











# Product Category Rules



## GAS METERS

UN CPC code: 48263

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## PRODUCT CATEGORY

1. Product category definition
2. Product category description
3. Declared Unit
4. Product lifetime



## 1. Product category definition

This document provides Product Category Rules (PCR) for the assessment of the impact on climate change of gas meters and the declaration of this performance by a CFP. The product category corresponds to UN CPC 48 Medical appliances, precision and optical instruments, watches and clocks.

The product category is defined under UNSD-CPC Ver 2.1 classification:

Division 48: Medical appliances, precision and optical instruments, watches and clocks.

482: Instruments and appliances for measuring, checking, testing, navigating and other purposes, except optical instruments; industrial process control equipment; parts and accessories thereof

4826: Other measuring, checking and testing instruments and appliances.

48263: Gas, liquid or electricity supply or production meters.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory.
- The term “should” is used to indicate a recommendation, rather than a requirement.
- The term “may” or “can” is used to indicate an option that is permissible.

For the definition of terms used in the document, see the normative standards.

## 2. Product category description

“Gas meter” is referred to as an instrument designed to measure, register and display the quantity of fuel gas that has passed it. In particular such category of meters includes products certified in accordance with the European Directive 2014/32/UE “MID” and OIML-R 137, with display, and with or without any additional functionalities such as data receiving and transmitting capabilities, shut-off valves, pressure measurement point, galvanic port, etc.

The category of meters does not include:

- Metering and measuring devices of quantities other than gas (e.g. electricity or water meters).

## 3. Declared Unit

The declared unit is a single meter which monitors and registers the consumption of gas starting from the primary measurement of gas, during a service life of not less than 15 years.

Moreover, describing the declared unit, the following items shall be specified:

- Type of gas meter (smart or traditional);
- Measuring range ( $m^3/h$ ), and in particular maximum flowrate and maximum operating pressure;
- Dimensional specifications;

- Measuring technology (e.g. thermal-mass, ultrasonic, diaphragm, ...);
- Any additional functionalities, such as:
  - Communication type
  - Shut-off valve
  - Galvanic port
  - Pulse emitter
  - Pressure point
  - Any other additional functionality in accordance with EN 16314.

For any additional functionality has to be specified if it is designed to last for the entire service life of the product.

#### **4. Product lifetime**

The product lifetime is 15 years.



## SYSTEM BOUNDARIES

1. Diagram
2. Upstream
3. Core
4. Downstream



Carbon Footprint Italy follows an approach that includes all attributional processes from “cradle to grave”, using the “limited loss of information at the final product” principle. This is especially important in the case of business-to-consumer communication.

The scope of this PCR and of CFPs based on this document is **cradle to grave**.

For the purpose of different data quality rules and for the presentation of results, the life cycle of products is split into three different life cycle stages:

- Upstream processes (from cradle-to-gate);
- Core processes (from gate-to-gate);
- Downstream processes (from gate-to-grave).

In the CFP, the impact on climate change associated to each of the three life-cycle stages mentioned above shall be reported separately.

## 1. Diagram

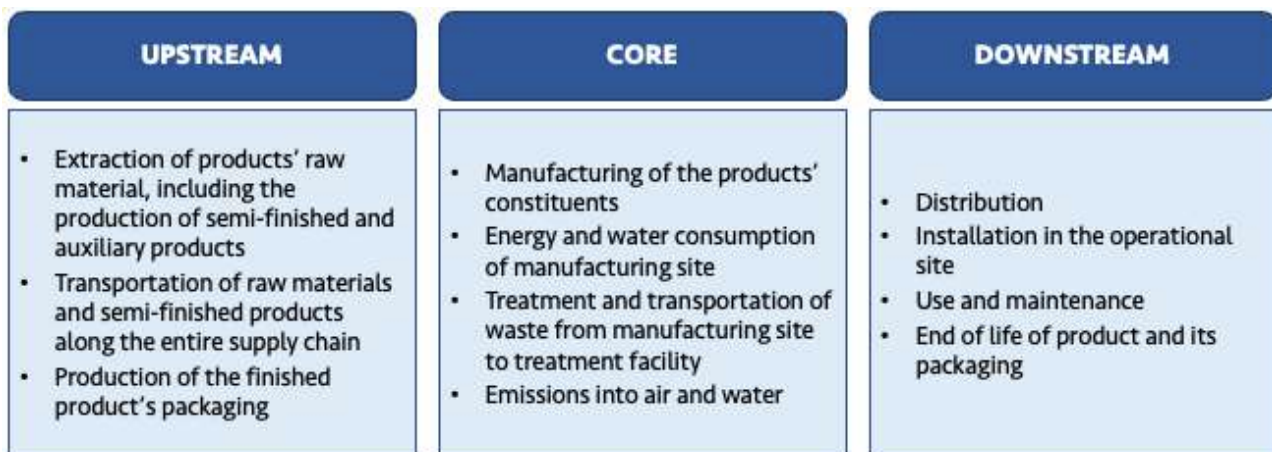


Figure 1 - System diagram illustrating the processes that are included in the product system, divided into upstream, core and downstream processes.

