aquatherm

ENVIRONMENTAL PRODUCT DECLARATION

Whitepaper -
How you can use sustainable products to reduce negative effects on our ecosystem

aquatherm

CONTENTS

What to **expect** __

COMBATING CLIMATE CHANGE WITH SUSTAINABLE PRODUCTS

Climate change is one of the greatest challenges of our time. Released CO_2 is the main problem: it enters the atmosphere and intensifies the greenhouse effect - the earth continues to heat up.

The steadily growing human demand for energy and the acidification of soils and waters are very topical issues. They all have an impact on the ecosystem - on plants, animals, and humans. Many organisations and companies have recognised that there is a need for action: Among other things, the United Nations has developed a roadmap for the future with „The 2030 Agenda for Sustainable Development“[1], which includes measures for climate protection.

The idea of sustainability has also arrived in the construction industry, which is responsible for 36 % of global energy consumption and 39 % of energy and process-related CO_2 emissions[2]. Sustainable products help to keep the impact on the environment as low as possible. But how do you know how sustainable a product is? Environmental Product Declarations provide answers to this question.

Source:

1 https://unric.org/en/united-nations-sustainable-development-goals/

2 https://globalabc.org/our-work/forging-regional-pathways-global-and-regional-roadmap

CREATING CLARITY

An Environmental Product Declaration (EPD) describes the environmental impact of a product or service on the environment. It records the consumption of resources and emissions over the entire life cycle of the product - from the extraction of raw materials to disposal - and quantifies and evaluates them. Thus, an Environmental Product Declaration offers the possibility to compare different products with each other. In the Environmental Product Declaration, the characteristics of a product are identified neutrally using internationally recognised standards.

A precise methodology according to ISO 14025 and EN 15804 is followed, and all values are checked by independent third parties regarding their completeness, plausibility, and conformity with standards.

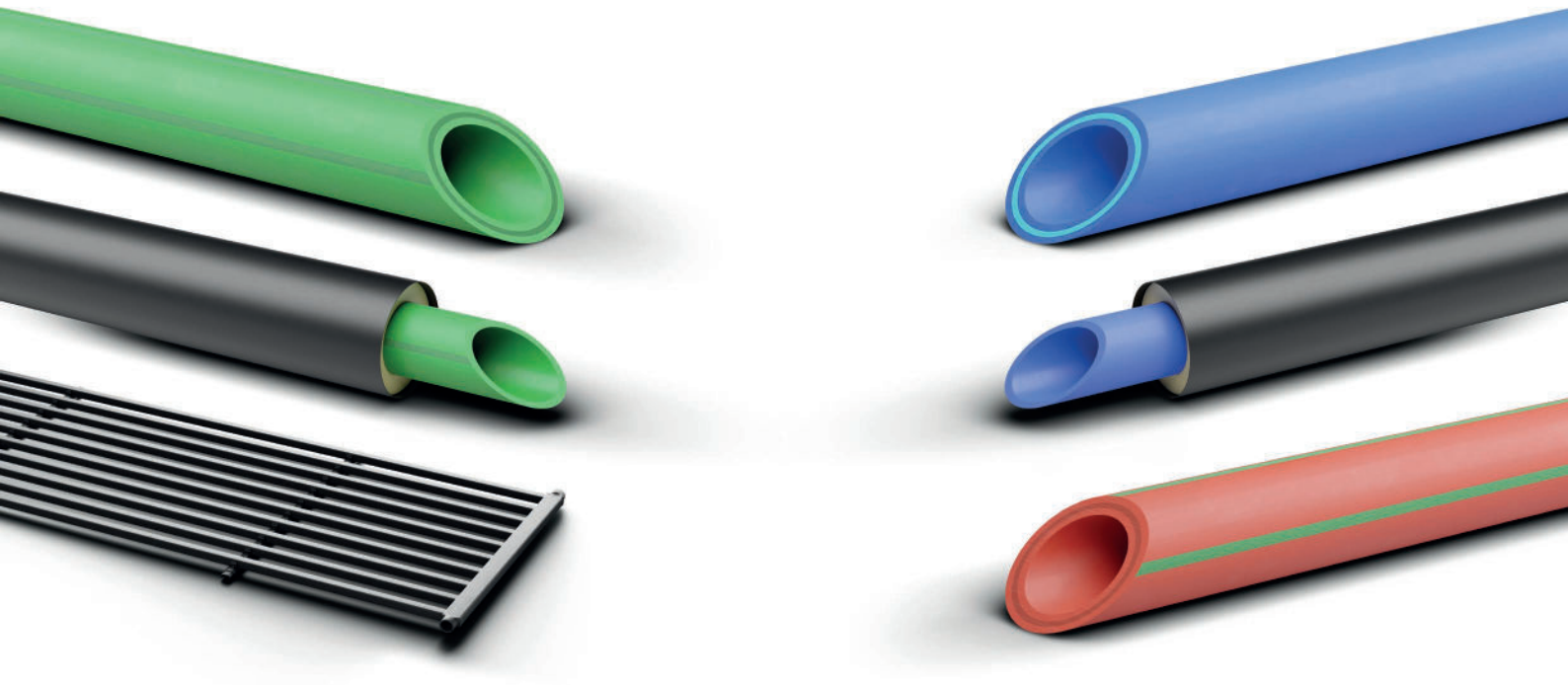
However, the EPD is not a certificate, i.e. there are requirements placed on the quality and format of the data, but not on the quality of the product. For the building sector, it forms an important basis for the ecological assessment of buildings.

