

Product-Category Rules (PCR)
for preparing an environmental product
declaration (EPD) for

Household Washing Machines

PCR 2008:1.1

Environment and Development Foundation

Version 1.1

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1. General Information

This document is to be used as the product category rules (PCR) for Household Washing Machines. This PCR applies to household washing machines manufactured worldwide. The requirements specified in this PCR are intended to be used for EPDs certified in accordance with ISO 14025 standard. This document shall be valid until July 11, 2010.

This PCR is jointly prepared by the Taiwan Electrical and Electronic Manufacturers' Association (TEEMA) and the TECO Electric and Machinery Co., Ltd. Representatives from major Taiwanese household washing machine manufacturers and stakeholders were invited to the open consultation meeting on November 11, 2008, which approved this PCR.

For further information concerning this PCR, please contact Mr. Gordon H.C Lee of TECO (Tel: ((03)4734901, ext 1223; Fax: (03) 473 4922; email: gordon@teco.com.tw).

2. Company and product description

The EPD shall include information about the manufacturing companies/organizations. The information may include manufacturing process related information, and environmental related information, such as the environmental management system information. The information may also include special issues which the companies/organizations would like to emphasize, such as the product meeting certain environmental criteria, or environmental safety and health related information.

This PCR covers the household washing machine products, and the products denoted here also include their packaging.

2.1 Product function

The household washing machines in this PCR denote a group of household electrical appliances used for cleaning, rinsing and spin-drying/dehydrating (the product may also include the drying function if fitted with a dryer) of clothing.

2.2 Product components

The household washing machine is consisted of the following main components: door assembly, front cabinet cover assembly, top plate assembly, cabinet, tub assembly,

drum assembly, electronic components, cardboard box, impact absorbing material and packaging material.

The data quality requirements for the main components are described in Section 9 on calculation rules and data quality requirements. The EPD shall also include the other components of the household washing machine, but their data quality requirements are different from those of the main components.

2.3 Product technical description

The product technical description part of the EPD shall include the following information:

1. washing/dehydrating capacity (kg)
2. drying capacity (kg)
3. standard water consumption (L)
4. total amount of detergent used (kg)
5. dimension: width (W) x height (H) x depth (D) (mm)
6. weight (kg)
7. nominal electric power consumption (W)
8. dehydration/spin-drying speed (rpm)
9. noise
10. additional functions etc.

3. List of parts and banned substances

The contents of the following parts and substances in the product shall be declared:

- All parts with weigh ratio (part weigh/product weight) $\geq 0.5\%$;
- All banned substances regulated by legal and customer requirements;
- The following materials in the main components: flame retardants, lead content in solder, lead and flame retardant content in solder mask, and substances regulated by RoHS Directive (2002/95/EC).

The declaration of halogen-free flame retardants, lead-free solders and no RoHS-regulated substances may only be made when appropriate evidences are available (for example, test reports from accredited laboratories/testing facilities). The following organizations may provide accreditation for certification organizations: Taiwan Accreditation Foundation (TAF), (Asia Laboratory Accreditation Cooperation (APLAC), International Laboratory Accreditation Cooperation (ILAC) or ILAC

Mutual Recognition Arrangement (ILAC MRA). For definitions of testing methodology and confirmations of regulated hazardous substances based on the accredited laboratories' product testing methods, please refer to the (Draft) IEC 62321 Standard.

4. Functional unit

The functional unit is defined as one unit of household washing machine, as the household washing machines are marketed and sold in such units.

5. System boundaries

The system boundaries of the product system are presented as follows:

