ABB EQ METER

# Product Environmental Profile

## Environmental Product Declaration


Document in compliance with ISO 14025: 2010 "Environmental labels and declarations. Type III environmental declarations"

| ORGANIZATION | | CONTACT INFORMATION | | | |
|---|---|---|---|---|---|
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| STATUS | SECURITY LEVEL | REGISTRATION NUMBER | REV. | LANG. | PAGE |
| In Review | Public | ABBG-00006-V01.01-EN | 1 | en | 1/10 |

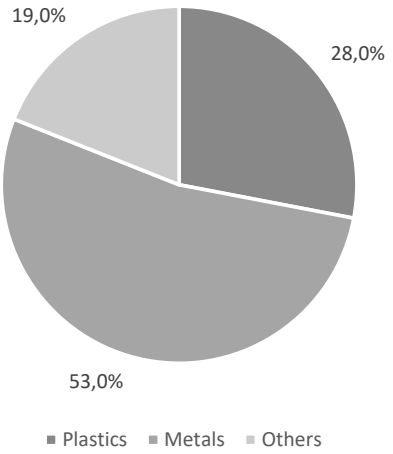
# ABB Purpose & Embedding Sustainability

ABB is committed to continually promoting and embedding sustainability across its operations and value chain, aspiring to become a role model for others to follow. With its ABB Purpose, ABB is focusing on reducing harmful emissions, preserving natural resources and championing ethical and humane behavior.

# General Information

| | |
|---|---|
| **Reference product** | ABB EQ METER B23 111-100 |
| **Description of the product** | Advanced compact DIN-rail meter with an easy to read back lighted display. The meter is intended for use in the commercial or residential buildings etc. The meter can be used in 3 or 4 wire systems. The meter has several instrumentation values, 25 possible alarms and event logs. Three phase direct connected for active energy. One output for pulses or alarm etc. Accuracy class 1.0 (or B for MID meters). The meters is IEC approved + MID approved and verified. |
| **Functional unit** | Measure energy consumption for sub billing purposes with direct and indirect (via CT) connection. The measure has to be provided with a rated level of accuracy (1%). The measurement can be readout by the user in different ways (based on the product code): via HMI, via Modbus or via Mbus |
| **Other products covered** | ABB EQ METER B21 112-100<br>ABB EQ METER B23 112-100<br>ABB EQ METER B23 113-100<br>ABB EQ METER B24 113-100<br>ABB EQ METER C11 110-301 |

# Constituent materials




| | |
|---|---|
| **Total weight of Reference product** | 302 g |

| **Plastics as % of weight** | | **Metals as % of weight** | | **Others as % of weight** | |
|---|---|---|---|---|---|
| **Name and CAS number** | **Weight-%** | **Name and CAS number** | **Weight-%** | **Name and CAS number** | **Weight-%** |
| Plastics | 28,0 | Metals | 53,0 | Others (including electronics) | 19,0 |

Products of this range are designed in conformity with the requirements of the RoHS directive (European directive 2011/65/EU), considering exemptions if applicable. Details of RoHS and REACh substances information are available on ABB Website. Products of this range are also in scope of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

# Additional Environmental Information

| | |
|---|---|
| **Manufacturing** | Manufacturing takes place in ABB plant in Santa Palomba (RM), Italy. The site is ISO14001 certified. |
| **Distribution** | Distribution scenario has been modelled considering ABB average market for the product. ABB EQ meters delivery scenario includes 1039 km by ship and 3332 km by truck |
| **Installation** | As installation is performed manually, no environmental burdens are associated to this phase besides end of life of product packaging |
| **Use** | Use phase scenario has been modelled based on PCR v3 requirements and scenarios. Based on PCR parameters, total energy demand for the use phase is equal to 126 kWh |
| **End of life** | End of life scenario has been modelled based on PCR v3 requirements and scenarios. 1000 km from waste generation to waste treatment facility are considered |
| **Software and database used** | Simapro v 9.3.0.2 - Ecoinvent v 3.8 + ELCD |
| **Standards** | "PCR-ed3-EN-2015 04 02" (PEP Association, 2015)<br>"PSR-0005-ed2-EN-2016 03 29" (PEP Association, 2016b) |

