

Programme operator
The Building Information Foundation RTS sr
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The Finnish RTS EPD programme Appendix A - verification of EPD-tools



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Guideline, Appendix A of the RTS EPD Environmental Product Declaration Programme in Finland

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1 RTS EPD program and purpose of Appendix A

RTS EPDs help building contractors, constructors and designers to better understand environmental issues related to construction products and materials. Environmental impacts of a product during its life cycle have become relevant information to assess environmental performance of a building or other construction works. Therefore, access to the data should be as simple as possible.

EPD-tools will provide manufacturers to show environmental impacts and flows and to create environmentally better products to meet increasing requirements placed for the products.

The verification of EPD-tools differs from the verification of independent EPD's. The appendix A specifies the differences and requirements for verification of an EPD-tool, SAMPLE-EPDs' and RTS EPDs' created using an EPD-tool. The LCA-report/PRE-EPD shall contain all relevant product and production information in suitable form (e.g. data sheet programme, machine readable) to be easily added to the EPD-database and later use e.g in building information modelling.

1.1 Relevant bodies

All relevant bodies related to EPD-tool verification process are mentioned in the list below:

RELEVANT BODIES IN THE PROCESS

EPD Owner: company manufacturing the product and owning the EPD,

Independent Verifier: external, approved by the PT18 RT EPD. Can verify both the EPD-tool and compiled EPDs.

Appointed data controller (ADC): internal/external set, control and mapping of BoM/recipe/data. Can be EPD-tool user as well.

Appointed EPD-tool users: specified by the company (nimetty käyttäjä)

PT18 RT EPD Principal Committee: Approval of verifiers

PT18 RT EPD work group: Approval of EPD tools and EPDs

The Building Information Foundation RTS: registering and publishing of RTS EPD's

1.2 Terminology

Several different EPD-formats are mentioned in the Guideline and therefore explained in the following list:

EPD FORMATS

RTS EPD: verified EPD accepted by the PT18 work group and published by the Building Information Foundation RTS sr.

PRE-EPD: printed LCA-information directly from the tool in the form of an EPD. Will be used in simplified verification process only and verified as RTS EPD.

SAMPLE-EPD: Will be used for EPD-tool verification. The information gathered from the EPD-tool representing output of the EPD-tool.

REFERENCE-EPD: Will be used for *SAMPLE-EPD* verification. Verifiers inspection calculations of EPD-information calculated with well-known reference method.

2 Creating an EPD-tool

Life cycle assessment tools for EPDs allows simplified process to create basic environmental information of construction products at best. Several things shall be taken into account before creating and using the tool.

2.1 Things to be considered by the manufacturer

Tasks for the manufacturer before creating the tool and implementing it to the manufacturing process. The manufacturer shall develop:

- a. a generic LCA report sheet
- b. a generic EPD template according to the RTS EPD sample
- c. a user guideline for choosing an LCA database (acceptable background LCA-tools are listed in the RTS PCR)
- d. define internal functions with defined responsibilities and competence requirements in the EPD developing process. The process owner shall be named, and a flow chart drawn and established.
- e. If knowledge is outsourced, (such as LCA background database) a support agreement is also required
- f. and implement a log book

The continuous improvement is a necessary procedure and therefore the *manufacturer, LCA-experts or ADC* shall be committed to the actions presented:

- g. Calculate an LCA
- h. Produce the EPD and perform a control of each PRE-EPD and make updates if required
- i. make updates to the database and guidelines if required or needed
- j. maintain, improve and perform the log book (preferably printed from the tool when needed)
- k. train personnel and keep the log book
- l. perform an external review of the changes in the tool

2.2 Content of the tool

The RTS EPDs comprised with an EPD-tool are verified. The PT18 RT EPD will accept EPD-tools and with this option the Building Information Foundation RTS sr will establish process to reduce the amount of work in collecting data, performing LCAs and creating RTS EPDs for similar product types. When creating a new EPD-tool, the purpose and target product groups of the tool shall be determined in detail.

The EPD-tool cannot be created for wide product groups, the products shall be classified in the same group with similar ingredients. If the tool is suitable for different product groups, the details concerning specific products shall be demerged and kept separately. The EPD-tool shall be created in such a way that product information in different product groups cannot be mixed together.