How is an Environmental Product Declaration created?

The process of creating an Environmental Product Declaration comprises several steps:

1. – Selection or, if necessary, development of a Product Category Rule (PCR)
2. – Data collection of all environmentally relevant inputs and outputs
3. – Preparation of the Life Cycle Assessment
4. – Preparation of the Environmental Product Declaration
5. – External verification
6. – Publication

Figure 1: Steps to an Environmental Product Declaration



3. WHAT ARE PRODUCT CATEGORY RULES?

CATEGORISATION INTO GROUPS

To be able to evaluate functionally similar products in the same way and in the context of an Environmental Product Declaration, Product Category Rules (PCRs) are used. These are a set of specific rules, requirements or guidelines according to which products are classified into groups. These specify how certain data is to be collected, what calculations are to be made to demonstrate environmental impacts, and how this information is to be presented.

The requirements for creating PCRs are based on ISO 14025. Currently, there are more than 180 different Product Category Rules, and more are being created[3]. Product Category Rules exist, for example, for thermal insulation materials, windows and doors or building piping systems.

Source:

3 www.environdec.com/pcr-library

ENVIRONMENTAL **INPUTS** AND **OUTPUTS** AS A BASIS

The aim of a Life Cycle Assessment (LCA) is not only to provide environmentally relevant data on specific products, but also to estimate potential environmental issues which then can assist in making a decision for or against a particular product. The basis of the Life Cycle Assessment is the life cycle of a product. It consists of different phases: Raw material extraction, material production, use, waste treatment and final disposal. All environmental inputs and outputs are listed. In other words, everything that flows into and out of the product is measured. These can be raw materials or resources, different types of energy, water or emissions into the air, soil or water.

A Life Cycle Assessment study comprises four phases: First, the goal and the scope of the study are defined. Among other things, the intended application, the reasons for conducting the study and the target group, but also the product system to be investigated are defined here. This is followed by a Life Cycle Inventory, which records data collection and calculation methods for quantifying relevant inputs and outputs of a product system. In the impact assessment phase, potential impacts on the environment are analysed with the help of the results of the Life Cycle Inventory.