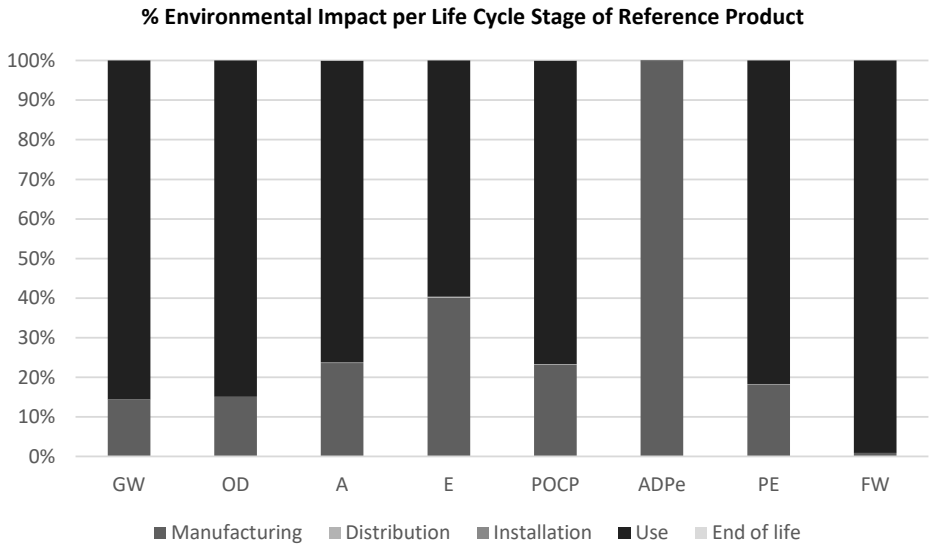
# Environmental impacts

| | |
|---|---|
| **Reference lifetime** | 20 years |
| **Product category** | Electrical switchgear and control gear Solutions. Meters have been modelled with parameters specified by PSR as "Other equipment" in its scope (§3.13) |
| **Installation elements** | N/A |
| **Use scenario** | Load measurement related to customer applications. Maximum current is related to the product (for direct connection max 65A for B series and 40A for C series) and the |
| **Geographical representativeness** | World |
| **Technological representativeness** | ABB Energy Meters have the following instrumentation values as a minimum: Active power, Voltage, Current, Power factor; and are designed to monitor energy consumption and energy |
| **Energy model used** | |
| **Manufacturing** | Italian grid mix, medium voltage |
| **Installation** | N/A |
| **Use** | European grid mix, medium voltage |
| **End of life** | N/A |

## Compulsory Indicators

| Impact indicators | Unit | Total | Manu-facturing | Distri-bution | Instal-lation | Use | End of life |
|---|---|---|---|---|---|---|---|
| Global warming (GW) | kg $CO_2$ eq. | 7,233E+01 | 1,040E+01 | 3,380E-02 | <0,01% | 6,190E+01 | <0,01% |
| Ozone depletion (OD) | kg CFC-11 eq. | 4,746E-06 | 7,160E-07 | <0,01% | <0,01% | 4,030E-06 | <0,01% |
| Acidification of soil and water (A) | kg $SO_2$ eq. | 3,384E-01 | 7,980E-02 | 5,340E-04 | <0,01% | 2,580E-01 | 4,110E-05 |
| Eutrophication (E) | kg $(PO_4)^3$ eq. | 2,616E-02 | 1,050E-02 | 6,400E-05 | <0,01% | 1,560E-02 | <0,01% |
| Photochemical ozone creation (POCP) | kg $C_2H_4$ eq. | 1,852E-02 | 4,290E-03 | 2,840E-05 | <0,01% | 1,420E-02 | 2,410E-06 |
| Depletion of abiotic resources – elements (ADPe) | kg Sb eq. | 3,754E-03 | 3,750E-03 | <0,01% | <0,01% | 4,420E-06 | <0,01% |

| Resource use indicators | Unit | Total | Manu-facturing | Distri-bution | Instal-lation | Use | End of life |
|---|---|---|---|---|---|---|---|
| Total use of primary energy (PE) | MJ | 8,545E+02 | 1,560E+02 | 4,530E-01 | <0,01% | 6,980E+02 | <0,01% |
| Net freshwater use (FW) | $m^3$ | 2,966E+01 | 2,600E-01 | <0,01% | <0,01% | 2,940E+01 | <0,01% |



2 identified parameters allow to identify a linear dependency between impacts and product features. Therefore, linear interpolation has been performed to estimate the relations among products in the same family.

