Abstract

There are a lot of different ways of presenting environmental information. The Building Information Foundation RTS sr launched a national EPD-program in 2016. The Information gathered from the Environmental Product Declaration (EPD) is verified by a third party and therefore neutral and reliable. Environmental performance of construction products is compiled according to the standard EN 15804:2012 + A1:2013 and with a methodology processed in the committee PT18 RT EPD’s. The name of the publication is "Methodology (PCR) for compiling environmental declarations for building products: EPD’s published by The Building Information Foundation RTS (2016)".

The EPD’s are created in Finland by the Principal Committee PT18 of The Building Information Foundation RTS. A newly opened Internet pages epd.rts.fi provides all relevant information concerning declarations, application procedure and also list of new RTS-environmental declarations. A work group of the Committee PT18 will audit and approve/reject the applications. The Building Information Foundation RTS will apply for the membership of The ECO Platform during the year 2016.

The eco-profiles and other environmental aspects provide input data for the assessment of environmental impacts of the buildings. The purpose of the declarations is to provide environmental information of construction products in a standardized and transparent way. The EN-standardized method developed by CEN/TC350 is utilized in other European countries as well by different EPD-programs. The purpose of the ECO Platform is to aim for equivalent application of EN 15804:2012 + A1:2013 across Europe on voluntary basis.

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1. A background behind EPD’s

In our society, a major part of environmental impacts of construction sector is still coming from operation of buildings over their service life. But according to the sustainable construction the life cycle approach needs to be applied. This is important, because focusing only on the use stage can easily cause sub-optimization especially from the ecological quality point of view as the raw material acquisition, production and end-of-life processes have their own environmental burdens. Lifecycle planning is today a necessity in building construction. The information gathered in the environmental declarations is required for different calculation programs and comparisons. The European Union adopted the Construction Product Directive (CPD) already in 1988 and its successor Construction Products Regulation (CPR) in 2011. CPR defines the so-called Basic Works Requirements (BWR) and the new BWR7 “Sustainable use of natural resources” requires the life cycle approach to be applied. In the recitals of the CPR there is a special text referring to EPD that is stating “For the assessment of the sustainable use of resources and of the impact of construction works on the environment Environmental Product Declarations should be used when available.”

2. What is an environmental declaration of building products?

The activity began in 1998 when the Building Information Foundation RTS carried out a project that involved 26 companies. The companies compiled the first declarations. Later, the matter was pursued in the EKA project coordinated by the Confederation of Finnish Construction Industries RT in 2002–2004. After that the new methodology was published in April 2016 based on the new standard EN 15804:2012 + A1:2013.

Energy use, emissions into the air and water, and the use of natural resources are among the topics reported on in the declarations. A building is a project-specific whole by nature, and it consists of building and building service products manufactured by many branches of industry. Therefore as mentioned in the updated standard EN 15804:2012 + A1:2013, the EPD can be product specific or made for product groups, it can be compiled by one company or many companies from the same industry.

The eco-profiles and other environmental aspects assessed according to the standards aim to provide initial data for the assessment of the environmental impacts of the buildings. The impact assessment based on the eco-profiles of building products and components must be performed as part of the impact assessment of the whole building. The eco-profiles of building components can be gathered from the eco-profiles and other environmental aspects of building products when the consumption of the products is recognized in the building components. Consumption of the products should always include the loss during the construction phase.

3. Special characters of the RTS EPD

Lifecycle planning has become a necessity in construction, the major environmental impacts come from the production and operation of buildings. Building materials can contribute a substantial load on the environment. The information gathered in the environmental declarations is required for different calculation programs and comparisons. RTS EPD is a reliable and unbiased source of environmental information. The comparison of information gathered from the EPD’s should be made on the construction level. In order to make comparisons, there have to be a lot of verified EPD’s. The reference in comparisons of alternative building components should be the functional unit of the end product or building. However, the assessment of the whole building is not obligatory unless essential with respect to the choices. The aim of the declarations is to promote the use of products that burden environment less than other similar products.

An environmental declaration of a building product describes part of the ecological footprint of the product in a standardized way, which makes it possible to assess the environmental performance of the material parts of the building, which in turn enables assessment on higher levels i.e. the process, the buildings etc. In the EPD’s environmental impacts are itemized under purchase of raw materials and production. Those impacts include, e.g., use of energy, emissions into the air and water and use of natural resources.

The RTS EPD is based on the national methodology following the basic principles stated in the standard EN 15804:2012 + A1:2013. There are three obligatory stages in the standard, A1 to A3. In addition to the standard,
there are more obligatory stages added in the RTS PCR. Added obligatory stages are A4, C1, C2, C3, C4 and D. The reason for the additional requirements is basically enabling the contents of the EPD to be wider and consequently to have more data available for the building level assessments from the manufacturers as added value.