The EPD-tool can be developed by a single company or by several companies like industry organisations. EPD-tools that will be used by several companies will lead to comparable EPDs that reduce the possible systematic error in EPD-tools used only by one company. It is important for both the company comprising RTS EPDs and for the Building Information Foundation RTS to emphasize that RTS EPDs created using EPD-tools shall have the same quality as EPDs created without EPD-tools.

The quality of the EPD-tools and process will be checked continuously by ADC and verified every three years by approved verifier. SAMPLE-EPDs verification will be carried out every three year in connection with verification of the EPD-tool. The quality of the EPDs will be ensured by verifying every EPD compiled in the EPD-tool. The verification process of single EPDs has been simplified and does not cover all parameters verified at the first time.

The EPD-tool can use *background information* e.g. ready-made and approved LCA databanks mentioned in the RTS PCR and below:

EXAMPLES OF
ACCEPTABLE
GENERIC DATA
BANKS

European Reference Life Cycle Database (ELCD)
(<http://lca.jrc.ec.europa.eu/lcainfohub/dataset2.vm?id=85>)

GaBi (<http://www.gabi-software.com/databases/gabi-databases/>)

ecoinvent database (www.ecoinvent.ch)

In addition, *foreground information* e.g. bill of material (BoM) and production processes including all input flows for single products and components shall be specified in the EPD-tool in details.

DEFINITION OF BoM	Bill of material (BoM) is an extensive list and inventory of raw materials, components, assemblies and the quantities of each required to construct or manufacture a product.
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2.3 Product information and data in the EPD-tool

The specific data for core process (foreground information) and background information will be gathered from the LCA-tools. An EPD-tool can be a combination tool with background LCA information (Generic Databank) and LCA information from the production of the company (foreground information).

With the tool it is possible to create a full LCA report of the product as PRE-EPD to be later published as verified RTS EPD. The foreground information shall cover all upstream data in the direction from the company to the EPD-tool needed for LCA-information of the products or development projects.

UPSTREAM DATA	is the data inputted and sourced in the direction from the client to the server
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the data is developed and maintained as open-source software, it can be owned or associated with the original developers of the given software

The information for the RTS EPD will be sourced from the EPD-tool. The tool shall include a Bill of Material in details (raw materials, energy and process). The cross-reference work shall be documented and reviewed by the ADC and verifier. List of changes should be printed as a log-book directly from the EPD-tool when needed. Verifier will need the information when verifying EPD's printed from the EPD-tool. The other relevant document is *SAMPLE-EPD*, which will be RTS EPD afterwards in the verification process if it will be accepted by the verifier. The *SAMPLE-EPD* should be printed directly from the tool. The verifier shall create *REFERENCE-EPD*, which will contain same information as *SAMPLE-EPD* printed from the tool but calculated without the tool. With this method will be checked that the tool output is correct.

2.4 Internal control made by appointed data controller (ADC)

Appointed data controller (ADC) shall have production and process knowledge of relevant field and may be either internal or external and can be the same person as EPD-tool user as well. If the ADC is internal, the ADC has been nominated by the company and owner of the tool. Otherwise, external ADC has been approved to use the tool by the owner.

An ADC has an important role in background/foreground data input and BoM gathering, checking and controlling. The ADC is not a verifier but can follow in internal EPD control verifiers checklist accepted by the Building Information

Foundation RTS sr (in appendix). All compiled EPDs shall be verified by the accepted verifier before sending the EPD to the RTS to be published as RTS EPDs.

Following information shall be checked in every point by the ADC, the checking shall be made also after every change in the tool:

1. Layout and text
 - Includes name of product (preferably brand name) and descriptive text (relevant, but not selling)
 - PCR number
 - organization number for the manufacturer
 - ISO-certification
 - flow charts
 - functional unit
 - names of developers
 - name of ADS
2. Input and output data
 - Modules A1- D
 - correspondence to declared/Functional Unit
 - Inputs and outputs from the manufacturing processes (e.g. energy use, waste, emissions)
 - Reference flows shall be mapped to production processes. If it is not possible to avoid allocation between co-products, the rules and methods in the applied PCR shall be followed.
 - Raw materials (BoM)
 - actual amounts of raw materials
 - Transport – transportation type, distance
 - raw materials
 - products
3. Other relevant information depends on the type of EPD and the EPD-tool
 - technical information
 - scenario (A4-D)

2.4.1 Internal control process and required documents

Internal control process performed by the ADC is for information gathering purposes to find out possible gaps in the information needed in the verification process. The verifier will check the details in the verification process.

