

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

**Card Reader**

PCR 2009:1.0

Environment and Development Foundation

Version 1.0

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## **1. General Information**

This document is to be used as the product category rules (PCR) for card readers. 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 **10-22, 2011**.

This PCR is jointly prepared by DATAFAB SYSTEMS INC. and Taiwan Electrical and Electronic Manufacturers Association (TEEMA). Representatives from major Taiwanese manufacturers of similar products and stakeholders were invited to the open consultation meeting on October 09, 2009, which approved of this PCR.

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## **2. Company and product description**

The EPD shall include information about the manufacturing company/organization. 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 company/organization would like to emphasize, such as the product meeting certain environmental criteria, or environmental safety and health related information.

This PCR covers the card reader products, and the products denoted here also include their packaging.

### **2.1 Product function**

The card reader in this PCR denotes a memory card reading device used for the purposes of memory card data reading, writing, storage, and transmission. The card readers are widely used in 3C (computers, communication and consumer electronics) products as important data transmission devices.

### **2.2 Product components**

The card readers can be divided into external and built-in types, with the following basic components.

#### **2.2.1 External card readers include:**

1) basic components: PCB, control IC, connector, oscillator, capacitor, resistor and casing.

2) optional components/accessories: specific components or mechanisms selected based on clients' special design needs or brands, such as special components, LED, wires, and decorations.

2.2.2 Built-in card readers include:

1) basic components: PCB, control IC, connector, oscillator, capacitor, resistor and casing.

2) optional components/accessories: specific components or mechanisms selected based on clients' special design needs or brands, such as special components and mechanisms.

### **2.3 Product technical description**

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

1. Product description
2. Dimension
- 3 Weight
- 4 Transmission interface
- 5 Power consumption (\*meet the requirements of transmission interface)
- 6 Operation voltage
- 7 System requirements
- 8 System environment
- 9 Standard options (\*other accessories besides the products, such as wires, optical disc, hanging decorations)

### **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 substances in the products regulated by legal and customer requirements (such as substances regulated by the RoHS Directive (2002/95/EC)) and their conformance declaration;
- The following materials in the major components shall be declared: flame retardants, lead contents in solders, lead and flame retardants contents in anti-soldering agent (防錫劑??), 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

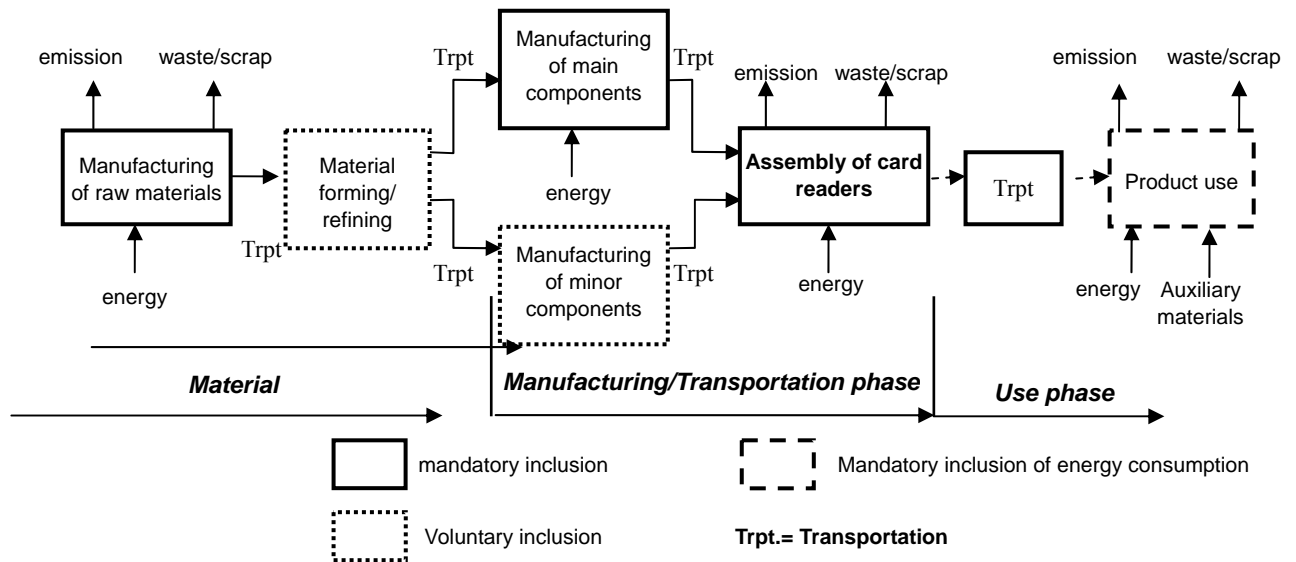
following organizations may provide accreditation for certification organizations: Taiwan Accreditation Foundation (TAF), (Asia Laboratory Accreditation Cooperation (APLAC), International Laboratory Accreditation Cooperation (ILAC) or ILAC Mutual Recognition Arrangement (ILAC MRA). For definitions of testing methodology and confirmations of regulated hazardous substances based on the accredited laboratories' product testing methods, please refer to the standards recognized by the industry, such as the IEC 62321 Standard.