*Overview of representative products and parameters*

| Product family | Reference product for which PEP results are reported | Parameter – All life cycle stages besides use phase | Parameter – Use phase |
|---|---|---|---|
| EQ meters | EQMETER B23 111-100 | PCBA mass in the product [g] | Nominal power [W] |

An overview of selected models and reference nominal parameters is reported below:

*List of reference parameters for interpolation*

| METER FAMILY | PCBA mass [g] | power [W] |
|---|---|---|
| 5. EQMETER B21 112-100 | 42,57 | 0,41 |
| 6. EQMETER B23 111-100 | 38,13 | 0,72 |
| 7. EQMETER B23 112-100 | 45,70 | 0,72 |
| 8. EQMETER B23 113-100 | 43,07 | 0,72 |
| 9. EQMETER B24 113-100 | 58,74 | 0,72 |
| 10. EQMETER C11 110-301 | 26,00 | 0,22 |

Next sections contain information and details about how the extrapolation rules have been computed for the product family. These extrapolation rules allow to pass from impacts reported in the PEP associated to a reference product to impacts associated to different products in the same family, providing the reference parameter.

For the investigated category the equation linking impacts among products is defined as

$$y = ax + b$$

Where:
y is the generic environmental impact category
x is the nominal value of reference parameter
a and b are coefficients computed starting from the assumption about the existence of linear dependency between impacts and product features

Next section contains all the details and the parameters to extrapolate results for other products in the same homogeneous family, and an example of extrapolation.

| Interpolation | | | B23 212-200 (PCBA mass 38,13 g) | |
|---|---|---|---|---|
| MANUFACTURING STAGE y = ax + b | a | b | Formula | Result |
| **Global warming** | 0,1935 | 2,7630 | a*PCBA mass (x) +b | 10,1418895 |
| **Ozone depletion** | 0,0000 | 0,0000 | a*PCBA mass (x) +b | 0,0000007 |
| **Acidification** | 0,0011 | 0,0212 | a*PCBA mass (x) +b | 0,0648494 |
| **Eutrophication** | 0,0002 | 0,0013 | a*PCBA mass (x) +b | 0,0098354 |
| **Photochemical ozone formation** | 0,0001 | 0,0011 | a*PCBA mass (x) +b | 0,0037066 |
| **Depletion of abiotic resources** | 0,0001 | 0,0004 | a*PCBA mass (x) +b | 0,0033450 |
| **Total use of primary energy** | 2,9888 | 36,9438 | a*PCBA mass (x) +b | 150,9068466 |
| **Net use of fresh water** | 0,0015 | 0,1982 | a*PCBA mass (x) +b | 0,2538026 |

| Interpolation | | | B23 212-200 (Power 0,721 W) | |
|---|---|---|---|---|
| USE STAGE y = ax + b | a | b | Formula | Result |
| **Global warming** | 85,8622 | - 0,0264 | a*Power (x) +b | 61,8801826 |
| **Ozone depletion** | 0,0000 | - 0,0000 | a*Power (x) +b | 0,0000040 |
| **Acidification** | 0,3582 | - 0,0001 | a*Power (x) +b | 0,2581201 |
| **Eutrophication** | 0,0216 | - 0,0000 | a*Power (x) +b | 0,0155849 |
| **Photochemical ozone formation** | 0,0197 | - 0,0000 | a*Power (x) +b | 0,0141832 |
| **Depletion of abiotic resources** | 0,0000 | - 0,0000 | a*Power (x) +b | 0,0000044 |
| **Total use of primary energy** | 968,7816 | - 0,2982 | a*Power (x) +b | 698,1933345 |
| **Net use of fresh water** | 40,7892 | - 0,0126 | a*Power (x) +b | 29,3964445 |