## 2. Upstream

The following attributional processes are part of the product system and classified as upstream processes:

- Extraction of product's 'raw material, including the production of semi-finished and auxiliary products.
- Transportation of raw materials (included auxiliary materials and packaging) and semi-finished products along the entire supply chain. If assembly is done at several sites in series, transport between each site must be considered. If some production/assembly processes are outsourced to external companies, the transportation to and from the sites must be included.
- Production of the finished product's packaging, including packaging to distribute the gas meter in the reference market segment.

## 3. Core

The following attributional processes are part of the product system and classified as core processes:

- Manufacturing of the products' components (including outsourced processes);
- Energy and water consumption of manufacturing site;
- Treatment and transportation of waste from manufacturing site to treatment facility;
- Emissions into air and water.

The technical system shall not include:

- Manufacturing of production equipment, buildings and other capital goods;
- Business travel of personnel;
- Travel to and from work by personnel;
- Research and development activities.

## 4. Downstream

The following attributional processes are part of the product system and classified as downstream processes:

- Distribution, i.e. transport of final product with packaging from production center to installation site. Please consider the primary data to the client and a further transport of 100 km from the customer to the installation site, if this route is not known or included in the previous mileage.
- Installation of the meter in the operational site:





- End of life of the packaging;
  - Scrap generated during the installation stage;
  - General waste arising from installation stage.
- Use and maintenance: if during the life of a gas meter it is necessary to replace a battery, consider this here; while the batteries inserted already at the beginning in the gas meter are to be considered in the upstream module. If other ordinary maintenance on the gas meter is required during the life cycle, they must be considered.
- End of life: operations from the decommissioning stage to the actual disposal of the meter at the end of its service life. Operations to remove the meter may be included in the cut-off given their marginal relevance to the impacts of the life cycle.

In order to better assess the product's sustainability from the point of view of its circular ability, the following operations should be considered instead:

- Transportation of the meter to the collection site;
- Meter disassembly operations, if possible;
- Distribution and destination of the various material flows to be sent for recycling or disposal.

Final waste treatment processes (landfill and incineration), where waste production is linked to the product life cycle, must be included in the study. Where it is not possible due to a lack of information, it is necessary to declare the quantity of waste produced. Also waste recovery and recycling processes must be included in the system boundary together with the transportation of the waste itself to the treatment platform.

Any exclusion of life cycle stages and unit processes shall be justified.



## DATA AND RULES FOR THE CFP STUDIES

1. Specific data or calculation rules
2. Cut-off rules
3. Allocation rules



# 1. Specific data or calculation rules

## 1.1 Specific data

A CFP calculation requires two different kinds of information:

- data related to the environmental aspects of the considered system (such materials or energy flows that enter the production system). These data shall come from the company that is performing the CFP calculation.
- data related to the life cycle impacts of the material or energy flows that enter the production system. Generic data can be used if specific data are not available.

Data on environmental aspects shall be as specific as possible and shall be representative of the studied process.

Data on the life cycle of materials or energy inputs are classified into three categories – specific data, selected generic data, and proxy data, defined as follows:

- **primary data** (also referred to as “site-specific data”) – data gathered from the actual manufacturing plant where product-specific processes are carried out, and data from other parts of the life cycle traced to the specific product system under study, e.g. materials or electricity provided by a contracted supplier that is able to provide data for the actual delivered services, transportation that takes place based on actual fuel consumption, and related emissions, etc.
- **secondary data** - data from commonly available data sources (e.g. commercial databases and free databases) that fulfill prescribed data quality characteristics for precision, completeness, and, proxy data from commonly available data sources (e.g. commercial databases and free databases) that do not fulfill all of the data quality characteristics of “selected generic data”.

As a general rule, specific data shall always be used, if available, after performing a data quality assessment.

