ed.), UN 2011]

3.9**scenario**

collection of assumptions and information concerning an expected sequence of possible future events

[SOURCE: EN 15804:2012+A2:2019, 3.28]

3.10**specific data**

data representative of a product, product group or construction service, provided by one supplier

[SOURCE: EN 15804:2012+A2:2019, 3.31]

3.11**unit process**

smallest element considered in the life cycle inventory analysis for which input and output data are quantified

Note 1 to entry: Data processed by mathematical relations from raw data [Sonnemann and Vigon (Ed.), UN 2011].

[SOURCE: EN ISO 14040:2006, 3.34, modified – Note 1 to entry has been added]

3.12**upstream process**

process that precedes a given life cycle stage

[SOURCE: EN 15804:2012+A2:2019, 3.34, modified – downstream process deleted]

3.13

proxy data

substitute data used to approximate for system specific data (3.10) or generic data (3.6) if they are not available

EXAMPLE Data for production of acetic acid used in lieu of data for production of formic acid or selection of a generic data set of electricity from one region to represent another region.

Note 1 to entry: Data can be site specific or average.

[SOURCE: ISO 21930:2017, 3.5.5, modified – definition clarified]

3.14

reference service life

RSL

service life of a construction product which is known to be expected under a set of reference in-use conditions and which can form the basis for estimating the service life under other in-use conditions

[SOURCE: EN 15804:2012+A2:2019, 3.26, modified – note 1 to entry and note 2 to entry have been deleted]

4 Abbreviations

ADP	Abiotic Depletion Potential
CHP	Combined Heat and Power
EPD	Environmental Product Declaration
GO	Guarantee of Origin
GWP	Global Warming Potential
HVAC	Heating, Ventilation and Air Conditioning
ILCD	International Reference Life Cycle Data System
LCA	Life Cycle Assessment or Life Cycle Analysis
LCI	Life Cycle Inventory
PCR	Product Category Rule
PEF	Product Environmental Footprint
PV	Photovoltaic
RSL	Reference Service Life

5 Types and sources of data at product, building and construction works level

5.1 General

This clause describes different categories of data and some different data sources that are commonly used in developing EPD and in the environmental performance assessment of buildings and construction works.

5.2 Sources of generic data for use at product, building and construction works level

Examples of sources for generic data for upstream processes include:

- Collective EPD according to Table 2 (e.g. industrial sector EPD);
- Industry average life cycle data from LCI databases that have been critically reviewed;
- Manufacturer specific EPD, if representative, used as proxy data where there is no collective EPD;
- EN ISO 14044 LCA studies that have been critically reviewed;
- Other data sets according to EN 15804 that have not been critically reviewed or verified;
- Industry average life cycle data from LCI databases that have not been critically reviewed;
- Industry association reports and governmental statistics;
- Data from literature, scientific papers, literature studies, engineering studies and patents;
- Data sets generated by data set providers in the absence of industry provided data;
- Proxy data from other sectors.

The selection of data are dependent on the context of its use.

Note The list contains sources for generic data. This does not mean that sources like a collective EPD is “automatically” generic data.

5.3 Examples of data and their uses at building and construction works level

In addition to the sources of generic data listed in 5.2, Table 1 provides a detailed overview of examples of data used at building and construction works level based on the different life cycle stages according to EN 15804 and EN 15978.

Table 1 — Examples of data for use at building and construction works level

Life Cycle Modules	Environmental LCA-based data for:	Type of data and quantities of products	Examples of data use
A1–A3	Construction products Building components HVAC-Systems	Specific, generic or average data on production processes Amount of products included	Use in building assessment
A4	Transport processes	Transport mode and vehicle type Transport distance Capacity utilization Fuel type/energy source	Specification of scenarios for the transport stage of the building assessment