In the final interpretation, the results of the Life Cycle Inventory and the impact assessment are considered together. This phase should provide results that are consistent with the goal and scope of the assessment and allow for conclusions, limitations, and recommendations. The ISO standards 14040:2006 and 14044:2006 define the rules and principles for conducting a Life Cycle Assessment internationally.

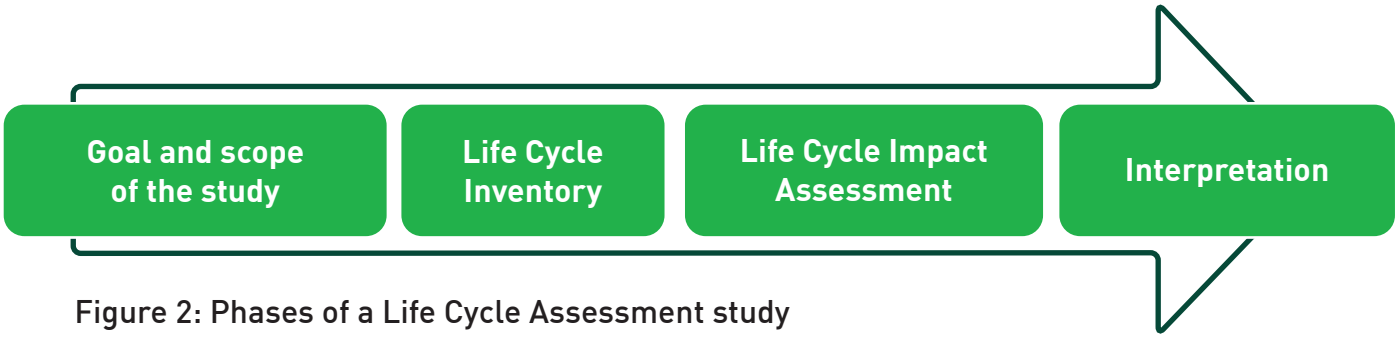


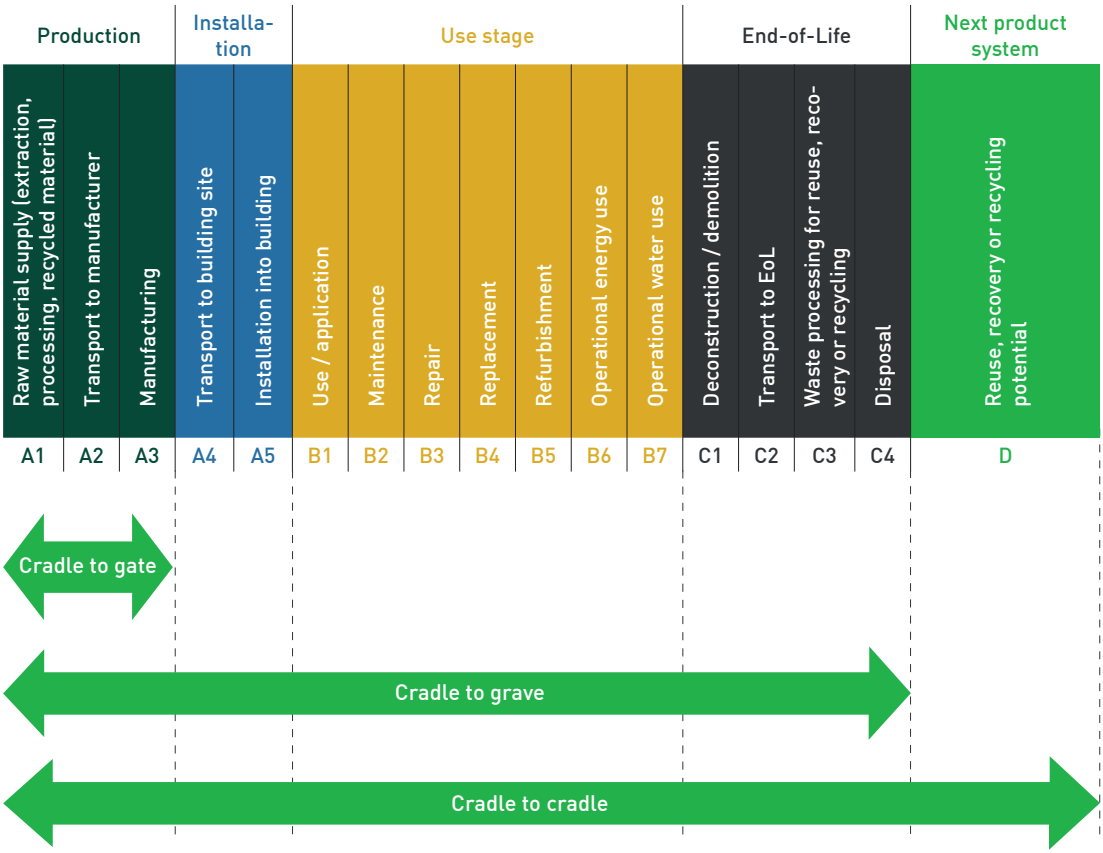
Figure 2: Phases of a Life Cycle Assessment study