The attributional LCA approach in Carbon Footprint Italy forms the basic prerequisites for selecting generic data. To allow the classification of generic data as “selected generic data”, they shall fulfill selected prescribed characteristics for precision, completeness, and representativeness (temporal, geographical, and technological), such as:

- the reference year must be as current as possible and preferably assessed to be representative for at least the validity period of the CFP,
- the cut-off criteria to be met on the level of the modelled product system are the qualitative coverage of at least 99% of energy, mass, and overall environmental relevance of the flows,
- completeness in which the inventory data set should, in principle, cover all elementary flows that contribute to a relevant degree of GHG emissions.

## 1.2 Calculation rules

The following requirements apply to the study:

- Data referring to processes and activities upstream in a supply chain over which an organisation has direct management control shall be specific and collected on site.
- Data referring to contractors that supply main parts, packaging, or main auxiliaries should be requested from the contractor as specific data, as well as infrastructure, where relevant.
- In case specific data is lacking, selected generic data may be used. If this is also lacking, proxy data may be used.
- For the electricity used in the processes, electricity production impacts shall be accounted for in this priority when specific data are used in the processes:
  1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used<sup>1</sup>.
  2. National residual electricity mix or residual electricity mix on the market
  3. National electricity production mix or electricity mix on the market.

The mix of electricity used in upstream processes shall be documented in the CFP study report, where relevant.

- Transport from the final delivery point of raw materials, chemicals, main parts, and components (see above regarding upstream processes) to the manufacturing plant/place of service provision should be based on the actual transportation mode, distance from the supplier, and vehicle load, if available.
- Waste treatment processes of manufacturing waste should be based on specific data, if available.

## 2. Cut-off rules

Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary as described in the relevant Section).

The check for cut-off rules in a satisfactory way is through the combination of expert judgment based on experience of similar product systems and a sensitivity analysis in which it is possible to understand how the un-investigated input or output could affect the final results.

The following flows and operations may be cut-off:

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<sup>1</sup> The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.



- Production, use and disposal of the packaging of components and semi-finished intermediates.
- Production, use and disposal of the packaging of components and semi-finished intermediates
- Materials making up the meter itself whose total mass does not exceed 2% of the total weight of the device
- Any extraordinary maintenance done on the meter<sup>8</sup>
- Material and energy flows related to dismantling phase, whenever it is reasonable to assume that dismantling is performed by adopting manual tools (e.g. screwdrivers, hammers, etc.)
- Devices external to the meter itself (e.g. switchboards) required for installation

Additionally, what defined in 4.2.3.3 of EN50693 applies.

### 3. Allocation rules

The following stepwise procedure shall be applied for multifunctional products and multiprocess processes:

1. Allocation shall be avoided, if possible, by dividing the unit process into two or more sub-processes and collecting the environmental data related to these sub-processes.
2. If allocation cannot be avoided, the inputs and outputs of the system shall be partitioned between its different products or functions in a way that reflects the underlying physical relationships between them; i.e. they should reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system.
3. Where physical relationships alone cannot be established or used as the basis for allocation (or they are too time consuming), the most suitable allocation procedure shall be used and documented.

In accordance with other existing programme operators, the methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP). This means that the generator of the waste shall carry the full climate impact until the point in the product's life cycle at which the waste is transported to a scrapyard or gate of a waste processing plant (collection site). The subsequent user of the waste shall carry the climate impact from the processing and refinement of the waste but not the impact caused in the "earlier" life cycles.

The allocation procedure for core processes shall be based on processing time. When this is not possible, the adoption of different allocation procedures shall be justified.



## PCR APPLICABILITY

1. Impact category indicator results
2. PCR use for EPD purpose



This document constitutes the Product Category Rules (PCR<sup>2</sup>) developed by Carbon Footprint Italy with a technical collaboration with EPDIItaly ([www.epditaly.it/en](http://www.epditaly.it/en)) for the additional EPD impact categories.

The requirements described in this Product Category Rules (PCR) are specified in addition to the ones indicated in the ISO standard 14067. Therefore, both the PCR and the ISO 14067 requirements shall be fulfilled in order to register to Carbon Footprint Italy.

In fact, this PCR was conceived and developed for CFP studies. Anyway, it can also be used for EPD (Environmental Product Declaration); to do this, the additional specific regulations required by the programme operator selected for the EPD registration should be followed as well (see Section 4.2).

So, in this PCR only the parameter reported in Section “Impact category indicator results” shall be included.

## 1. Impact category indicator results

The present PCR is aimed at the development of CFP. Therefore, a special focus is on the “Global Warming Potential” indicator.