Life Cycle Modules	Environmental LCA-based data for:	Type of data and quantities of products	Examples of data use
A5	Construction processes	Type of construction process Resource consumption for construction process Amount of waste and its further handling	Specification of scenarios for the construction stage of the building assessment
B1	Non-energy related emissions Aging of products	Type and amount of construction products with interior or exterior surfaces and their emissions to the environment Carbonation Fugitive emission of refrigerant HVAC system	Identification of dangerous substances
B2	Maintenance processes	Frequency Type and amount of activity	Maintenance strategy Service level
B3	Repair processes Construction processes	Frequency Probability of repair Type and amount of activity	Repair Strategy
B4	Like A1-A3, A4, A5, C1, C2, C3, C4 and D1	Like A1-A3, A4, A5, C1, C2, C3, C4 and D1	Replacement strategy
B5	Like A1-A3, A4, A5, C1, C2, C3, C4 and D1	Like A1-A3, A4, A5, C1, C2, C3, C4 and D1	Refurbishment strategy
B6.1	Operational energy supply	Energy demand (heating, cooling, air conditioning, hot water supply, lighting)	Climate conditions User behaviour Management quality
B6.2	Operational energy supply	Energy demand (e.g. elevator)	User behaviour
B6.3	Operational energy supply	User related energy demand (e.g. cooking, electricity use for computers)	User behaviour
B7	Water supply Wastewater treatment	Water demand Wastewater collection	User behaviour

Life Cycle Modules	Environmental LCA-based data for:	Type of data and quantities of products	Examples of data use
B8	Transport processes Other processes and services	Transport mode and vehicle type Transport distance Goods associated with activities relating to the buildings intended use	Specification of scenarios for the use stage of the building assessment
C1	Deconstruction processes	Type and amount of deconstruction processes	Deconstruction strategy (demolition versus deconstruction)
C2	Transport processes	Transport mode and vehicle type Transport distances	Specification of scenarios for the end-of-life stage of the building assessment
C3	Waste processing	Type of processes and amount of material	Strategy
C4	Disposal processing (Coefficients for transfer to environment)	Type of processes and amount of material	Strategy
D1	Potential benefits and loads from reuse, recycling and energy recovery resulting from the net flows of materials exiting the system boundary	Type and amount of materials for reuse and recycling Type and amount of substituted processes	Deconstruction strategy (demolition versus deconstruction) Understanding the potential benefit and loads from reuse, recycling and energy recovery resulting from the net flows of materials exiting the system boundary
D2	Potential benefits and loads from exported utilities exiting the system boundary	Type and amount of exported energy and potentially avoided emissions occurring beyond the system boundary	Understanding the potential benefit of exported energy

Other data such as technical characteristics are not covered here. Average data for a product group should not be used to represent a narrower product group with significantly higher impact.

NOTE Modules A4-D2 are scenario based. In some countries these modules use pre-defined defaults.

5.4 Types of EPD

Table 2 provides a detailed description of the different types of EPD in terms of their scope and describes the range of specific and average EPD, together with examples. It can be used to describe the scope of EPD in a standardized way.

NOTE This classification by scope is different from the types of EPD with respect to life cycle stages described in EN 15804:2012+A2:2019, 5.2.

Average data for a product group should not be used to represent a narrower product group with significantly higher impact.

This needs to be justified in the project report and in the EPD. Examples are given in Annex C.

Table 2 — Types of EPD with respect to their scope (adapted from ISO 21930:2017, Annex B)

