Information Sheet:

# EFCA Model European Environmental Product Declarations

European Federation of Concrete Admixtures Associations

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The Voice of European Admixtures since 1984

## INTRODUCTION

In 2006, recognising that concrete producers and their customers needed reliable, quantitative information relating to the environmental impacts of construction materials, EFCA published generic EPD for a range of admixtures.

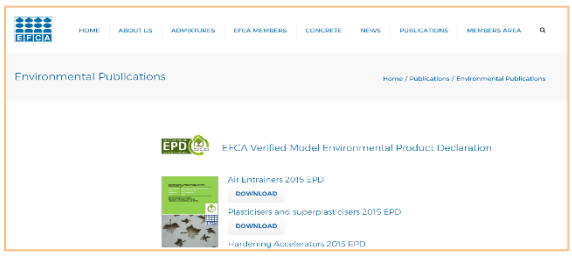
In 2012 a new harmonised European standard was published; *EN 15804 "Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products" [1]* which provided a common method for producing EPD.

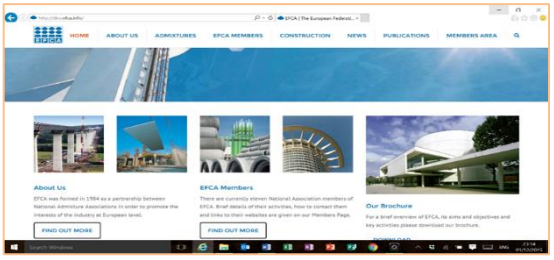
In 2015, working closely with its German national association member Deutsche Bauchemie, EFCA published six new Model EPD externally verified as in compliance with EN 15804 and ISO 14025 by the respected German Institute for the Building and Environment (IBU), a programme holder within the ECOPlatform ibu-epd.com/en/epd-program/published-epds/.
In 2016 these were also confirmed and adopted by the ECO Platform www.eco-platform.org/eco-epd-40.html

The Model EPD cover six concrete admixture categories in compliance with EN 934-2 [2]

- **AIR ENTRAINING ADMIXTURES**
- **HARDENING ACCELERATING ADMIXTURES**
- **PLASTICISING AND SUPERPLASTICISING ADMIXTURES**
- **RETARDING ADMIXTURES**
- **SET ACCELERATING ADMIXTURES**
- **WATER RESISTING ADMIXTURES**


They are available at www.efca.info/efca-publications/environmental/



## BACKGROUND – ENVIRONMENTAL DECLARATIONS

Environmental declarations can be of various 'Types' sometimes termed 'Eco-labels' which provide information about the environmental and sustainability performance of products. These may be self-declared by the producer (Type II to ISO 14021) or assessed as part of recognised schemes where the criteria are set by third parties (Type I to ISO 14024) such as the EC Eco-label, Nordic Swan and German Blue Angel.

Arguably the most useful and reliable form of environmental declaration is Type III which is covered by ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures. [3]

The aim of Type III environmental declarations is to provide reliable, credible and quantitative environmental impact information, based on **Life Cycle Assessment (LCA)** using recognised **Product Category Rules (PCR)** to convert the LCA data to quantitative impact values. Type III declarations must be independently verified as in compliance with the relevant PCR and ISO 14025.

EN 15804 provides the common core PCR for construction products which allows independent accredited assessors to verify that the EPD produced complies with the EN 15804 methodology and ISO 14025 principles and procedures.

## EFCA MODEL EPD

The basis of the EPD is life cycle assessment, in which all of the inputs to and outputs from the product are assessed for their environmental impact with regard to a number of agreed parameters. EN 15804 recognises several stages in the life of the construction product such as concrete which are:

- The product stage
- Construction process stage
- Use Stage
- End of life stage

These are further divided into modules which are shown in **Table 1.**

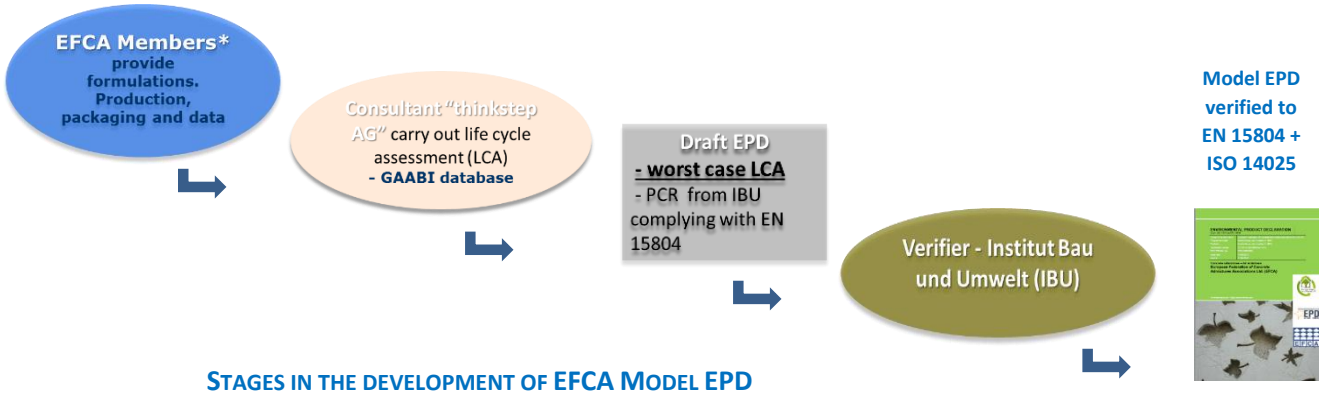
Additionally Module D is designed to consider any other benefits or impacts that can occur outside of the normal life cycle modules, for example for concrete this could (and should) include the benefits of carbonation of concrete in reducing atmospheric carbon dioxide, particularly after crushing and storage for recycling after demolition.