The specific GHG emissions and removals treatment in the CFP or partial CFP that shall be quantified and documented separately in the CFP study report are reported in the ISO 14067:2018, Table 1 of chapter 6.4.9.8.

Four GWP indicators shall be declared, which differentiates greenhouse gases depending on their origin: GWP-fossil, GWP-biogenic emissions, GWP-land use and land use change (dLUC), and GWP-biogenic removals, in accordance with the mentioned ISO 14067:2018 standard.

It should be noted that other impact categories can be relevant for the product category under assessment, other than the “Global Warming Potential” category. Therefore, in order to integrate the CFP results and to provide a broader view of the product environmental impacts, more impact categories shall be evaluated. The details of this option are outlined in the following sections.

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<sup>2</sup> Product Category Rules (PCRs) are documents that provide the rules, requirements and guidelines for developing a CFP study for a specific product category. PCRs are necessary to ensure uniformity of methodological approach to studies and to allow comparability between CFP studies related to products of the same category. The PCR development process is described in the “PQ04 PCR development” procedure, which can be downloaded in the dedicated section of the website. This PCR follows the requirements of ISO/TS 14027, ISO 14067 and ISO 14025.

## 2. PCR use for EPD purpose

This PCR was conceived and developed for CFP studies. Anyway, it can also be used for EPD (Environmental Product Declaration); to do this, other predetermined parameters or extension of system boundary required by the programme operator selected for the EPD registration shall be followed. These parameters are:

- other impact category indicator results (see table 1 and following);
- inventory results that are elementary flows;
- data that do not represent elementary flows;
- additional environmental information.

About the extension of System Boundary, if the product is considered as electric/electronic product, its Life Cycle Assessment (LCA) shall be developed in conformity with EN 50693 with the impacts shown into table 1 and following.

More information could be found from EN 50693 or general PCR into EPDItaly System.

If the product is not an electric/electronic product the EPD developer shall use this PCR with the impacts shown into table 1 and following.

| Impact category   | Impact indicator  | Unit of measurement                       |
|---|---|---|
| Climate change - total                                  | Global Warming Potential total (GWP-total)  | kg of CO <sub>2</sub> equivalent          |
| Ozone Depletion   | Depletion potential of the stratospheric ozone layer (ODP)  | kg of CFC-11 equivalents                  |
| Acidification   | Acidification potential, Accumulated Exceedance (AP)  | moles of H <sup>+</sup> equivalents       |
| Eutrophication of water                                 | Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | kg of P equivalent                        |
| Eutrophication aquatic marine                           | Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine)         | kg of N equivalent                        |
| Eutrophication terrestrial                              | Eutrophication potential, accumulated exceedance (EP-terrestrial)                                   | mol of N equivalent                       |
| Photochemical ozone formation                           | Formation potential of tropospheric ozone (POCP)  | kg of NMVOC equivalents                   |
| Depletion of abiotic resources - minerals and materials | Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)                          | kg of Sb equivalents                      |
| Depletion of abiotic resources - fossil resources       | Abiotic Depletion for fossil resources potential (ADP-fossil)                                       | MJ, calculated using net calorific values |





|           |   |                            |
|-----------|---|----------------------------|
| Water use | Water deprivation potential, deprivation-weighted water consumption (WDP) | m <sup>3</sup> equivalents |
|-----------|---|----------------------------|

TABLE 1: OTHER IMPACT CATEGORY

The environmental impact indicators must be determined using the characterization factors and impact assessment methods specified in EN 15804:2012+A2:2019.

| Parameters  | Unit of measurement     |
|---|-------------------------|
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)               | MJ, net calorific value |
| Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)                        | MJ, net calorific value |
| Use of non-renewable primary energy resources used as raw material (PENRM)  | MJ, net calorific value |
| Use of renewable primary energy resources used as raw material (PERM)   | MJ, net calorific value |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT) | MJ, net calorific value |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)      | MJ, net calorific value |
| Net use of fresh water (FW)   | m <sup>3</sup>          |
| Use of secondary raw materials (MS)   | kg                      |
| Use of renewable secondary fuels (RSF)  | MJ                      |
| Use of non-renewable secondary fuels (NRSF)   | MJ                      |