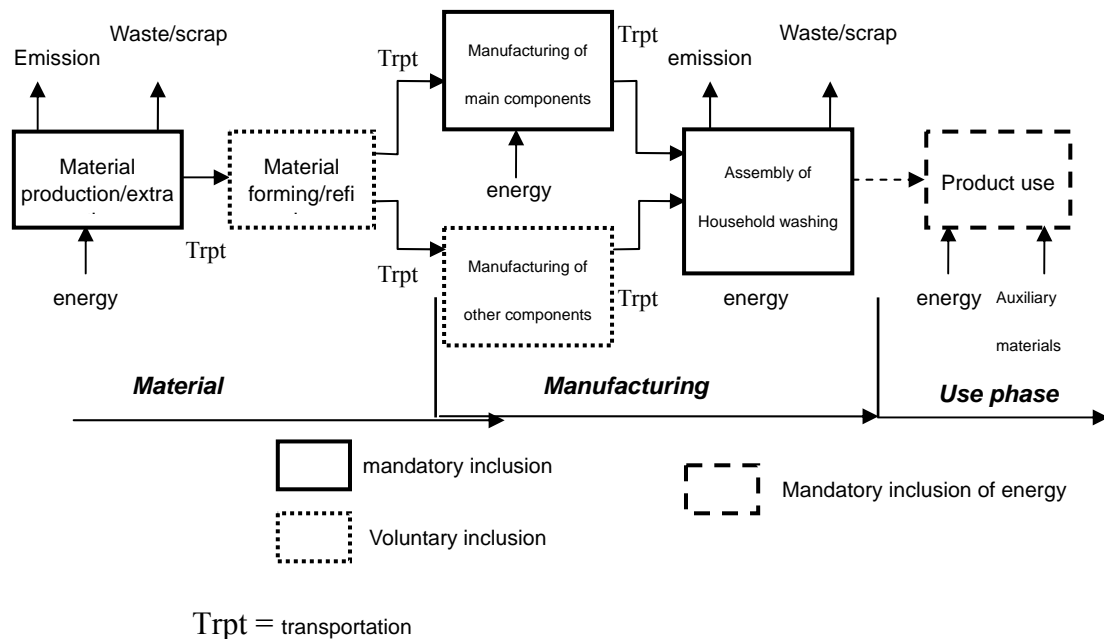


Figure 1 System boundary of the main product system

As described in the Figure 1 above, the life cycle of a household washing machine covers the manufacturing and use phases. Provision of recycling information is of the voluntary declaration nature (see Section 11).

Manufacturing Phase

The LCA shall include information for the following unit processes:

- Material extraction and production for main components and other smaller parts

- Manufacturing of main components
- Assembly of product
- Transportation of main components to product manufacturers
- Transportation of main assemblies to product manufacturers

The inclusion in the LCA the information on the material forming and refining and manufacturing of smaller parts is of the voluntary reporting nature. When voluntarily reported information is included, they shall be explained in the EPD.

Use Phase

The standard scenario for the usage of a household washing machine is:

- Total electric power consumption = {(the yearly number of times the washing machine is used × power consumption per use) + (annual standby time × power consumption at the standby mode)} × lifetime
- Total water consumption = {(the yearly number of times the washing machine is used × water consumption per use)} × lifetime
- Total detergent consumption = {(the yearly number of times the washing machine is used × detergent consumption per use)} × lifetime
- Define the lifetime of a washing machine to be 7 years; the yearly number of times the washing machine is used to be 730 (2 times a day).
- If the product is fitted with a dryer, assumed the yearly number of times the dryer is used is 38, and the total electric power consumption is calculated as below:
 - ※ Total electric power consumption = {(the yearly number of times the washing machine is used (730) × power consumption per use) + (the yearly number of times the dryer is used (38) × (power consumption per use) + (standby time × power consumption at the standby mode))} × lifetime
- A “use” is defined as a cycle that the washing machine operates to wash the maximum amount of laundry (i.e. the capacity) at the product-specific standard course.
- The detergent consumption throughout the lifetime of the product shall be included in the information on product characteristics. Since the responsibility for the environmental impact resulted from the detergent is taken by the detergent manufacturer independently of the use of the washing machine, the detergent is not included; the message “This environmental declaration does not include the environmental information on the detergent.” should be written on the EDP Certificate (Separately provided).
- The message “This environmental declaration is based on the assumption that the lifetime of the product is 7 years.” should be written in the item “4. Other Information” in the EDP Certificate (Separately provided).

- The total electric power consumption at washing cycle and drying cycle should be individually documented in the item “4. Other Information” in the EDP Certificate (Separately provided).

Recycling/end of life

The reporting of recycling information (such as recycling and dis-assembly report and information on recycling channels) is mandatory in the EPD.

5.1 Specification of different boundary settings

Boundary in time

The validity period for the LCA results presented in the LCA report shall be defined.

Boundary towards nature

If the manufacturing processes are located within Taiwan, the waste categories as defined in Taiwan’s Waste Disposal Act shall be adopted. If the processes are located in other countries, equivalent legal requirements shall be considered.

The natural boundary of the system shall describe the boundary where the materials and energy resources flow from nature into the system, and where the water and air emissions and waste are released out of the system.