Internal control process

1. The ADC shall collect all relevant data in an Excel-sheet or similar tool and sort it by year (preferably directly from the EPD-tool). The production volume for the same year shall be summarized in the same sheet.
2. List of the names who have put the data in, date and source of information.
3. All the data from the production site shall be collected:

- a. energy use by energy source
 - b. waste production by type of waste.
 - c. emissions to air, water and soil
4. All possible allocations shall be justified in the overview.
 - a. detailed information of the context
5. All information on transportation of raw materials to production site shall be collected.

ADC shall use a checklist and check that

- a. the data in the tool is corresponding to the data in the excel-sheet
- b. the calculations in the sheet are correct
- c. the source of data is correct
- d. all relevant text is in the EPD and that it is correct

3 Verification procedure

All process parties have responsibilities for data collection or control, verification or publishing. The verifier shall verify both the EPD-tool, SAMPLE-EPD's and RTS EPDs. Reverification of the EPD-tool and SAMPLE- EPDs is every three years.

After verifying the tool and SAMPLE-EPDs' every RTS EPD compiled using the EPD-tool shall be verified by *simplified verification procedure*. The verification process can be performed by the same person verified the tool and SAMPLE-EPDs, but not necessarily. The verifier should add following information to all reviewed documents and appendix:

- verifiers name and company
- date and time
- accordance with relevant standards
- review is external

3.1 Verification of the EPD-tool and SAMPLE-EPD's

Accepted background LCA-tools are mentioned in the RTS PCR, there is no need for a separate verification process for generic databanks. The generic LCA-background tool data will be verified at the same time with the EPD tool. RTS do not require separate verification process to LCA-background tools, all tools mentioned in the "RTS PCR protocol: EPDs published by the Building Information Foundation RTS sr" will be accepted.

When verifying the EPD-tool for the first time, both the tool and SAMPLE-EPDs' (three different kind, extremities included) will be verified.

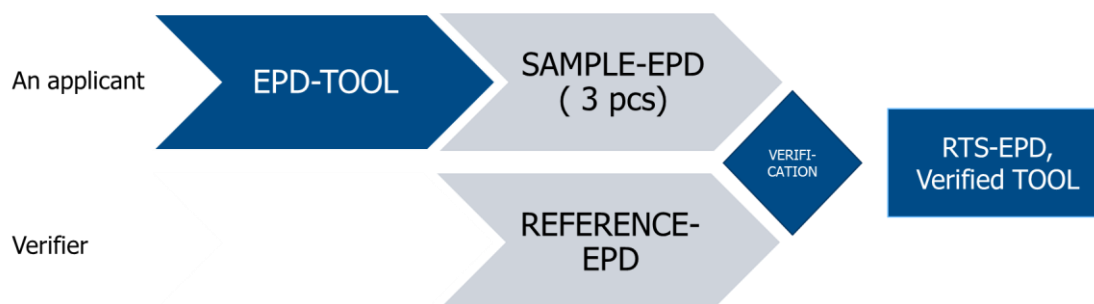


Figure 1 Verification process of an EPD-tool and SAMPLE-EPDs

The background LCA-tool shall be verified with the foreground LCA-tool and the combination (Background LCA and foreground LCA databanks) is valid for three years. Reverification is after three years.

If the EPD-tool have changed remarkable within three years, new verification process shall be instituted. The company shall establish a log book to trace all changes in the LCA data tools. The log book is part of the verification process and approved by the verifier. Verification and reverification processes are the same.

3.1.1 Verifiers tasks before tool verification

The verifier shall follow the changes in standards and calculation rules. If the calculation methods will change remarkable, the EPD-tool shall be modified and reverified. Therefore, these instructions are relevant also in reverification process. The verifier should get acquainted with the tool and its characters and check following things before starting the verification process:

1. Does the EPD-tool meet the requirements set for the tools?
2. Does the EPD-tool meet the requirements set for the products and processes?
3. Is it possible to track changes in the tool and print/get a log book of the changes with relevant information?
4. Does the printed EPD fulfil all the requirements of the RTS?
5. Does the LCA-report/SAMPLE-EPD contain all relevant product and production information in suitable form (e.g. data sheet programme, machine readable) to be included in the database?