Type of product	Description	Examples
1. Manufacturer specific EPD (1 manufacturer)	Specific product 1A Declaration of a specific product from a single plant. (1 product, 1 plant)	EPD for a specific concrete mix produced at a single ready-mix plant of one manufacturer.
	Average product 1B Declaration of a specific product as an average from several of the manufacturer's plants. (1 product, > 1 plant)	EPD of a specific concrete mix produced at several (or all) of the plants of one manufacturer. This can include different sites of one company with the same production processes.
	Typical representative product 1C Declaration of an average product from a manufacturer's plant. (average product, 1 plant)	EPD of the average concrete (or a group of concretes) produced at a single ready-mix plant of one manufacturer.
Typical representative product	Average product 1D Declaration of an average product as an average from several of the manufacturer's plants. (average product, > 1 plant)	EPD of the average concrete mix (or a group of concretes) produced at several (or all) of the plants of one manufacturer. This can include different sites with different production processes.
	Typical representative product 1E Declaration of the impact of a typical, representative product to represent the impact of a product group from a manufacturer's plant. (typical representative product, 1 plant)	A manufacturer can select a (typical) product which is representative for a certain product group and declare the environmental impacts for it as representing the entire product class. The choice of representative product needs to be justified.
	Typical representative product 1F Declaration of the impact of a typical, representative product to represent the impact of a product group from several of the manufacturer's plants. (typical, representative product, > 1 plant)	A manufacturer can select a (typical) product which is representative for a certain product group and declare the environmental impacts for it as representing the entire product class (representative EPD). The choice of representative product needs to be justified.

Type of product	Description	Examples
2. More than 1 manufacturer EPD (from > 1 manufacturer, associations, sector, equivalent to a collective EPD)	2A Declaration of a specific product as an average from several manufacturers' plants.	Declaration of an extruded polystyrene insulation product as an average from plants of a certain number of manufacturers within an association.
	2B Declaration of an average product as an average from several manufacturers' plants.	EPD for an average across a range of different densities of insulation material averaged across all products produced by a defined number of members of an association of insulation manufacturers.
	Typical, Representative product	Manufacturers or trade association can select a (typical) product which is representative for a certain product group and declare the environmental impacts for it as representing the entire product class (representative EPD). The choice of representative product needs to be justified.
3. Worst case EPD	Product with highest impact	This type of EPD is normally only used for products within minimal impact at building level, e.g. adhesives. For Module D, worst case EPD declare the smallest benefit and highest load from all modelled products and manufacturers to ensure it is the worst case.
	Default data in c-PCRs for processes, inputs, and outputs according to worst-case scenario can be used (similar to the use of tabulated values in many harmonized standard).	

6 Data quality criteria and aspects for products and construction works

6.1 General

The data quality assessment information shall cover at least the following criteria dealing with representativeness:

- time-related coverage;
- geographical coverage;
- technological coverage.

Care must be taken to avoid overlap as the three criteria are closely interrelated. In addition, the following aspects shall be addressed:

- precision;
- completeness;
- consistency;
- sources of the data.

The criteria are used at both product and building level to assess the data quality (see 7.1 and 8.3), and the data quality assessment is used to select data (see 7.2 and 8.4) and to evaluate it (see 8.5). For reporting of data quality see 7.3 and 8.7.

There is a potential to aggregate unit process data sets and define different data quality criteria and aspects. Aggregation approaches are not included in this document.

6.2 International Reference Life Cycle Data System data

The International Reference Life Cycle Data System data (ILCD) format uses a consistent nomenclature and classification of data to provide meta-data and environmental information for generic and specific LCI and LCA for both unit process data sets and system data sets used in product life cycle assessments. The ILCD format is made up of fields, which are mandatory, recommended or optional within ILCD. Information for particular data quality criteria from ILCD is provided in the relevant clauses below.

NOTE The ILCD format is defined in the document, “International Reference Life Cycle Data System data (ILCD) Documentation of LCA data sets. Version 1.1 Beta”. The format is available at the following web-link: <https://eplca.jrc.ec.europa.eu/LCDN/developerILCDDataFormat.xhtml>.

The ILCD format is mainly used for product data.

6.3 Time-related coverage

6.3.1 General

Criteria associated with time-related coverage are used in both assessment of data quality and selection of data at both product and building level.

6.3.2 General time related criteria

The LCA results as defined in application of current CEN/TC 350 standards are in principle independent of time and of the time elapsing during the life cycle stages production, use and end-of-life. For example, years may pass between fossil oil extraction, refinery, production of plastic, use of plastic as a gutter and finally the process of recycling the waste gutter. This independence is one of the pre-conditions for aggregation of data across modules or across the life cycle stages of buildings or construction works.