TABLE 2: PARAMETERS DESCRIBING RESOURCE USE

| Impact category                     | Unit of measurement     |
|-------------------------------------|-------------------------|
| Hazardous landfill waste (HWD)      | kg                      |
| Non-hazardous waste disposed (NHWD) | kg                      |
| Radioactive waste disposed (RWD)    | kg                      |
| Materials for energy recovery (MER) | kg                      |
| Material for recycling (MFR)        | kg                      |
| Components for reuse (CRU)          | kg                      |
| Exported thermal energy (ETE)       | MJ, net calorific value |
| Exported electricity energy (EEE)   | MJ, net calorific value |

TABLE 3: WASTE PRODUCTION DESCRIPTIVE PARAMETERS



## COMPLEMENTARY INFORMATION

1. PCR use within other programme operators
2. Glossary
3. Bibliography
4. Underlying studies
5. Other existing PCR



## 1. PCR use within other programme operators

Carbon Footprint Italy believes in the importance of sharing different existing experiences, and considers the different Programme Operators as organizations that cooperate for a global climate transition.

CFI maintains the copyright of the document to ensure that it is possible to publish, update when necessary, and available to all organisations to develop and register CFPs. Stakeholders participating in PCR development should be acknowledged in the final document and on the website.

This PCR can be openly used by each CFP or EPD Programme Operator, if the original source of the know-how is mentioned (namely, the “PCR 2022-0003”, developed by Carbon Footprint Italy).

## 2. Glossary

|                 |  |
|-----------------|--|
| CO <sub>2</sub> | Carbon dioxide                                 |
| CPC             | Central product classification                 |
| CFI             | Carbon Footprint Italy                         |
| CFP             | Carbon Footprint of Products                   |
| GHG             | Greenhouse gases                               |
| ISO             | International Organization for Standardization |
| kg              | Kilogram                                       |
| LCA             | Life cycle assessment                          |
| PCR             | Product Category Rules                         |
| UN              | United Nations                                 |

## 3. Bibliography

EN (2019), EN 50693:2019, Product category rules for life cycle assessments of electronic and electrical products and systems

ISO (2000), ISO 14020:2000, Environmental labels and declarations – General principles

ISO (2017), ISO 14026:2017, Environmental labels and declarations – Principles, requirements and guidelines for communication of footprint information

ISO (2021), ISO 14040:2021, Environmental management – Life cycle assessment – Principles and framework

ISO (2021), ISO 14044: 2021, Environmental management – Life cycle assessment – Requirements and guidelines

ISO (2018), ISO 14067:2018, Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification

PQ 04 PCR Development, Carbon Footprint Italy

## 4. Underlying studies

The methodological choices made during the development of this PCR (functional unit/declared unit, system boundary, allocation methods, impact categories, data quality rules, etc.) in this PCR were primarily based on the following underlying studies:

- *CFP Systematic Approach of SIT SpA products*, Aequilibria Srl – SB, 2022

## 5. Other existing PCR

As part of the development of this PCR, existing PCRs were considered in order to avoid overlaps in scope. The existence of such documents was checked in the public PCR listings of the following programmes based on ISO 14025 or similar:

- EPDIItaly
- International EPD® System.



|   |  |
|---|--|
| <b>Programme operator:</b>              | <b>Carbon Footprint Italy</b><br>P.le Martiri delle Foibe 5, 30175 Venezia Marghera, Venezia, Italy<br>Website: <a href="http://www.carbonfootprintitaly.it/en/">www.carbonfootprintitaly.it/en/</a><br>E-mail: <a href="mailto:info@carbonfootprintitaly.it">info@carbonfootprintitaly.it</a> |
| <b>Product category:</b>                | Gas meters   |
| <b>Registration number and version:</b> | 2022-0003, version 1.0   |
| <b>CPC classification code:</b>         | 48623  |
| <b>Geographical scope:</b>              | Global   |
| <b>PCR moderator:</b>                   | Marta Mancin, Aequilibria Srl – SB, <a href="mailto:mmancin@aequilibria.com">mmancin@aequilibria.com</a>   |
| <b>PCR Committee:</b>                   | SIT SpA; Aequilibria Srl – SB  |
| <b>PCR Review panel</b>                 | The Technical-Scientific Committee of Carbon Footprint Italy and the technical support of EPDItaly.<br>The review panel may be contacted via <a href="mailto:info@carbonfootprintitaly.it">info@carbonfootprintitaly.it</a>  |
| <b>PCR initiation phase:</b>            | 2022-07-11   |
| <b>Open consultation:</b>               | 2022-09-12 – 2022-10-11  |
| <b>Publication:</b>                     | 2022-11-1  |
| <b>Valid until:</b>                     | 2027-11-10   |