3.1.2 Verification of the tool

The verification process starts when the verifier is convinced that the tool is suitable for the products and meet the requirements set for the tool. The verifier needs a checklist to complete the verification process.

The verifier shall create *REFERENCE-EPD*, which will contain same information as *SAMPLE-EPD* printed from the tool but calculated with another well-known tool or method. With this method will be checked that the tool output is correct.

1. The verifier shall take care that the verification checklist is mentioned for the tool
 - a. the verifier shall fulfil and mark every aberration to the checklist
2. The verifier shall check that possible modifications have been made correctly in product and production level
 - a. e.g electricity change for renewable energy?
3. The verifier shall create and maintain a dialog between tool user, ADC and verifier.
 - a. The applicant will need the report when applying approval for the EPD-tool.
4. When all details have been reviewed, the verifier should be able to print an LCA-report and SAMPLE-EPD.
 - a. three different kind (extremities) of SAMPLE-EPDs shall be printed out from the tool
5. The verifier will check that the SAMPLE-EPD and REFERENCE-EPD information do not differ remarkable
 - a. if the LCA information differs a lot, the verifier shall inform EPD-tool owner, ADC and tool user of the differences to be corrected before continuing the verification.
 - b. if the details are correct, the SAMPLE-EPD's will be verified

3.1.3 Verification of the SAMPLE-EPD

SAMPLE-EPD verification process is similar with the verification process of EPDs compiled without EPD-tool. The process is described in the RTS Guidance and RTS PCR. The verifier verifying SAMPLE-EPDs shall be the same person verifying the EPD-tool. **The SAMPLE-EPD verification should be made in connection to tool verification with no delay.**

When the verifier has printed SAMPLE-EPD from the tool, it shall be verified as RTS-EPD. The verifier needs a checklist to complete the verification process.

1. The verifier shall take care that the verification checklist is mentioned for the SAMPLE-EPD
 - a. the verifier shall fulfil and mark every aberration to the checklist
2. The verifier shall check that possible modifications have been made correctly in product and production level
 - a. e.g electricity change for renewable energy, used energy volume shall be checked
3. The verifier shall create and maintain a dialog between tool user, ADC and verifier.
 - a. The applicant will need a completed report when applying approval for the SAMPLE-EPDs printed from the tool.
4. When the SAMPLE-EPDs have been verified, the applications and appendix can be sent to the RTS.

3.2 Simplified verification process of an PRE-EPD printed from the tool

In the RTS EPD Guideline has been mentioned that calculations made for all EPDs' shall be impartial and objective evaluation of manufacturing process. Therefore, it is crucial to follow in house control plan, guidelines and instructions for use to ensure quality of bill of material, recipes and changes in the product development processes. All aberrations shall be documented and maintained in a log book.

There is advantage for the verifier, if the verifier has got acquainted with the tool and its characters before starting the simplified verification process. The verification process can be performed by the same person verified the tool and SAMPLE-EPDs, but not necessarily.

3.2.1 Verifiers tasks in the simplified verification process for PRE-EPDs'

The verifier shall use the checklist for the verification process of PRE-EPDs'. The checklist differs from the SAMPLE-EPD and tool verification checklist and concentrate on the modified details. PRE-EPD verification process can start after verifying the tool and SAMPLE-EPDs' for the first time.