Modules A1–A3 (Acquisition of raw materials, Transport to manufacturing site, Manufacturing) are mandatory under EN 15804:2012 + A1:2013. Furthermore, as per the protocol (RTS PCR), RTS EPDs must include modules A4, C1, C2, C3, C4 and D in accordance with the following provisions:

- Module C3 (Environmental impacts of waste processing): Mandatory if carbon dioxide uptake has been taken into account in section A1. Section A1 shall also specify whether carbon dioxide uptake has been taken into account as i.e. removal of carbon dioxide from the atmosphere as “negative emissions”.
- Module A4 (Transport to construction site): The environmental impacts must be declared if their GWP (global warming potential) is over 20% of the GWP of modules A1–A3.
- Module D (Reuse, recovery, recycling): If module D shows the benefits, the declaration must specify the scenarios that meet the requirements of the standard. If no scenario is specified, the value in module D must be (0).
- Module C (Deconstruction, Transport during end-of-life stage, Waste processing and Disposal): If module D shows the benefits of material recycling or the impacts of other material recovery (net substitution effects from using the material for the next application), the essential parts of modules C1–C4 that cause environmental impacts must be included:
  - Module C1 (Deconstruction) related technical implementation (scenario)
  - Module C2 (Transport during end-of-life stage)
  - Module C3 (Waste processing) environmental impacts
  - Module C4 (Disposal) environmental impacts


The compiler of the EPD should make specific scenarios for deconstruction and waste processing in order to facilitate recyclability of materials according to existing technology and market demand. Waste flows that are reaching the “end-of-waste” state can be treated as recyclable materials in accordance with EN 15804:2012 + A1:2013. The allocation procedure is necessary when calculating the data of module D. The substitution effects are defined according to the formula below (Formula 1). The share of virgin raw material is 1 – R1. The formula takes into account waste generation, use of resources and net emissions avoided by material recycling. Furthermore, the formula takes into account the quality ratio between replacement material and virgin material and reduces the recovered material already used by the product system, i.e. the net benefits. The share of virgin raw material is 1 – R1. The calculations shall be demonstrated in the background information made for the verification of RTS EPD.

\[
(R_2 - R_1) \times \left( E_{\text{recycled}} - E^* V \times \frac{Q_S}{Q_P} \right)
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(1)

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5. RTS EPD is a third party verified environmental product declaration

After compiling the content for EPD’s the EPD is verified by the accepted third party verifier. Verification is an extremely important and challenging part of the quality assurance process for EPDs. As referred to in the standard, the aim of the verification process is to verify that all declared information is correct and that all of the requirements set for the declaration have been met. All declarations verified by a third party have been checked and proved to be a reliable source of environmental information.

The verifier cannot be the same person as the company that made the calculations. The company is responsible for the information provided. The designated verifiers are approved in advance by the Committee PT 18, a list of approved verifiers is published on RTS EPD’s website epd.rts.fi. The verifier has to be a specialist in construction engineering and in assessment of environmental impacts as well as have a wide experience on related standards and knowledge of RTS PCR. The purpose of verification and the assessment of the task group are to confirm that the environmental declarations are uniform and comparable basic data for the life cycle assessment of buildings.

The calculations can be performed by the company or a designated expert. The calculations and other information have to be verified by authorized verifier. The background document made for the EPD is only for the verifier and compiler. The task group can ask more information, if there is unclear information mentioned in the EPD the company has sent to RTS for certification. All relevant documents are handled confidentially by RTS.

6. All the relevant information can be gathered from the web pages and RTS PCR

The Finnish system is organized by the Building Information Foundation RTS sr. It is supported by RTS’s website where all relevant information about the system and the application procedure can be found. The system is transparent and based on the methodology document, Methodology (PCR) for compiling environmental declarations for building products: RTS EPD’s published by The Building Information Foundation RTS sr (2016) which is public. The Committee PT18 RT EPD is responsible for maintaining and updating the Methodology Document (RTS PCR).

The Environmental Declarations are granted by RTS. RTS is a private, not-for-profit foundation whose task is to foster both good planning and building methods and good property management practices. The foundation and its activities represent the entire building and construction industry through 52 associations and organisations. RTS is the main information provider of the Finnish construction industries. RTS runs continuously 30-50 Principal and Working Commissions and Committees Task Groups that support and supervise production of new information and publication activities. A company that has been granted a RTS EPD has the right to mark the product with the RTS EPD logo and to use the logo for marketing purposes. The Building Information Foundation RTS sr monitors the use of the logo.

![Fig. 1. a RTS EPD-logo](image)
The members of the principal committee PT18 represent the highest expertise as well as all parties concerned by the system. The members are appointed by RTS Director General. Its task is to monitor and develop the methodology as well as the system. PT18 task group is the body within RTS that grants the RTS EPD’s. A declaration is granted for five years depending on the time for verification document. If the composition and method of manufacturing the product have not changed, the declaration can be renewed by application without LCI calculations. Both new and continuation applications will always be examined in accordance with the current methodology.

The RTS EPD is a voluntary and public document providing comparable and impartial information on the environmental impacts of building materials. It is a source of information for users, designers and constructors.

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References