FROM RAW MATERIAL **EXTRACTION** TO **RECYCLING**

A Life Cycle Assessment considers either the entire life cycle of a product or parts of it. Therefore, there are three different approaches to assessing the product life cycle:

1) **Cradle to grave**
2) **Cradle to gate**
3) **Cradle to cradle**

The concept "cradle to grave" refers to the life cycle phases from the extraction of raw materials to the disposal of the product at the end of its life cycle. If one evaluates only the extraction of raw materials and material production, we speak of "cradle to gate". The consideration of the product's impact on the Life Cycle Assessment ends with the finished product, which reaches the factory gate. Transport and use are not included in this approach. "Cradle to cradle" is the most comprehensive approach, in which the product or parts of it are made usable again for a new product. Which of the three approaches is chosen depends, among other things, on the availability of the data.



4.2 WHAT ARE ENVIRONMENTAL IMPACT INDICATORS?

IMPACTS ON **PEOPLE** AND **NATURE**

Life Cycle Assessments provide information on the potential impact of a product (or service) on the environment. EN 15804+A2 describes 13 core Environmental Impact Indicators to be reported for an Environmental Product Declaration and 6 additional optional Environmental Impact Indicators.

Core indicators according to EN 15804+A2:

Core indicator	Unit
GWP-total	kg CO_2-Äq.
GWP-fossil	kg CO_2-Äq.
GWP-biogenic	kg CO_2-Äq.
GWP-luluc	kg CO_2-Äq.
ODP	kg CFC11-Äq.
AP	mol H^+-Äq.
EP-freshwater	kg PO_4-Äq.
EP-marine	kg N-Äq.
EP-terrestrial	mol N-Äq.
POCP	kg NMVOC-Äq.
ADPE	kg Sb-Äq.
ADPF	MJ
WDP	m^3 World-Äq. withdrawn

Legend

GWP = Global warming potential
ODP = Stratospheric ozone depletion potential
AP = Acidification potential of soil and water
EP = Eutrophication potential
POCP = Potential for formation of tropospheric ozone
ADPE = Potential for depletion of abiotic resources - non-fossil resources (ADP - substances)
ADPF = Potential for depletion of abiotic resources - fossil fuels (ADP - fossil fuels)
WDP = Water depletion potential (users)

Additional impact categories according to EN 15804+A2-optional:

Indicator	Unit
PM	Illness cases
IR	kBq U235-Äq.
ETP-fw	CTUe
HTP-c	CTUh
HTP-nc	CTUh
SQP	-

Legend

PM = Potential incidence of disease due to particulate matter emissions.
IR = Potential effect from human exposure to U235
ETP-fw = Potential toxicity comparison unit for ecosystems
HTP-c = Potential toxicity comparison unit for humans (carcinogenic effect)
HTP-nc = Potential toxicity comparison unit for humans (non-carcinogenic effect)
SQP = Potential soil quality index

Some categories are measured in equivalents, as different emissions belong to the same category. For example, global warming potential (GWP) is expressed in CO_2 equivalents and includes not only carbon dioxide but also methane or nitrous oxide. In addition, the LCA also includes the consumption of renewable and non-renewable energies and water, as well as various waste categories such as non-hazardous waste disposed (NHWD) or materials for recycling (MFR).

