



PRODUCT CATEGORY RULES

EN 15804

NPCR 027 version 1.0

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PCR – Part B for electrical cables and wires





REVISION LOG

This is an overview of the changes made to this PCR. Typology of changes:

- Editorial (ed): Text or layout edited, with no change in content.
- Technical (te): Existing content has been changed.
- Addendum (ad): New content has been added.

Naming convention: Version x.y, where x is a major revision and y is a minor revision.

Date		
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Introduction

These product category rules (PCR) are intended for companies preparing an environmental product declaration (EPD) for electrical cables and wires. The PCR for electrical cables consists of two parts. This document contains PCR part B for electrical cables and wires, which is the part of the PCR that is specific for electrical cables and wires. Part A contains the requirements that are common for all construction products. When preparing an EPD for electrical cables and wires, all requirements outlined in part A and part B must be followed. In PCR part B, the requirements for PCR part A are referred to in each section where they occur. The purpose of this document is to define clear guidelines for performing the underlying life cycle assessment (LCA) to ensure comparability between EPDs.

This PCR was developed from May 2019 to October 2019, by a Norwegian PCR working group (WG) with representatives from the electrical cables and wires industry and with aid from Ostfold Research (Østfoldforskning) and the EPD programme operator, The Norwegian EPD Foundation. This PCR has been developed in accordance with the requirements outlined in the general programme of instructions from the Norwegian EPD programme (EPD-Norway, 2014). The PEP ecopassport specific rules for wires, cable and accessories were reviewed during the work with the aim of harmonisation.

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1 Scope

This document complements the core rules for the product category of construction products as defined in EN 15804 and NPCR part A and is intended to be used in conjunction with those standards.

The intended application of this product category rule (PCR) is to give guidelines for the development of environmental product declarations (EPD) for electrical cables and wires; either cradle to gate with options or cradle to grave; and to further specify the underlying requirements of the life cycle assessment (LCA). The core rules valid for all construction products are given in standard EN 15804, NPCR Part A and relevant published complementary PCR, and are expected to be known by those preparing the EPD.

2 Normative references

NPCR Part A: Construction products and services. Ver. 1.0. April 2017. Oslo: EPD-Norge.

If relevant complementary product category rules (c-PCR) are published as a European standard, then these shall be reviewed during development of an EPD and should be followed according to this PCR. A justification shall be given in the LCA report and EPD if the EPD is not following relevant c-PCR when published.

3 Terms and Definitions

As in PCR part A and relevant c-PCR.

3.1 Cable

Assembly of usually parallel wires of considerable length formed into a compact circular section

[ISO 6707-1:2004]

3.2 Wire

Longitudinal cold drawn metal of any cross-section shape

[EN 845-3:2003]

3.3 Electricity transmission lines

Line of electric cables(s) carried on lattice towers or poles

[ISO 6707-1:2004]

4. Abbreviations

c-PCR Complementary product category rules

NPCR 027:2020 Part B for electrical cables and wires version 1

EPD	Environmental product declaration
DU	Declared unit
FU	Functional unit
PCR	Product category rules
LCA	Life cycle assessment
LCI	Life cycle inventory
LCIA	Life cycle impact assessment
RSL	Reference service life
ESL	Estimated service life

5. General Aspects

5.1 Objective of PCR Part A and B

As in PCR part A and relevant c-PCR.

5.2 Types of EPD in respect to life cycle stages covered

As in PCR part A and relevant c-PCR.

5.3 Comparability of EPD of construction products

As in PCR part A and relevant c-PCR.

5.4 Additional information

As in PCR part A and relevant c-PCR.

5.5 Ownership, responsibility and liability for the EPD

As in PCR part A and relevant c-PCR.

5.6 Communication format

As in PCR part A and relevant c-PCR.



6. Product Category Rules for LCA

As in PCR part A and relevant c-PCR.

6.1 Product Category

As in PCR part A and relevant c-PCR, including the following further clarification:

The product group electrical cables and wires comprises all kinds of electrical cables, wires and transmission lines prepared for trade and are made of different materials.

6.2 Life cycle stages and their information modules to be declared

6.2.1 General

As in PCR part A and relevant c-PCR, including the following further clarification:

Transport in all life cycle modules shall include the following:

- Direct emissions during transport (i.e. exhaust, tyres, etc.)
- Upstream emissions from fuel extraction, processing and distribution
- Life cycle emissions of vehicles (i.e. raw materials, manufacturing, maintenance and disposal)
- Life cycle emissions of infrastructure (i.e. raw materials, manufacturing, maintenance and disposal)

6.2.2 A1-A3, Product stage, information modules

As in PCR part A and relevant c-PCR.