#### **4. Functional unit**

The functional unit is defined as one unit of external card reader, or one piece of built-in reader, since the card readers are sold in the unit of one unit or one piece (including standard components).

## 5. System boundaries

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



\*: the scope for the transportation phase needs to be defined first.

**Figure 1 System boundary of the main product system**

As described in the Figure 1 above, the life cycle of a card reader covers only the manufacturing/transportation phase and the use phase. 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 minor parts;
- Manufacturing of main assembly
- Assembly of products
- Transportation of main assembly to product manufacturer
- Transportation of assembly to product manufacturer

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

## **Use Phase**

The product provides the clients or consumers with information on standby power consumption.

When practical, the clients or consumers' usage scenarios should be simulated to calculate the product energy consumption.

## **Recycling/end of life phase**

The recycling information (such as recycling or disassembly report or information on recycling channel) is a mandatory report information 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 is defined as two years at the maximum, and shall be invalid as soon as there is a process change.

### **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 the 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. The construction of the site and infrastructure, as well as 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 impact potential 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:

- weight units use kg;
- voltage units use volt;
- energy units use MJ.

## **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 in principle. If other types of data are used, the practicality and motives for using them shall be described.
- Generic data may be used in the manufacturing process of minor (not major)

components for card readers. 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 specific data will not greatly affect the final outcome. The general rule is that if generic data are used in place of specific data, their combined contribution for all life cycle phases shall not be greater than 10% of the total impact for any impact category. However, there may be exception for some specific products.

- The data shall be representative for the average of a specific year.

#### Data quality requirements for the manufacturing phase

- Site-specific data shall be used for the production of main assembly and main components.
- The date for electricity mix, water consumption, transportation mode/distance or other energy used for the manufacturing phase should be site-specific data. If site-specific data can not be obtained, the official electricity mix, water consumption, transportation mode/distance or other energy for the country where the site is located may be used as approximate value. The data for electricity mix, water consumption, transportation mode/distance or other energy should be documented.
- For the definition of hazardous waste, the definition as defined in Taiwan's Waste Disposal Act should be used for sites located in Taiwan. For sites located outside Taiwan, legal requirements for the host country shall be observed.
- For the transportation from the manufacturers, the transportation modes and distances from the suppliers shall be used.

## **10. Parameters to be declared in the EPD**

For the manufacturing phase, the following parameters shall be declared:

### Resource Use

Use of non-renewable resources:

- without energy content
- with energy content

Use of renewable resources:

- without energy content
- with energy content

Electricity consumption for the assembly of main assembly and main components (considered optional declaration information, as energy for production of electricity are already listed under renewable and non-renewable resources.)

Impact equivalents expressed as potential environmental impacts

-Global warming	kg CO <sub>2</sub> equivalent
-Energy	MJ
-Water	kg
-Acidification	kg SO <sub>2</sub> equivalent
-Eutrophication	kg PO <sub>4</sub> equivalent

Use phase

For products used at the user ends, the operating voltage used during the ON/operation mode and off/shutdown mode should be provided. Preferred voltage unit: volt.

Additional information

The environmental impact analysis on global warming for basic components is mandatory. Others are included voluntarily.

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 includes both solid and semi-solid waste)*

**11. Recycling information**

The recycling information shall include information such as which parts/components are suitable for recycling or not suitable for recycling. For example, the WEEE Directive requires information provided by end product manufacturers to be included into product declaration made by card readers.

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.

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.

EPD Certification is valid to 2011-10-22

According to the Requirements for the international EPD system. General Programme Instructions, version 1 – [www.environdec.com](http://www.environdec.com)

The PCR review for **Card Reader** (PCR 2009 : 1.0) was administered by the Environment and Development Foundation and carried by an LCA expert panel chaired by Dr. Ning Yu ([ningyu@edf.org.tw](mailto:ningyu@edf.org.tw))

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

Internal  External

Third party verifier : Environment and Development Foundation in Taiwan.

Accredited by :

Organization \_\_\_\_\_ Signature \_\_\_\_\_

Organization \_\_\_\_\_ Signature \_\_\_\_\_

Organization \_\_\_\_\_ Signature \_\_\_\_\_

Environmental declarations from different programs 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 Elektrometallurg, 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
Material (Data of Taiwan)	ITRI Doitpro Data	1992
Energy	Boustead model 5.0	2007

## **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 14)

- *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*