However, the date and the period over which data are collected has an influence on the quality of data. To be temporally representative, data sets should reflect the true data population of interest regarding time/age of the data. This also includes background data sets.

6.3.3 Time-related criteria for construction products and buildings

At both product and building level, four time-related criteria are considered:

- a) **The period of data collection of raw data for the product or building under study.** The period of data collection is relevant to ensure that the data are representative of normal production. The data collection period shall give the date when the data collection period started and the time when the data collection period stopped, e.g. Calendar Year 2018 or 1st January 2018 to 31st December 2018. For bio-based products used in construction, agricultural and forestry processes can change during the growing stages through harvesting, and there can be different yields each year due to differences in weather, growing and harvesting practices (soil and land management, irrigation, chemical inputs etc.); thus, collecting data over several years may be more representative of typical production. For forestry processes, it will be important to ensure that data are collected for all processes that occur during a rotation; manufacturing may be more efficient during times when plant is run at full capacity so a year's data will be more representative than a month's production. Collecting data (energy, inputs, production, waste etc.) over the same period ensures the data accurately represents production over that period. When process data are collected where production has only recently started, a shorter period for data collection can be used, but it should be as representative of typical production as possible (e.g. data collection starts when production is stabilized). The optional field, 'Data collection period', is included in ILCD format to provide this information.
- b) **The reference year for the data set being used.** The reference year refers to the year which the overall inventory represents best, considering the age/representativeness of raw data, and any specific and generic data sets used, i.e. it is not automatically the year of modelling, calculation or publication year.

NOTE 1 Typically, recent data are considered to be more representative, as some processes, for example electricity grid mix, can change significantly over time, and processes and new equipment are expected to become more efficient over time.

The recommended bullet point, 'reference year', is included in ILCD format in order to enable the provision of this information.

NOTE 2 Please find explanatory information within Table 3 on time related fields used in ILCD format.

- c) **The validity of a data set.** The validity refers to the date to which the data set provider judges the inventory is valid regarding the documented technological and geographical representativeness. EPD have a maximum validity of 5 years from the time of publication. ILCD format provides a recommended field, "data set valid until" which provides this information. It is assumed a data set is temporally representative from the reference year to the end of validity.

- d) **The temporal representativeness of the data set**, as judged by the data set provider. This is provided in the ILCD field, “time representativeness description”.

Another time-related criterion relevant to the consistency of data sets is the time period over which inputs and outputs from the system are accounted for, particularly in relation to disposal processes and carbonation processes. Processes such as landfill can have impacts for many years from the point of disposal, potentially for thousands of years until the landfill has returned to nature. Describing the time period over which impacts have been considered ensures consistency in assessing these impacts. The data quality requirements from EN 15804:2012+A2:2019, Clause 6.3.8.2 on time period over which inputs to and outputs from the system shall be accounted for apply.

6.3.4 Time related meta-data for ILCD data sets

Table 3 describes the meta-data fields in ILCD format that are time related.

Table 3 — Time related fields used in ILCD format

Field name	Requirement	Compliance Requirement Type	Definition
Data collection period (text)	Optional	Optional	Date(s) or time period(s) when the data was collected. Note that this does NOT refer to e.g. the publication dates of papers or books from which the data may stem, but to the original data collection period.
Reference year (Year)	Recommended	ILCD documentation-compliant	Start year of the time period for which the data set is valid (until year of “Data set valid until”). For data sets that combine data from different years, the most representative year is given regarding the overall environmental impact. In that case, the reference year is derived by expert judgement.
Data set valid until: (Year)	Recommended	ILCD documentation-compliant	End year of the time period for which the data set is still valid/sufficiently representative. This date also determines when a data set revision/remodelling is required or recommended due to expected relevant changes in environmentally or technically relevant inventory values, including in the background system.
Time representativeness description	Recommended	ILCD documentation-compliant	Description of the valid time span of the data set including information on limited usability within sub-time spans (e.g. summer/winter).

