



## Environmental Product Declarations (EPD): Comparability A Technical Review

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**EPD are a type of environmental label which provide quantitative information about the environmental impacts associated with making and using a construction product, then managing it after use. EPD are produced according to set rules, using a standardised life cycle assessment (LCA) methodology and reporting format.**

**This Briefing Paper provides guidance on how to check the comparability of different EPD for the same product. It should be read in conjunction with the [Briefing Paper: Environmental Product Declarations: Uncertainty](#), which describes the types of uncertainty and variability that can affect EPD results.**

### Comparing EPD

The standard [ISO 14025:2006](#) contains a list of conditions to be met for two or more EPD to be considered comparable. In summary, these are:

- a) identical product category definition and description; identical functional unit; identical cut-off rules
- b) equivalence of system boundaries, data descriptions and data quality requirements (coverage, precision, completeness, representativeness) [the achieved data quality is also very significant]
- c) equivalence of methods for both data collection and allocation of material and energy flows and releases
- d) identical selection and calculation rules for environmental impact categories, with identical inventory data categories and impact category indicators
- e) equivalence of instructions for producing the data required to create the EPD and on its content and format
- f) equivalence of requirements regarding non-LCA information such as product content or additional environmental information
- g) equivalence of validity period

- h) for EPD based on information modules (as is the case for construction product EPD which have an AI-D modular structure in both EN 15804 and ISO 21930), *“either the environmental impacts of omitted life cycle stages of the products shall not be significant, or the data of omitted life cycle stages shall be identical within the accepted uncertainty of the data”*

This list constitutes a stringent set of criteria.

The standards for developing EPD for construction products - [EN 15804](#) and [ISO 21930](#) - and programme operators' rules, seek to address some of them - such as product category definitions, the use of declared units, cut-off rules and validity periods. Some others – notably point *f* - might be considered as relevant to only part of the information in EPD. Nevertheless, a number of points remain for users to check before concluding that two EPD (or indicator values taken from them) are indeed comparable.

### Comparing EPD according to the standard EN 15804

[EN 15804](#) emphasises that any comparison of products using EPD *“shall be based on the product’s use in and its impacts on the building, and shall consider the complete life cycle (i.e. all information modules)”*.

However, it also says that comparisons can be undertaken at the sub-building level for one of more life cycle stages, as long as:

- the required functionality (by the client and/or legislation) is met;
- the performance of anything excluded from the comparison is the same;
- the amounts of any material excluded are the same;
- excluded processes, modules or life cycle stages are the same;
- the influence of the products on the building are considered; and
- biogenic carbon, carbonation and other inherent aspects have been considered in the same way.

It also allows that if scenarios in one or both EPD are missing or inappropriate, then they should be generated based on the specific building conditions to undertake the comparison.

#### **Example – comparing concrete blocks using EPD**

**Required functionality:** Although [ISO 14025](#) requires that the functional unit is identical for any comparison of EPD, EPD to [EN 15804](#) can use a declared unit rather than a functional unit. EN 15804 just requires that the functionality required by the client and/or legislation is met to undertake a comparison. This means that the functionality doesn't have to be the same – for example two concrete blocks could have different acoustic and thermal performance, but if they are only required to provide a load-bearing wall, their acoustic and thermal functionality is not relevant to the comparison. Similarly, the structural performance of the blocks does not have to be identical, so long as they can carry the required load needed by the client and according to relevant regulations.

**Functional unit for comparison and the performance of excluded aspects:** In this instance, the comparison should be made on the basis of 1 m<sup>2</sup> of blockwork that can carry a given load. The rest of the building can be excluded from the assessment because its performance will be the same whichever type of block is used. EPD for blocks may use declared units such as m<sup>3</sup>, m<sup>2</sup> or kg. A calculation will need to be made to assess the amount of each block needed to produce 1 m<sup>2</sup> of blockwork and the results for the declared unit of each EPD will need to be adjusted accordingly.