Only the waste which is required to be disposed of needs to be considered; the landfilling process does not need to be included. If the waste will be treated through water treatment or incineration, these processes need to be included.

Boundaries in the life cycle

The boundaries in the product life cycle are described in the Figure 1. Site and infrastructure constructions, the production of manufacturing equipment and activities of the workers do not need to be included.

Boundaries towards other technical systems

Boundaries towards other technical systems describe the inputs of material and other components towards other systems, as well as outputs of materials towards other systems. For the inputs of recycled materials and energy towards the product manufacturing phase, the transportation between the recycling process and use of recycled materials shall be included in the data set. For the production of recyclable

products during the manufacturing phase, the transportation towards the recycling process shall be included.

(Note: Further explanations are provided in Section 7 on open-loop recycling)

Boundaries regarding geographical coverage

The manufacturing phase may cover manufacturing processes located on any sites around the world. For processes located in a specific region, the data used should be representative of the region. The data for the main components shall be the specific regional data for the region where the process takes place (see Section 9). For ease of comparison, no matter where the emissions are generated, the same parameters should be used for life cycle impact assessment (see Section 10).

6. Cut-off rules

For any impact category, if the sum of various impacts from a specific process/activity is less than 1% of the impact equivalent in that category, such a process/activity may be neglected during the inventory analysis. Parts and materials omitted from the LCA shall be documented.

(Note: This judgment for this “1% Rule” is based on the environment relevance assessment of material input to the system, and does not consider special and exceptional environmental impacts.)

7. Allocation rules

While selecting allocation rules, the following principles are recommended:

- Multi-output: The allocations are based on the changes in the resource consumption and pollutant emissions (for example, adopted quantity allocation for some main component, or surface allocation for some components), following the changes in the studied system’s output product or function or economical relationship.
- Multi-input: The allocation is based on actual relationship. For example, the manufacturing process’s emissions may be affected by the change in waste flow input.
- Open loop recycling: For the input of recycled materials or energy during the manufacturing phase of the product system, the transportation between the recycling process and the recycling to material use shall be included in the dataset. For the product which shall be recycled during the manufacturing phase, the

transportation towards the recycling process shall be included.

Notes:

- *The main allocation rules shall be valid for the entire product system. For other secondary processes, other allocation rules may be defined; however, the use of these rules should be justified.*
- *Product-specific information should be preferentially collected in order to avoid the need for allocation.*
- *Allocation may be avoided through avoidance of dividing processes, for example as described in Section 6.3 of ISO/TR 14049; or through expansion of system boundary (for example as described in Section 6.4), so that the amended system shares the same product exchanges as the original system.*

8. Units

The following units shall be used:

SI units (Système International d'unités)

Preferentially used power and energy units:

- power units use kW or W;
- energy units use kWh.

Preferentially used specification units:

- capacity units use L;
- weight units use kg.

9. Calculation rules and data quality requirements

- Site-specific data (for example, specific factory data or transportation data for a specific manufacturing process) shall be used for the production of main components and main assembly. If other types of data are used, the data and motives for using them shall be described.
- Generic data may be used in the manufacturing process for the household washing machine's smaller (not main) components. Generic data may also be used for the production of bulk materials (see Appendix I for sources of generic data). For example, when bulk materials are purchased in the spot market or while treating waste; or when suppliers refuse to provide specific data; or when the lack of

| | |
|----------------------------------|---|
| -Acidification | kg SO ₂ equivalent |
| -Photochemical oxidant formation | kg ethylene equivalent |
| -Eutrophication | kg P ₂ O ₅ equivalent |
| - Energy use | MJ |
| - Water | kg H ₂ O |

Use Phase

If the products are used by the users, the power consumption during active and low-power modes shall be provided.

If the product is equipped with a main switch, the power consumption during the power off mode shall be considered.

The following power and energy units shall be preferentially used: power units, kW or W; energy unit, kWh. (Describe mode of usage and any revision.)

Additional information

Recyclable materials (optional)

Information on secondary materials (optional)

Waste (classification):

- Hazardous waste as defined in Taiwan's Waste Disposal Act. Follow host countries' laws for sites outside Taiwan.
- Other waste.

(Note: The declared waste include both solid and semi-solid waste)

11. Recycling information

The recycling information shall include information such as dis-assembly instructions, which parts/components are suitable for recycling (such as metal cases) or not suitable for recycling (for example, the information requirements for the final product manufacturers contained in the WEEE Directive may also be included in the household washing machine's EPD).