Field name	Requirement	Compliance Requirement Type	Definition
Data treatment and extrapolations principles	Recommended	ILCD documentation-compliant	Principles applied regarding methods, sources, and assumptions done in data adjustment including extrapolations of data from another time period, another geographical area, or another technology.
Deviation from data treatment and extrapolations principles / explanations	Recommended	ILCD documentation-compliant	Short description of any deviations from the “Data treatment and extrapolations principles”. In case of no (result relevant) deviations, “none” is entered.
NOTE “Requirement”: This column identifies which fields are to be filled in to have an ILCD format schema valid data set or an appropriately documented “ILCD documentation-compliant” data set. Some fields are optional.			

6.4 Geographical coverage

6.4.1 General geography related criteria

Criteria associated with geographical coverage are used in both requirements and assessment of data quality and selection of data, at product and building level.

For most modern products, the location of extraction of resources, supply chain processes, product use and end-of-life is rarely close to the location where the product is manufactured. The LCA results, as defined in application of EN 15804:2021+A2:2019 and EN 15978, are in principle independent of the location where the life cycle stages of production, use and end-of-life take place. For example, fossil oil extraction, the oil refinery, extrusion of plastic, use of the plastic gutter and finally the recycling the gutter at end-of-life will take place in very different locations but are considered using the same Life Cycle Assessment methodology. This independence is one of the pre-conditions for aggregation of data across modules or across the life cycle stages of buildings or construction works.

However, the LCA takes into account the diverse conditions which will affect impact when a process occurs in different locations, for example due to differences in the technology used in different regions, for example the differences in electricity grid mix. Another example is the use of water in a region with abundant freshwater resources may also be very different to water use in a region with high water scarcity. Other differences may include the use of different supply chains, different transport modes and varying distances, different emissions measurement techniques and regulation and different approaches to treating and recovering particular waste streams. For example, a data set for European concrete may be inappropriate for use in the Middle East due to the need to import sand from Europe or elsewhere with significant additional transport impacts.

Therefore, it is important to understand how well the process data collected for a construction product represents the processes in the location where they actually take place.

To be geographically representative, a data set will reflect the true population of interest regarding geography, including for included background data sets, if any. Geographical representativeness and technological representativeness are often related in the sense that poor geographical representativeness means that the applied data represents a potentially different technology (mix) from what is applied in the system under study.

6.4.2 Geography related criteria for construction products and buildings

At product and building level, four geography-related criteria are considered.

- a) **The location the data set represents**, for example the country for an average data set. This is described by the ILCD field “Location”. Details of factory addresses can be provided in the field, “geographical representativeness description”.
- b) **The type of location**, such as “to consumer” or “at plant”. This is described by the ILCD field, “Mix and location types”.
- c) **The geographical representativeness** shall describe any issues with the geographical representativeness, for example if data has been extrapolated from another region. This is also described by the ILCD field, “Geographical representativeness description”.
- d) **The region(s)** where products are used in scenarios. For end-of-life processes it is particularly important due to the differences in waste management approaches to use local data. This is also described in the ILCD field “location” for these types of data sets.

6.4.3 Geography related meta-data for ILCD data sets

Table 4 describes the meta-data fields in ILCD format that are geography related.

Table 4 — Geography related fields used in ILCD format

Field name	Requirement	Compliance Requirement Type	Definition
Location	Recommended	ILCD format schema valid data set	Location of operation, supply or production as relevant that the data set represents. Can be a place, country or region. If a country should use the ISO 3166-2 letter country codes, “seven-letter regional codes” for regions or continents, or “market areas and market organisations”, as predefined for the ILCD.
Latitude and Longitude	Optional	Optional	Geographical latitude and longitude reference of “Location”. For area-type locations (e.g. countries, continents) the field is empty.
Geographical representativeness description	Optional	ILCD documentation-compliant	Further explanations about additional aspects of the location: e.g. a company and/or site description and address, whether for certain sub-areas within the “Location” the data set is not valid, whether data are only valid for certain regions within the location indicated, or whether certain elementary flows or intermediate product flows are extrapolated from another geographical area.