6.2.3 A4-A5, Construction process stage, information modules

As in PCR part A and relevant c-PCR, including the following further clarification:

The installation in A5 shall include the following:

- Waste treatment of packaging
- Energy use during installation
- Wastage of material during installation
- Paint or other surface treatment for products which are intended to be surface treated during installation.

Fasteners (screws) and other additional materials are not included, these are expected to be included at construction level assessments.

6.2.4 B1-B5, Use stage, information modules related to the building fabric

As in PCR part A and relevant c-PCR.

6.2.5 B6-B7, Use stage, information modules related to the operation of the building

As in PCR part A and relevant c-PCR.



6.2.6 C1-C4, End-of-life stage, information modules

As in PCR part A and relevant c-PCR.

6.2.7 D, Benefits and loads beyond the system boundary, information module

As in PCR part A and relevant c-PCR.

6.3 Calculation rules for the LCA

As in PCR part A and relevant c-PCR, including the following further clarification:

For declaring electrical cables and wires, a functional or declared unit as described here can be used. The functional unit shall be used for products intended for outdoor use. The declared unit shall be used for products intended for indoor use.

The scope and variations of products must be declared according to EPD-Norway's guidelines. As of 2018, similar products in the same EPD can only be included if the variation in results for each LCIA category does not exceed +/- 10 %. The variation shall be stated in the EPD. Special care must be given to composite products.

6.3.1 Functional unit

As in PCR part A and relevant c-PCR, including the following further clarification:

The functional unit for all outdoor cable products in a cradle-to-grave EPD is defined as:

1 m of installed electrical cables or lines with a specific function, from cradle-to-grave, with activities needed for the study period of the construction.

Results shall be displayed both per declared unit (cradle-to-gate, A1-A3) and per functional unit based on scenarios for life cycle modules A4-A5, B1-B7, C1-C4 and D.

The functional unit shall also specify:

- Quantified key properties of the product when integrated into the construction works, facilitating a functional equivalent comparison with similar products.
- The defined in-use conditions and time period for these performance characteristics.

The study period should be 100 years for civil engineering works and 60 years for buildings.

6.3.2 Declared unit

As in PCR part A and relevant c-PCR, including the following further clarification:

For indoor cable products, the declared unit (cradle to gate with options, as a minimum A1-A5, C1-C4 and D) is defined as:

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1 m installed electrical cables, including waste treatment at end-of-life.

Results shall be displayed both per declared unit (cradle-to-gate, A1-A3) and based on scenarios for life cycle modules A4-A5, C1-C4 and D.

For wire as raw material for cables, the declared unit (cradle to gate with options: A1-A3, C1-C4 and D) is defined as:

1 kg of wires manufactured, and waste treated at end-of-life.

Results shall be displayed both per declared unit (cradle-to-gate, A1-A3) and based on scenarios for life cycle modules C1-C4 and D.

6.3.3 Reference service life (RSL)

As in PCR part A and relevant c-PCR.

The reference service life of the product shall be stated for both the declared and functional unit.

6.3.4 System boundaries

As in PCR part A and relevant c-PCR.

6.3.5 Criteria for the exclusion of inputs and outputs (cut-off)

As in PCR part A and relevant c-PCR, including the following further clarification:

The cut-off criteria in EPD-Norway's general program of instructions (GPI) shall also be followed. As of 2018, the key points of the requirements are:

- that processes and activities that do not contribute more than 1 % to the total environmental impact in some of the environmental impact categories can be left out.
- production of capital, buildings and equipment that are not included shall also be justified according to the GPI. This requirement is interpreted that justification shall be based on quantitative assessments to the cut-off criteria. Conservative assumptions can be used when data is missing and is always better than leaving out activities in the inventory.

6.3.6 Selection of data

As in PCR part A and relevant c-PCR, including the following additions:

For transport data in life cycle modules A2 and A4, the data representativeness of the vehicle type, fuel use and load factor must be shown to be realistic and conservative for the actual use and scenario.



6.3.7 Data quality requirements

As in PCR part A and relevant c-PCR.

6.3.8 Scenarios at the product level

As in PCR part A and relevant c-PCR, including the following additions:

EN 15978:2011 provides additional guidance on developing scenarios.

