



connect

PCR

Active fiber optical network components for communication services

Version 1.0

25th January 2024

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Introduction

This document provides Product Category Rules (PCR) for Environmental Product Declarations (EPD) for **active fiber optical network components for communication services**. It complements the core product category rules for all construction products and services as established in EN 15804, the product category rules for life cycle assessments of electronic and electrical products and systems as established in EN 50693 and the Dutch horizontal PCR for construction products “Bepalingsmethode milieuprestatie bouwwerken 1.1”¹.

European Standard EN 15804 provides core product category rules for all construction products and services. It provides a structure to ensure that all Environmental Product Declarations (EPD) of construction products, construction services and construction processes are derived, verified and presented in a harmonized way.

European Standard EN 50693 provides core product category rules for electronic and electrical products and systems (EEPS). It specifies the process and requirements on how to conduct life cycle assessment in the context of environmental declarations.

An EPD communicates verifiable, accurate, non-misleading environmental information for products and their applications, thereby supporting scientifically based, fair choices and stimulating the potential for market-driven continuous environmental improvement.

This PCR was developed from June 2021 to July 2023, by a Dutch PCR work group within NLconnect, with representatives from the fiber optical industry.

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¹ Available from the website www.milieudatabase.nl. Document is originally in Dutch, an English translation is available on the website. <https://milieudatabase.nl/en/downloads/download/135/>

1 Scope

This document provides general Product Category Rules (PCR) for Type III environmental declarations for **active fiber optical network components for communication services**, this includes components such as routers, switches, chassis, line cards, optics and CPE's. This PCR intends to cover all active components in a optical fiber network².

Environmental declarations are used to assess the environmental performance of construction works. Another function of environmental declarations is to assess the environmental performance of products in purchasing or contracting.

This standard is intended to be used in conjunction with the Dutch standard “Bepalingsmethode milieuprestatie bouwwerken 1.1” (provided by Stichting Nationale Milieudatabase through their website www.milieudatabase.nl). The Bepalingsmethode complements the core rules for the product category of construction products as defined in EN 15804 and is intended to be used in conjunction with EN 15804. The core category rules as set out in the EN 50693 are also applied to active fiber optical network components, however the EPD declaration and the use of modules to present details of life cycle stages of the EN 15804 is applied (detailed in Annex D of the EN 50693). This is done to ensure that the LCA results can be taken into the Nationale Milieudatabase for later use in project calculations in the software that is connected to the Nationale Milieudatabase.

For sake of clarity the chapter built up of a PCR for use under the EN 15804 is applied to this document, as well as the name PCR, where the EN 50693 recognizes the use of PSR (product specific rules) as name for documents detailing rules for product groups.

2 Normative references

The following documents, in whole or in part, are referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- EN ISO 14025, Environmental labels and declarations — Type III environmental declarations — Principles and procedures (ISO 14025:2006)
- EN ISO 14044:2006, Environmental management — Life cycle assessment — Requirements and guidelines (ISO 14044:2006)
- EN 15804, Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products
- EN 50693:2019, product category rules for life cycle assessments of electronic and electrical products and systems
- Bepalingsmethode Milieuprestatie bouwwerken v1.1

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15084:2019, the EN 50693:2019 apply.

² Transformation from light signal to electronic signal takes place in active components of the optical fiber network. Active components are network components that consume energy (electricity).

4 Abbreviations

EPD	Environmental Product Declaration
PCR	Product Category Rules
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory analysis
LCIA	Life Cycle Impact Assessment
RSL	Reference Service Life
GWP	Global Warming Potential
CPE	customer Premises equipment
PoP	Point of Presence

5 General Aspects

5.1 Objective of this general PCR for optical fiber products for communication services

An EPD according to this document provides quantified environmental information for active fiber optical network components for communication services on a harmonized and scientific basis. It also provides information on emissions to soil and water during the use stage of the product. The purpose of an EPD in the construction sector is to provide the basis for assessing buildings and other construction works and identifying those which cause less stress to the environment.

5.2 Types of EPD with respect to life cycle stages covered

Bepalingsmethode applies³

5.3 Comparability of EPD for construction products

Bepalingsmethode applies

³ The Bepalingsmethode numbering of the chapters and paragraphs differs in the sense that all chapters of the EN 15804 are part of chapter 2 of the Bepalingsmethode. E.g. paragraph 5.1 of the EN 15804 is 2.5.1. in the Bepalingsmethode

5.4 Additional information

Bepalingsmethode applies

5.5 Ownership, responsibility and liability for the EPD

Bepalingsmethode applies

5.6 Communication format

Bepalingsmethode applies

6 Product Category Rules for LCA

6.1 Product category

Bepalingsmethode applies

6.2 Life cycle stages and their information modules to be included

6.2.1 General

Bepalingsmethode applies

6.2.2 A1-A3, Production stage

Bepalingsmethode applies

The ROHS guideline is applicable for active components. Declaration of Conformity with the ROHS, if applicable, will be part of the general information in the EPD.

Often components of products are purchased ready made from third parties. In that case the transportation of the raw materials to the production location may not be known specifically. The use of “market for” processes from Ecolnvent is required in such cases.⁴ Also for the production processes to be applied commonly used processes shall be considered and applied (e.g. injection molding or extrusion for plastics and metal working for metal parts).