Field name	Requirement	Compliance Requirement Type	Definition
Mix and location types	Recommended	ILCD documentation-compliant	Specifying information on the good, service, or process, e.g. location type of availability (such as e.g. “to consumer” or “at plant”).
Data treatment and extrapolations principles	Recommended	ILCD documentation-compliant	Principles applied regarding methods, sources, and assumptions done in data adjustment including extrapolations of data from another time period, another geographical area, or another technology.
Deviation from data treatment and extrapolations principles / explanations	Recommended	ILCD documentation-compliant	Short description of any deviations from the “Data treatment and extrapolations principles”. In case of no (result relevant) deviations, “none” is entered. (Note: If data representative for one “Location” is used for another “Location”, its original representativeness can be indicated here.)
NOTE “Requirement”: This column identifies which fields are to be filled in to have an ILCD format schema valid data set or an appropriately documented “ILCD documentation-compliant” data set. Some fields are optional.			

6.5 Technological coverage

6.5.1 General

The criteria of this document, associated with technological coverage, are valid at product and building level. They are used in both assessment of data quality and selection of data.

6.5.2 Technology-related criteria at product level

The unit process LCI data depend on the technology applied to model a production process. Such technologies change over time and differ in geographical regions. Therefore, it is important to understand which technology is represented by the data used in the study.

Technologies for certain commodities (e.g. plastic resins, or alumina) can differ depending on geographic regions offering a different spectrum of raw materials for the commodity’s production and respective energy generation and waste management. Economic and legal conditions in different regions also influence the applied technology.

A systematic overview of the actual technology and its typical boundary conditions (defined by e.g. region and time) applied for a unit process can be achieved by using the ILCD format. The technology related requirements can be seen as a refinement of the temporal and geographic data quality requirements. To be technologically representative, data sets should reflect the true population of interest regarding technology, including for included background data sets, if any.

6.5.3 Technology related criteria for data quality at building level

At building level, there is a need for the data chosen to have technological coverage that reflects the physical reality for the products used.

6.5.4 Technology related meta-data for ILCD data sets

Table 5 describes the technology related meta-data fields in the ILCD format.

Table 5 — Technology related fields used in ILCD format

Field name	Requirement	Compliance Requirement Type	Definition
Technology description including background system	Recommended	ILCD documentation-compliant	Description of the technological characteristics including operating conditions of the unit process under study. Professional terminology should be used.
Mix and location types	Recommended	ILCD documentation-compliant	Specifying information on the good, service, or process, e.g. whether being a production mix or consumption mix.
Included data sets	Recommended	Optional	“Process data set(s)” included in this data set, if any, and available as separate data set(s). It is recommended to reference all quantitatively relevant (“key”) included process data sets. Field is unused only for single operation unit processes.
Technical purpose of product or process	Recommended	ILCD documentation-compliant	Description of the intended / possible applications of the good, service, or process. E.g. for which type of products the material, represented by this data set, is used. Examples: “This high purity chemical is used for analytical laboratories only.” or “This technical quality bulk chemical is used for large scale synthesis in chemical industry.”. Or: “This truck is used only for long-distance transport of liquid bulk chemicals”.
Pictogram of technology	Optional	Optional	Link to pictogram of the good, service, technology, plant etc. represented by this data set. For use in graphical user interfaces of LCA software.
Flow diagram(s) or picture(s)	Optional	ILCD documentation-compliant	“Source data set” of the flow diagram(s) and/or photo(s) of the good, service, technology, plant etc. represented by this data set. For clearer illustration and documentation of data set.
Data treatment and extrapolations principles	Recommended	ILCD documentation-compliant	Principles applied regarding methods, sources, and assumptions done in data adjustment including extrapolations of data from another time period, another geographical area, or another technology, e.g. such as averaging/aggregation, scaling, unit-conversion etc.