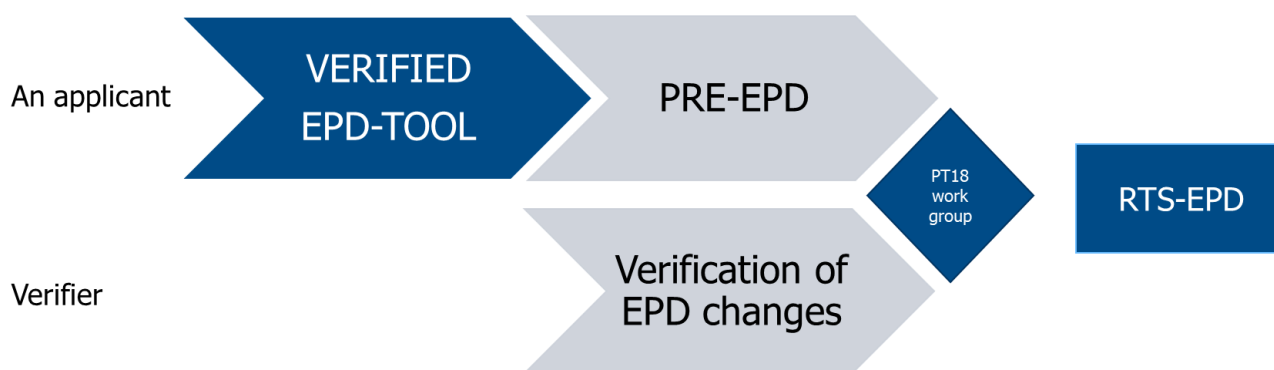


Figure 2 Simplified verification process of an EPD printed from the EPD-tool

The verifier should check basic information and modified information using the log book as a map of all changes.

The verifier needs a checklist to complete the verification process.

1. The verifier shall take care that the verification checklist is mentioned for the PRE-EPDs printed out from the EPD-tool
 - a. the verifier shall fulfil and mark every aberration to the checklist
2. The verifier shall check that the log book contains all relevant information
 - a. the log book is essential document in simplified verification process
3. The verifier shall concentrate only on modified details
 - a. verifier shall use initial data for comparisons
4. The verifier shall check that possible modifications have been made correctly in product and production level

- a. e.g electricity change for renewable energy, used energy source and volume shall be checked
5. The verifier shall create and maintain a dialog between tool user, ADC and verifier.
 - a. The applicant will need the completed report when applying approval for the PRE-EPDs printed from the tool.
6. When the PRE-EPD has been verified, the application and appendix can be sent to the RTS.

4 Applying process and sample review without notice

Third party verification of customized EPD-tools, SAMPLE-EPDs and PRE-EPDs can be performed only by the verifier approved by The Building Information Foundation RTS sr.

After producing all relevant information needed for EPD, the manufacturer shall inform RTS and fulfill the application form, send it with signature and appendix to the Building Information Foundation RTS sr to be published as an RTS EPD. The publishing process has been described in the RTS EPD Guideline and on the web pages epd.rts.fi.

In addition, The Building Information Foundation can perform a sample review concerning the EPD-tool at any time without any specific reason. After review, the EPD-tool user will get the review report that may require action.

4.1 Information to be gathered before applying approval for the EPD-tool

The competence of tool users shall be maintained by providing training related to the features and content of the tool. The Building Information Foundation RTS sr will require before approving the tool that following activities shall be completed and documented:

- 1) A generic LCA report shall be prepared for the data that is entered in the tool.
- 2) Verification of an EPD-tool and SAMPLE-EPD shall be carried out by an approved verifier.
- 3) The verifier shall complete and sign the verification checklist made especially for the tool, data in it and SAMPLE-EPDs'. (Verification shall be made according to ISO 14025, 8.1.3 of LCI data used in EPD generators)
- 4) The fixed background LCA data for use with the EPD tool must be qualified regarding the PCR requirements, age of data and system boundaries. The name of the product specific PCR and RTS PCR shall be mentioned
- 5) Detailed instructions for use shall be prepared for tool users, ADC and sent to the verifier and the RTS.

- 6) The EPD-tool owner shall create, maintain and fulfil a log book, the book shall be sent to the verifier and RTS.

5 List of relevant documents

Relevant documents for the verifier before verification process

1. Relevant standards (EN 15804, ISO 14025 (8.1.3))
2. Product specific PCRs
3. RTS PCR
4. RTS Guidance
5. Manual and instructions for use of the customized EPD-tool

Relevant documents to be used/printed in the verification process

1. A log book
2. A dialog between verifier, tool user and ADC
3. Checklist for customized EPD tool/PRE-EPD/SAMPLE-EPD
4. an LCA-report
5. PRE-EPD
6. SAMPLE-EPD
7. review report

6 Appendix

1. Verifiers checklist for EPD-tool
2. Verifiers checklist for SAMPLE-EPD
3. Verifiers checklist for PRE-EPDs printed from the EPD-tool