6.3.8.1 A4 Transport to the building site

As in PCR part A and relevant c-PCR, including the following additions:

Transport from the manufacturing site to the construction site is estimated based on information from the manufacturer relevant for the intended market. The following default values can be used for developing scenarios at the product level:

- For domestic production, the default travel distance from the manufacturing site to the building site is 300 km.
- For import, the distance is measured from the manufacturing site to a specific storage location, plus a transport distance from the storage location to the building site (300 km if not specified). If no specific storage location is given, then the capital city of the country that the product is being imported to may be used as an approximate location.

6.3.8.2 A5 Installation

As in PCR part A and relevant c-PCR, including the following additions:

The material wastage of electrical cables and wires at the construction site should be estimated based on information from the manufacturer and information of relevance for the intended market. If no estimate is available, then the amount of waste is set to 5% by product weight.

6.3.8.3 B1-B7 Use phase

As in PCR part A and relevant c-PCR, including the following additions:

The release of substances to air, soil or ground should be provided as additional information, see chapter 7.4 in EN 15804:2012. These emissions do not need to be included in the LCA if the emissions are not relevant for the LCIA categories included.

Module B2-B5, Maintenance, repair, replacement and refurbishment scenarios are provided by the manufacturer, and shall be relevant for the intended market and intended area of application.

6.3.8.4 C1-C4 End-of-life

As in PCR part A and relevant c-PCR, including the following additions:

Transport from the building/demolition site to the waste treatment/recycling facility is estimated based on NPCR 027:2020 Part B for electrical cables and wires version 1



information from the manufacturer and shall be relevant for the intended market. Default scenarios for life cycle module C2 transport to waste processing should be based on representative data, e.g. national statistics.

More than one scenario for waste treatment and disposal should be included if there are several relevant common practices, but the most conservative scenario shall always be included. Default conservative scenarios for life cycle modules C3 for waste processing and C4 for waste disposal are listed in Table 1.

Table 1: Default conservative scenarios for life cycle modules C3 and C4.

Product types	C3	C4
Products with insulation	Separation of waste into fractions. Processing of waste fractions until they reach an end-of-waste state and become materials for recycling. Municipal incineration with energy recovery for waste not recycled.	Landfilling of ashes from incineration.
100 % metal product	Central sorting of mixed construction waste. Recycling of metals.	Landfilling of wastes in sanitary landfill.

6.3.9 Units

As in PCR part A and relevant c-PCR.

6.4 Inventory analysis

As in PCR part A and relevant c-PCR.

6.5 Impact assessment

As in PCR part A and relevant c-PCR.

7. Content of the EPD

7.1 Declaration of general information

As in PCR part A and relevant c-PCR, including the following additions:

The material composition of the product shall be listed with specific weights of the main components as it is installed. This information shall be included in the LCA report. Usage areas and conditions must be specified in the EPD. The harmonised standard for which the product is produced according to must be specified in the EPD.

The scope of products declared in an EPD must be specified so that the product range can easily be identified by the customer. The ability of scaling LCA results to other dimensions must also be specified.

7.2 Declaration of environmental parameters derived from LCA

7.2.1 General

As in PCR part A and relevant c-PCR.



7.2.2 Rules for declaring LCA information per module

As in PCR part A and relevant c-PCR.

7.2.3 Parameters describing environmental impacts

As in PCR part A and relevant c-PCR.

7.2.4 Parameters describing resource use

As in PCR part A and relevant c-PCR.

7.2.4.1 Water use

As in PCR part A and relevant c-PCR.

7.2.4.2 Electricity used in A3 Manufacturing

As in PCR part A and relevant c-PCR.

7.2.5 Other environmental information describing waste categories and output flows

As in PCR part A and relevant c-PCR.

7.2.6 Accounting of biogenic carbon during the life cycle

As in PCR part A and relevant c-PCR, including the following additions:

If no specifications are given in PCR part A, biogenic carbon shall be declared according to ISO 21930.

7.2.7 Greenhouse gas emissions from land use change

As in PCR part A and relevant c-PCR, including the following additions:

If no specifications are given in PCR part A, greenhouse gas emissions from land use change shall be declared according to ISO 21930.

7.2.8 Carbonation

As in PCR part A and relevant c-PCR, including the following additions:

If no specifications are given in PCR part A, carbonisation shall be declared according to ISO 21930, EN 16757:2017 or NPCR 020 Concrete Products.



7.3 Scenarios and additional technical information

7.3.1 General

As in PCR part A and relevant c-PCR.

7.3.2 Construction process stage

7.3.2.1 A4, Transport from the production site to the construction site.

As in PCR part A and relevant c-PCR, including the following additions:

Transport from the production gate to the construction site is typically carried out using trucks. The distance, type of vehicle, fuel consumption and degree to which the transport capacity is utilised may have a large impact on transport emissions, thus these factors must be stated. Capacity utilisation is calculated as a percentage (%) of the total load capacity of the vehicle. The percentage given shall be the average of the capacity utilisation including the return trip.