Field name	Requirement	Compliance Requirement Type	Definition
Deviation from data treatment and extrapolations principles / explanations	Recommended	ILCD documentation-compliant	Short description of any deviations from the “Data treatment and extrapolations principles”. In case of no (result relevant) deviations, “none” is entered.
Percentage supply or production covered	Recommended	ILCD documentation-compliant	Percentage of the overall supply, consumption, or production of the specific good, service, or technology represented by this data set, in the region/market of the stated “Location”. For multi-functional processes the market share of the specific technology is stated. If data that is representative for a process operated in one “Location” is used for another “Location”, the entry is '0'. The representativeness for the original “Location” is documented in the field “Deviation from data treatment and extrapolation principles, explanations”. Especially for generic or average data sets, consider which market-relevant technologies are actually and explicitly addressed/included in the inventory of this data set.
Annual supply or production volume	Optional	Optional	Supply / consumption or production volume of the specific good, service, or technology in the region/market of the stated “Location”. The market volume is given in absolute numbers per year, in common units, for the stated “Reference year”. For multi-functional processes the data should be given for all co-functions (goods and services). Note that for data sets that are intended to be used in a decision context, it is recommended to document the “market size” here, to later be able to check whether a modelled scenario has large-scale consequences on the market.
NOTE “Requirement”: This column identifies which fields are to be filled in to have an ILCD format schema valid data set or an appropriately documented “ILCD documentation-compliant” data set. Some fields are optional.			

6.6 Aspect of Precision

6.6.1 General

Precision is a measure of the variability of data values for each data category expressed, sometimes called the variance. It measures the spread or variability of the data set values about the mean of the data set.

The mean value, standard deviation and probability distribution function of reported values can be calculated. The type of distribution can also be described together with the mean, and the standard

deviation (or, alternatively, minimum and maximum values). These measures may be used to describe and assess the variance of the data set.

For a study covering many production sites, the variance may be expected to be broad – this does not mean that the quality is poor – it shows that the variation in inputs and outputs of the unit processes run at different sites is significant; for a company specific study with two sites with similar technology and geography, a much smaller difference in inputs and outputs may be expected, and this is not an indication of higher quality, but that there is little difference in inputs and outputs between the two sites.

The variance also gives an indication of the likelihood that any particular production process represented by the data set will have similar impacts to those reported in the data set.

6.6.2 Precision related meta-data for ILCD data sets

Table 6 describes the meta-data fields in ILCD format that are precision related.

Table 6 — Precision related fields used in ILCD format

Field name	Requirement	Compliance Requirement Type	Definition
Mean amount	Optional	Optional	Mean amount of the LCIA result of the inventory, calculated for this LCIA method. Only significant digits should be stated
Uncertainty distribution type	Optional	Optional	Defines the kind of uncertainty distribution that is valid for this particular object or parameter. Types: undefined, log-normal, normal, triangular, uniform.
Relative StdDev in %	Optional	Optional	The resulting overall uncertainty of the calculated variable value considering uncertainty of measurements, modelling, appropriateness etc.
Comment	Optional	Optional	General comment on this specific LCIA result, e.g. commenting on the correspondence of the inputs and outputs with the applied LCIA method etc.
NOTE 1 “Requirement”: This column identifies which fields are to be filled in to have an ILCD format schema valid data set or an appropriately documented “ILCD documentation-compliant” data set. Some fields are optional.			
NOTE 2 EN 15942 provides requirements for the significant digits to be reported in an EPD.			

6.7 Aspect of Completeness

6.7.1 General

Completeness in the context of data quality describes whether information given for the unit process under study is sufficient for reaching conclusions in accordance with the goal and scope definition of the LCA study.

In order to assess the environmental impacts of a given unit process, a totally complete data set would ideally consider all inputs and outputs during the inventory of data. At the inventory stage it is difficult to estimate the influence of any specific input or output. While the completeness of the inventory is the