Information for the parts which can not be recycled and therefore should be disposed of properly during the end-of-life phase may also be included.

12. Other environmental information (Optional)

The EPD may cover information including technology adopted, site of product manufacturing and assembly, as well as information on other working environment, health and risk-related aspects. The declaration may also include information which

the manufacturers possess and customers are interested in (such as on risk related issues), proper handling of products during usage and maintenance, reduction of environment impacts during product use, and environmental information systems (such as eco-labeling) products are in conformance with.

The decoration shall include most commonly seen emission information. The odor information shall also be included, as customers may request them while purchasing.

13. Information about the certification

The information on PCR review, EPD verification and verification organization shall be included.

The PCR review for Household Washing Machine (PCR 2008:) was administered by the Environment and Development Foundation and carried out by a LCA expert panel chaired by Dr. Ning Yu (ningyu@edf.org.tw).

Independent verification of the declaration, according to ISO 14025:2006

Internal External

Third party verifier : accredited by

Environmental declarations from different programmes may not be comparable.

14. References

The EPD shall make reference to the following documents:

- EPD General Program Instructions, Version 1.0 (2008-02-29), The International EPD Cooperation, downloaded from <http://www.gednet.org>;
- Relevant PCR documents;
- The underlying LCA report.

When available, the following documents shall also be referenced:

- Other documents and recycling instructions which verify and complement the EPD.

Appendix I – Generic Data Sources to Refer to

For processes located within Taiwan, the Taiwan generic data or the data published by the commercial, industrial and energy competent authorities of the Republic of China (ROC) government, may be used. However, for other regions (such as EU), if there are more relevant generic data available, these data should be used instead. When data from the following generic databases are used, the most current and updated data should be used:

| Material | Database | Published |
|-------------------------------|---|------------------|
| Steel | IISI (International Iron and Steel Institute) | 1998 |
| Copper | ICA (International Copper Association) | 1998 |
| Copper semi products | ICA (International Copper Association) + IME (Institut für Metallhüttenwesen und Elektrometallurgi, Aachen) | 1998 1995 |
| Electricity | ETH (Eidgenössische Technische Hochschule) Data combined with IEA (International Energy Agency) statistics 1998 | 1996 |
| Aluminum | EAA (European Aluminum Association) | 2000 |
| Plastics (and some chemicals) | APME (Association of Plastics Manufacturers in Europe) | 1993-1998 |
| Electronic components | EIME (Environmental Information and Management Explorer) EcoBilan | 1998-2000 |

Appendix II – Reporting Format for the EPD

This appendix provides guidance information for the titles of sections, types of data and required information to be reported in the mandatory reporting part of the EPD. As a generic reporting template, the following titles and sub-titles are recommended:

(Refer to the PCR manual for the section numbering, the information in Italics are the recommended data/information for inclusion)

Introductory part

Each EPD should have an introduction part on the top part of the EPD which includes the following information:

- *EPD system logo (LOGOTYPE)*
- *Company/organization name*
- *Product name*
- *EPD registration number*

Description of the company/organization and product/service

Company/Organization

- *Description of company/organization*
- *Description of overall working environment, existing quality system and environmental management system*

Product and services (see Section 2)

- *Product's main application*
- *Description of product specification, manufacturing process, manufacturing sites (if there are several sites)*
- *For product's environmental performance aspects, characteristics which may improve the usefulness of product*
- *Other types of relevant information, for example, special manufacturing processes with special advantages*

List of materials and chemical substances

- *Content declaration (see Section 3)*

Presentation of the environmental performance

- *Outline of the LCA methodology, for example, period of LCA, functional units, system boundaries (graphical presentation), cut-off and allocation rules, and*

data sources.

Manufacturing phase (see Section 10)

Use phase (see Section 10)

- *Geographical region for product delivery*
- *Transportation data*
- *End-of-life information*

Information about Company and Certification Organization

Recycling information (see Section 11)

Other environmental information (see Section 12)

Information regarding certification

- *Names of certification and verification organizations*
- *Validity of certification certificates*
- *Compliance with legal and relevant requirements*

References (see Section 13)

- *relevant PCR documents*
- *EPD Requirements, MSR 1999 : 2*
- *underlying LCA study*
- *other supporting documents for LCA information*
- *other relevant documents regarding company/organization's environmental activities*