5. HOW RELIABLE IS AN ENVIRONMENTAL PRODUCT DECLARATION?

HIGH **DEMANDS** ON DATA **QUALITY**

Neutral and in accordance with internationally recognised standards: This is how the characteristics of a product are recorded in an Environmental Product Declaration. The exact methodology follows ISO 14025 and EN 15804, and all values are verified by independent third parties. The Environmental Product Declaration is valid for a period of five years. If there are changes in the manufacture of the product during this period, leading to major deviations from the previous values, a review must be carried out.

Data quality requirements

The data used must be as precise, complete, consistent, and representative as possible.

Measured primary data is of the highest precision, followed by calculated data, literature data and estimated data.

Completeness is measured by the completeness of the so-called inputs and outputs per process unit and the completeness of the process units themselves. The EN 15804+A2 describes, among other things, that the total neglected flows should not exceed 5 % of the product inputs by mass or 5 % of the primary energy contribution.

Consistency refers to the choice of models and data sources. It shall be ensured that the differences in the results do reflect the actual differences between the product systems and are not due to inconsistencies in the choice of models, data sources, emission factors or other artefacts.

Reproducibility indicates the extent to which third parties would be able to reproduce the results of the study based on the information contained in this report.

Representativeness expresses the extent to which the data meets the geographic, temporal, and technological requirements defined in the goal and scope of the study.

6. WHAT ADVANTAGES DOES THE ENVIRONMENTAL PRODUCT DECLARATION OFFER ME? AND WHERE ARE THE LIMITS?

TRANSPARENCY FOR CUSTOMERS, COMPANIES AND LEGISLATOR

Both customers and legislators are increasingly demanding that the environmental impact of products be presented transparently. Environmental Product Declarations enable companies, for example, to participate in public tenders or investors to have their building's sustainability systems, such as BREEAM, LEED or DGNB, in place. In addition, an Environmental Product Declaration forms the basis for the development and optimisation of sustainable products.

In some areas, Environmental Product Declarations reach their limits. For example, social aspects, such as compliance with human rights in raw material extraction or production, are not taken into account in the assessment. The quality, durability or technical suitability of a product, e.g. in terms of sound insulation or fire resistance, is not covered.

Nevertheless, Environmental Product Declarations provide a good basis for assessing the environmental impact of a product and enable architects, planners, building contractors, investors, facility managers and companies, to make informed, sustainable decisions.

EVERYTHING IMPORTANT AT A GLANCE

Environmental Product Declarations are important - for the construction industry, for us, and our customers. That is why we have had our products evaluated according to the „cradle to gate“ concept. Additionally, the aquathrm EPDs also includes modules C (end-of-life) and D (next product system) under the requirements of the revised EN 15804+ A2 standard. Our Environmental Product Declarations are available for the following product groups:

- **aquatherm green/blue S/MF pipe**
- **aquatherm red pipe S/MF**
- **aquatherm black system**
- **aquatherm green/blue S/MF pipe (OT)**
- **aquatherm green/blue S/MF pipe (UV)**
- **aquatherm green/blue S/MF pipe (Energy)**

Legend

S = single-layer
MF = multi-layer
OT = oxygen-tight
UV = UV-resistant
Energy = thermally isolated

You can find out more under:

www.aquatherm.de/sustainability

www.aquatherm.de/download-area/

Made in Germany

Management System
ISO 9001:2015
ISO 14001:2015
ISO 50001:2018

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