**Quantities of excluded materials and components:** If the blocks are all solid and the same size, then the amount of mortar required to bond them would be identical for all the blocks, so could be ignored in the comparison. However, if one of the blocks can be used with a thin joint mortar, or the blocks are different sizes so require different amounts of mortar per m<sup>2</sup>, then the relevant quantities of both block and mortar in 1 m<sup>2</sup> of blockwork for each of the systems need to be considered in the comparison.

**Excluded life cycle stages and modules:** If the blocks and mortar weigh the same, are made of similar materials and can all be recovered in the same way at end of life, then the impact of the end of life can be disregarded because it will be the same for all the systems. However, assuming the blocks are manufactured in different locations, then the A4 stage will need to be considered in the assessment, using the distance from each factory to the chosen construction site. If the EPD provides results for A4, then these should be adapted to provide the impact for the relevant distance. If the EPD doesn't provide a scenario for A4, then the impact will have to be generated using generic data and assumptions<sup>1</sup>. If structural performance wasn't relevant and one of the blocks included wood chip, then the end of life of all the blocks would need to be considered in the comparison as the impacts in module C accounting for biogenic carbon would not be the same.

**Influence of the products on the building:** If the blocks were being used in an external wall, and the building needed to achieve compliance with Part L, then the thermal performance of the blocks would be relevant to the comparison. If the blockwork had different thicknesses or thermal conductivity for example, then the comparison would also need to account for the different amounts of thermal insulation for 1 m<sup>2</sup> needed to achieve Part L compliance for the comparison.

**Biogenic carbon, carbonation and other inherent aspects:** Some of the EPD may account for carbonation of the concrete in Modules A5, B1 and C3, others may not declare A5 and B1 or consider carbonation. It is important to ensure that this aspect is considered consistently in any comparison, using the same assumptions<sup>1</sup> to generate impacts of carbonation.

## What to look for when comparing EPD

Based on ISO 14025 and the further requirements of EN 15804, some key things to look for when setting out to compare EPD are listed below:

### **Identical functional / declared unit:**

Consider the functionality that is needed from the products (including how long you need them to stay functional in the building) and what would be the appropriate functional unit for any comparison. EPD do not always provide information about technical performance but this can be taken from manufacturer's data.

Any construction EPD should include a factor to convert a declared unit to mass if it isn't mass based. However, these conversion factors can be quite approximate (not every assembled product is made to a tight tolerance of its overall mass).

### **Identical selection and calculation rules for environmental impact categories:**

Look for the environmental categories, indicator names and units.

For example: the indicators used in EPD based on EN 15804+A1 and EN 15804+A2 are different in this respect: you can't compare acidification in +A1 EPD measured in kg SO<sub>2</sub>eq with acidification in +A2 EPD measured in kg H<sup>+</sup>eq for example.

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<sup>1</sup> The [RICS Professional Statement on Whole Life Carbon in the Built Environment, v2](#), provides guidance on sources of generic data and default assumptions to generate scenario data across the life cycle.

Regarding EPD based EN 15804+A2 and ISO 21930 EPD for the North American market, the former are calculated with the Environmental Footprint rules (EF 3.0 & EF 3.1 LCIA methods), the latter with the TRACI 2.1 rules: they are not comparable.

Even where EPD use the same indicator (for example GWP measured using kgCO<sub>2</sub>eq) there are differences between EN 15804+A1, EN 15804+A2 and ISO 21930 EPD using TRACI, due to the different versions of the [IPCC](#) global warming potentials used, particularly the impact of biogenic methane. In EPD which reported results using both +A1 and +A2 indicators, [Stapel et al. \(2022\)](#) found a roughly 3-5% increase in GWP impact, consistent with the increase in GWP factors for methane and carbon monoxide used for EN 15804+A2 compared to EN 15804+A1, but the recent revision of GWP for methane in the latest PEF v3.1 characterisation factors used for EN 15804+A2 EPD will have reduced this increase.

#### ***Equivalence of system boundaries, data descriptions, etc.:***

Look for the background database used. It will likely be a version of [GaBi](#) or of [ecoinvent](#). Different EPD produced using ecoinvent and GaBi are unlikely to be comparable without expert guidance.