| A41 - A42 -A43 - A444 | | | | | |
|---|---|---|---|---|---|
| A41 111-100 | 2CMA170554R1000 | A43 112-100 | 2CMA100244R1000 | A44 212-600 | 2CMA225223R1000 |
| A41 111-200 | 2CMA100082R1000 | A43 112-200 | 2CMA100555R1000 | A44 213-100 | 2CMA170535R1000 |
| A41 112-100 | 2CMA170500R1000 | A43 113-100 | 2CMA100245R1000 | A44 213-200 | 2CMA100124R1000 |
| A41 112-200 | 2CMA100083R1000 | A43 113-10Ö | 2CMA101624R1000 | A44 213-600 | 2CMA225213R1000 |
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| B21 - B23 - B24 | | | | | |
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| B21 112-100 | 2CMA100150R1000 | B23 212-10M | 2CMA106054R1000 | B24 311-400 | 2CMA100265R1000 |
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| B21 112-10N | 2CMA218942R1000 | B23 212-300 | 2CMA100160R1000 | B24 312-300 | 2CMA100176R1000 |
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| B23 112-10M | 2CMA100689R1000 | B24 113-100 | 2CMA100179R1000 | | |
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| B23 112-300 | 2CMA100159R1000 | B24 212-10D | 2CMA104354R1000 | | |
| B23 112-400 | 2CMA100258R1000 | B24 212-200 | 2CMA100812R1000 | | |
| B23 113-100 | 2CMA100165R1000 | B24 212-300 | 2CMA100174R1000 | | |

| C11 -C13 | |
|---|---|
| C11 110-100 | 2CMA100014R1000 |
| C11 110-101 | 2CMA103571R1000 |
| C11 110-10A | 2CMA101403R1000 |
| C11 110-300 | 2CMA170550R1000 |
| C11 110-300 (B10) | 2CMA170600R1000 |
| C11 110-301 | 2CMA103572R1000 |
| C11 110-401 | 2CMA103573R1000 |
| C11 110-401 B | 2CMA104388R1000 |
| C13 110-100 | 2CMA100191R1000 |
| C13 110-101 MID | 2CMA103574R1000 |
| C13 110-300 | 2CMA100192R1000 |
| C13 110-300 | 2CMA100194R1000 |
| C13 110-301 | 2CMA103575R1000 |
| C13 110-401 | 2CMA104386R1000 |
| C13 110-401 B | 2CMA104387R1000 |

## Environmental Impact Indicator Glossary

| Impact indicators | Description | Unit |
|---|---|---|
| Global warming (GW) | Indicator of potential global warming caused by emissions to air contributing to the greenhouse effect. Includes fossil and biogenic | kg $CO_2$ eq. |
| Ozone depletion (OD) | Indicator of emissions to air that contribute to the destruction of the ozone layer | kg CFC-11 eq. |
| Acidification of soil and water (A) | Indicator of the potential acidification of soils and water caused by the release of certain gases to the atmosphere | kg $SO_2$ eq. |
| Eutrophication (E) | Indicator of the contribution to eutrophication of water by the enrichment of the aquatic ecosystem with nutritional elements, e.g. industrial or domestic effluents, agriculture, etc. | kg $(PO_4)^3$ eq. |
| Photochemical ozone creation (POCP) | Indicator of emissions of gases that affect the creation of photochemical ozone in the lower atmosphere (smog) because of the rays of the sun. | kg $C_2H_4$ eq. |
| Depletion of abiotic resources – elements (ADPe) | Indicator of the depletion of natural non-fossil resources | kg Sb eq. |

| Resource use indicators | Description | Unit |
|---|---|---|
| Total use of primary energy (PE) | Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) + Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) | MJ (lower heating value) |

| | | | |
|---|---|---|---|
| Registration number: | | Drafting Rules: | PCR-ed3-EN-2015 04 02 |
| ABBG-00006-V01.01-EN | | Supplemented by: | PSR-0005-ed2-EN-2016 03 29 |
| Verifier accreditation number: | | Information and reference documents: | |
| VH40 | | www.pep-ecopassport.org | |
| Date of issue: | 07/22/2022 | Validity period: | 5 years |

Independent verification of the declaration and data, in compliance with ISO 14025: 2010

Internal ○ External ◉

The PCR review was conducted by a panel of experts chaired by Philippe Osset (SOLINNEN)

PEP are compliant with XP C08-100-1: 2016
The elements of the present PEP cannot be compared with elements from another program

Document in compliance with ISO 14025: 2010 "Environmental labels and declarations. Type III environmental declarations"