7.3.2.2 A5, Installation

As in PCR part A and relevant c-PCR.

7.3.3 Use stage

As in PCR part A and relevant c-PCR.

7.3.4 End of life

As in PCR part A and relevant c-PCR.

7.4 Additional information

As in PCR part A and relevant c-PCR, including the following further clarification:

This clause includes all significant environmental and health impacts not included in the impact categories of this PCR. See section 7.2.3.

7.4.1 Additional information on release of dangerous substances to indoor air, soil and water

7.4.1.1 Indoor air

As in PCR part A and relevant c-PCR, including the following additions:

Release of substances to indoor air is relevant when the product is used on the inside of the vapour barrier. The following standard should be applied for measuring emissions to indoor air:

- EN 16516 Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air

7.4.1.2 Soil, ambient air and water

As in PCR part A and relevant c-PCR, including the following additions:

Release of substances to ground water or soil is relevant for products when they are used in direct contact with the ground or rainwater. Until horizontal standards for the measurement of leaching characteristics are available, the following report can be used:

- CEN/TR 17105:2017 Construction products. Assessment of release of dangerous substances. Guidance on the use of ecotoxicity tests applied to construction products

7.4.2 Additional Norwegian requirements

As in PCR part A and relevant c-PCR.

7.4.2.1 Greenhouse gas emissions from electricity use in A3 Manufacturing

As in PCR part A and relevant c-PCR.

7.4.2.2 Dangerous substances and content declaration

As in PCR part A and relevant c-PCR, including the following additions:

Specification of materials and substances that can adversely affect human health and environment shall be reported.

A detailed list of the product's substances (i.e. chemicals included in the final product), including CAS number and health class (according to risk phrases or CLP Regulation (EC) No. 1272/2008) when these are in force, shall be included in the product content declaration. The content of substances shall be declared in terms of weight percentages. Only substances that are mentioned in the raw material safety declaration sheets (SDS) shall be included. The EPD owner has no obligation to investigate the content of ingredients used in raw material production, except for products on the REACH candidate list and the Norwegian Priority List.

In cases where information about contents could affect patent or company secrets, a qualitative list of chemicals and their expected functions is enough, including the risk phrases. This does not apply to substances registered under the REACH directive.

7.4.2.3 Emission classification of building materials

As in PCR part A and relevant c-PCR.

7.4.2.4 Carbon footprint of products

As in PCR part A and relevant c-PCR, including the following additions for products containing biogenic carbon:

Global warming potential (GWP) shall be declared in two sub-categories for all life cycle modules declared in the EPD, in order to make carbon footprint of buildings easier to understand, and to facilitate for comparison to NPCR 027:2020 Part B for electrical cables and wires version 1



national greenhouse gas accounting. The two sub-categories are listed in Table 3.

Table 3: Sub-categories for GWP

Abbreviation	Name	Explanation
GWP-IOBC	Global warming potential – instantaneous oxidation of biogenic carbon	The accounting assumes that all carbon in bio-based materials will eventually oxidize and can therefore be accounted as an emission at harvest. This implies that the emissions of biogenic methane need to be adjusted so that the carbon that oxidizes from methane is not double counted. In national greenhouse gas accounting methods from IPCC, this approach is known as instantaneous oxidation.
GWP-BC	Global warming potential – Biogenic carbon	The flows of carbon to and from the bio-based material is here accounted as CO ₂ at the module in the life cycle where it occurs. This follows the harvested wood products (HWP) methodology in IPCC but is also accounting other bio-based materials than wood.
GWP	Global warming potential	As in the LCIA results. This is the sum of GWP-IOBC and GWP-BC.

The differentiation in LCI results between product and packaging should be presented according to ISO 21930:2017, Annex E, Table E.4.

7.5 Aggregation of information modules

As in PCR part A and relevant c-PCR.

8. Project Report

As in PCR part A and relevant c-PCR.



9. Verification and Validity of an EPD

As in PCR part A and relevant c-PCR.

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Norwegian EPD Foundation, Technical committee

Christofer Skaar
Leader of the Technical committee

10 Bibliography

As in PCR part A, including the following additions:

ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services

EN 15978. Sustainability of construction works – Assessment of environmental performance of buildings
– Calculation method

EPD-Norway (2014). General program instructions for the Norwegian EPD program.

PEP ecopassport programme. (2015). PSR0001 – Wires, cables and accessories.