For different EPD produced using different versions of ecoinvent or of GaBi, changes in the background database from one version to another may be a significant cause of any differences between indicator values found in EPD. Comparisons must allow for this possibility.

#### ***Differences in methodological approaches:***

There are a number of aspects where different EPD may use different approaches, for example:

- the use of Guarantee of Origin (GoO) for electricity and biogas
- the allocation approach for pre-consumer recycling, e.g. metals
- the allocation approach to low-value co-products such as blastfurnace slag
- the use of the mass balance chain of custody credit approach<sup>2</sup>.

These differences can be significant in terms of results, for example, if electricity is a significant source of energy in manufacturing, if products are made with pre-consumer scrap or low-value co-products or if they generate a significant amount of pre-consumer recycling, or if the mass balance credit approach has been used. If any of these is likely in a comparison, then great care should be taken to establish how the EPD has been modelled and whether the comparison is fair.

#### ***Data Quality:***

[CEN/TC 350](#), the Committee responsible for developing and revising the EN 15804 standard, has developed a new standard, [EN 15941:2024 Sustainability of construction works — Data quality for environmental assessment of products and construction work — Selection and use of data](#). It defines data quality requirements with respect to temporal, technological and geographical representativeness for the data used to calculate the indicator results in EPD and gives guidance to support the selection of the most appropriate data regarding data quality. It also addresses the reporting of data quality in EPD. It may take some time before EPD comply with EN 15941 but when they do, they will provide more information on the quality of data used to generate the EPD and more transparency, for example about the use of Guarantee of Origin (GoO) for electricity and biogas in EPD.

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<sup>2</sup> This is where a manufacturer uses, for example, 5% biobased content across all their production, but sells 5% of their production as having 100% biobased content.

## ECO Platform

[ECO Platform](#) is the association of EPD Programmes for construction products. It provides additional calculation rules to EN 15804 to try to increase consistency and transparency across EPD programmes. All ECO Platform member programmes have to follow the ECO Platform Rules and use a common approach to verification. This may still lead to differences (for example a few ECO Platform EPD programmes do not allow the use of Guarantee of Origin (GoO) for electricity or biogas, whilst most allow GoO but require the use of residual electricity mix if GoO have not been used) but newer EPD should at least be more transparent about the approaches taken.

## Using EPD Comparisons

Alignment between the elements discussed above is vital for robust comparisons of environmental performance based on EPD. In addition, the aspects covered by the related briefing paper **“Environmental Product Declarations: Uncertainty”** must be considered. Crucial points to keep in mind are that each indicator value quoted is a point in a range, and that the breadth of that range differs from product to product and indicator to indicator. On the one hand, the more the indicator values in individual EPD are driven by the module A3 (the EPD owner’s operations), the narrower the range of uncertainty. On the other hand, the more differences there are between compared elements and the associated EPD, the more different dimensions of uncertainty become relevant to the comparison, so the bigger the difference needed for any comparative conclusion to be robust.

### Further reading:

- [BS EN ISO 14025:2010 – Environmental labels and declarations – Type III environmental declarations – Principles and procedures](#)
- [BS EN 15804:2012+A2:2019. Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products](#)
- [ISO 21930:2017 – Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services](#)
- [EN 15941:2024 Sustainability of construction works — Data quality for environmental assessment of products and construction work — Selection and use of data](#)
- [RICS Professional Statement on Whole Life Carbon for the Built Environment](#)
- [Stapel et al. \(2022\). Environmental Product Declarations – an extensive collection of availability, EN15804 revision and the ILCD+EPD format. IOP Conf. Ser.: Earth Environ. Sci. 1078 012108.](#)
- [Herrmann and Moltesen, \(2015\). Does it matter which Life Cycle Assessment \(LCA\) tool you choose? - A comparative assessment of SimaPro and GaBi. Journal of Cleaner Production 86 163-169.](#)
- [ECO Platform Calculation Rules + ECO Platform Verification Guidelines](#)

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**V1 –August 2024**