⁴ For commonly used components as PCB and IC the available profiles from Ecolnvent may be applied. When available specific environmental profiles are preferred, but given the complex nature of these products and that these are commonly traded Ecolnvent “market for” profiles may be applied.

6.2.3 A4-A5, Construction process stage

Bepalingsmethode applies

6.2.4 B1-B5, use stage

Bepalingsmethode and EN 50693:2019 apply

No maintenance or repairs are normally required for an installed optical fiber network.

For CPE's it is known that refurbished is sometimes applied. This can be applied in a specific End of Life scenario. The requirements from the Bepalingsmethode do apply (see page 22 2.6.3.9 Development of product scenarios⁵)

6.2.5 B6-B7, use stage, related to the operation of the building

Bepalingsmethode applies⁶

The actual electricity consumption shall be determined using the standard ANSI/CTA-2049-A⁷: Determination of Small Network Equipment Average Energy Consumption.

6.2.6 C1-C4, End-of-life stage

Bepalingsmethode applies

For active components that are normally installed above ground it is assumed that these will be collected and recycled according to the industry standards. The Bepalingsmethode provides adequate default scenarios for end of life for the commonly used materials.⁸

The WEEE LCI database provides additional information on common waste scenario's for electric equipment and electronic components. This information may be applied when deemed relevant.

6.2.7 D, Benefits and loads beyond the system boundary

Bepalingsmethode applies

⁵ [Bepalingsmethode \(www.milieudatabase.nl\)](http://www.milieudatabase.nl)

⁶ The Bepalingsmethode does not require calculation of module B6, even for active components when taken up into the current version of the Nationale Milieudatabase B6 can not be entered and is not required to be declared.

⁷ This standard is freely available on <https://shop.cta.tech/products/determination-of-small-network-equipment-average-energy-consumption>

⁸ Appendix 5 of the Bepalingsmethode provides end of life scenario's for commonly used materials.

6.3 Calculation rules for the LCA

EN 15804 applies

6.3.1 Functional or declared unit

Bepalingsmethode applies

6.3.2 Functional unit

Bepalingsmethode applies

The functional units provided in table 1 shall be used.

Component	Functional unit	Reference service life
Chassis	piece	4 years in case with wifi and 8 years in case without wifi
Routers	piece	4 years in case with wifi and 8 years in case without wifi
Switches	piece	4 years in case with wifi and 8 years in case without wifi
Line cards	piece	4 years in case with wifi and 8 years in case without wifi
Optics	piece	4 years in case with wifi and 8 years in case without wifi
CPE's	piece	4 years in case with wifi and 8 years in case without wifi

Table 1. Functional unit and RLS guidance for optical fiber network components.

6.3.3 Declared unit

Bepalingsmethode applies

6.3.4 Reference Service Life (RSL)

Bepalingsmethode applies

The RSL provided in table 1 shall be used.

6.3.5 System boundaries

Bepalingsmethode applies

6.3.6 Criteria for the exclusion of inputs and outputs

Bepalingsmethode applies

6.3.7 Selection of data

Bepalingsmethode applies

6.3.8 Data quality

Bepalingsmethode applies

6.3.9 Developing product level scenarios

Bepalingsmethode applies

6.3.10 Units

Bepalingsmethode applies

6.4 Inventory Analysis

6.4.1 Data collection

Bepalingsmethode applies

6.4.2 Calculation procedures

Bepalingsmethode applies

6.4.3 Allocation of input flows and output emissions

Bepalingsmethode applies

6.5 Impact assessment

Bepalingsmethode applies

7 Content of the EPD

7.1 Declaration of general information

Bepalingsmethode applies

7.2 Declaration of environmental parameters derived from LCA

7.2.1 General

Bepalingsmethode applies

7.2.2 Rules for declaring LCA information per module

Bepalingsmethode applies

7.2.3 Indicators describing environmental impacts based on LCA Assessment

Bepalingsmethode applies

7.2.4 Indicators describing resource use and environmental information based on Life Cycle Inventory (LCI)

Bepalingsmethode applies

7.2.5 Information on biogenic carbon content

Bepalingsmethode applies

7.3 Scenarios and additional technical information

7.3.1 General

Bepalingsmethode applies

7.3.2 Construction process stage

Bepalingsmethode applies

7.3.3 B1-B7 use stage

Bepalingsmethode applies

7.3.4 End-of-life

Bepalingsmethode applies

7.4 Additional information on release of dangerous substances to indoor air, soil and water during the use stage

7.4.1 Indoor air

Bepalingsmethode applies

7.4.2 Soil and water

Bepalingsmethode applies

7.5 Aggregation of information modules

Bepalingsmethode applies

8 Project report

8.1 General

Bepalingsmethode applies

8.2 LCA related elements

Bepalingsmethode applies

8.3 Documentation and additional information

Bepalingsmethode applies

8.4 Data availability for verification

Bepalingsmethode applies

9 Verification and validity of an EPD

Bepalingsmethode applies

10 Bibliography

Bepalingsmethode applies. Additional references:

1. Bepalingsmethode milieuprestatie bouwwerken 1.1, Stichting Nationale milieudatabase, document can be downloaded from www.milieudatabase.nl
2. Carbon performance in the cable industry, Methodologies to assess the Carbon Footprint of organizations and products, Europacable HSE Task Force CARBON FOOTPRINT, Brussels September 2019, Europacable.
3. Code of Conduct on Energy Consumption of Broadband Equipment, JRC, version 8.0, 2021