EN 15804 allows EPD to be produced which include a minimum of **modules A1-A3** with options to include the remaining modules. For admixtures, which are constituent materials of the final concrete products, the most appropriate are Modules A1-A3 since it is difficult to assess the admixture itself directly at the later stages as it has been fully incorporated into the concrete. This is commonly described as a **'Cradle to Gate'** EPD.

A **series of indicators** allows calculation of the environmental impacts of using the product across the life cycle stages shown in the EPD. Table 1 shows the range of indicators and their units. The values shown relate to 1kg of admixture and are extracted from the EPD for plasticisers and superplasticisers. These inputs could then be typically used as inputs to the calculation of LCA and EPD for concrete and mortar products based on the actual amounts used in the mix design.

To produce the LCA and EPD the consultant, Thinkstep analysed data relating to raw materials and production supplied by the manufacturers using Product Category Rules (PCR) established to be in compliance with EN 15804 by IBU[4].

This analysis and a confidential background report was submitted to IBU who independently verified that the EPD are in compliance with the PCR and structured in accordance with EN ISO 14025. This important verification process provides the user of the EPD with confidence that the declaration is a credible representation of the environmental implication of using the admixtures as described in the relevant European Standards.




**STAGES IN THE DEVELOPMENT OF EFCA MODEL EPD**

The term **"Model" EPD** is used to show that the results of the Life Cycle Assessment provided in each declaration have been selected from the product within each category that showed the highest environmental impact (i.e. a worst-case scenario). This method was chosen so that anyone wanting to use the EPD data for an analysis of concrete and mortar products could use the model data in the knowledge that they are adopting a conservative, safe value that represents this admixture type across the EFCA members.

## EFCA MEMBERS' DECLARATIONS

Admixture companies that are members of the 11 EFCA national associations can declare that the EFCA Model EPD and therefore the impact data included, apply to their branded products. To enable them to do this, a confidential guidance document has been produced which allows the supplier to assess, through a point scoring system, whether its admixture formulation is covered. Having done this the supplier can then declare to customers, that it meets the requirements for the EFCA EPD to be applicable to its products in the country of manufacture if the company is a member of the EFCA national association for that country.

It is important to note that, because the life cycle assessment data that underlies the EPD was provided only by EFCA member associations and their companies, the Model EPD cannot be applicable to any company not within the EFCA federation structure.

**References:**

[1] EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.
[2] EN 934-2:2009+A1:2012 Admixtures for concrete, mortar and grout – Part 2: Concrete admixtures – Definitions, requirements, conformity, marking and labelling.
[3] EN ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
[4] IBU Product Category Rules: Institut Bauen und Umwelt e.V., Berlin: Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. 2013/04 www.bau-umwelt.de

# Table 1 LCA Results from the Plasticisers and Superplasticisers EPD (EPD 2015)

## DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

| PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to site | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse- Recovery- Recycling- potential |
| **A1** | **A2** | **A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| X | X | X | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 kg plasticisers and superplasticisers

| Parameter | Unit | A1-A3 |
|---|---|---|
| Global warming potential | [kg $CO_2$-Eq.] | 1.88E+0 |
| Depletion potential of the stratospheric ozone layer | [kg CFC11-Eq.] | 2.30E-10 |
| Acidification potential of land and water | [kg $SO_2$-Eq.] | 2.92E-3 |
| Eutrophication potential | [kg $(PO_4)^{3-}$-Eq.] | 1.03E-3 |
| Formation potential of tropospheric ozone photochemical oxidants | [kg ethene-Eq.] | 3.12E-4 |
| Abiotic depletion potential for non-fossil resources | [kg Sb-Eq.] | 1.10E-6 |
| Abiotic depletion potential for fossil resources | [MJ] | 2.91E+1 |

## RESULTS OF THE LCA – RESOURCE USE: 1 kg plasticisers and superplasticisers

| Parameter | Unit | A1-A3 |
|---|---|---|
| Renewable primary energy as energy carrier | [MJ] | 1.51E+0 |
| Renewable primary energy resources as material utilization | [MJ] | 0.00 |
| | | |
| Total use of renewable primary energy resources | [MJ] | 1.51E+0 |
| Non-renewable primary energy as energy carrier | [MJ] | 2.66E+1 |
| Non-renewable primary energy as material utilization | [MJ] | 4.82E+0 |
| Total use of non-renewable primary energy resources | [MJ] | 3.14E+1 |
| Use of secondary material | [kg] | 0.00 |
| Use of renewable secondary fuels | [MJ] | 0.00 |
| Use of non-renewable secondary fuels | [MJ] | 0.00 |
| Use of net fresh water | [$m^3$] | 6.04E-3 |

## RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 kg plasticisers and superplasticisers

| Parameter | Unit | A1-A3 |
|---|---|---|
| Hazardous waste disposed | [kg] | 5.17E-6 |
| Non-hazardous waste disposed | [kg] | 2.56E-2 |
| Radioactive waste disposed | [kg] | 9.00E-4 |
| Components for re-use | [kg] | 0.00 |
| Materials for recycling | [kg] | 0.00 |
| Materials for energy recovery | [kg] | 0.00 |
| Exported electrical energy | [MJ] | 0.00 |
| Exported thermal energy | [MJ] | 0.00 |