Verification Report according to ISO 14025: LCI Data - Related to the Aluminium Coil Coating Process - and EPD Tool for aluminium coil coated sheet

by
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Scope and Procedure

EAA runs an EPD program for aluminium building products. An EAA PCR document was developed in 2005 in order to settle the EPD program according to ISO 14025 rules. EAA developed an EPD tool for aluminium coil coated sheet and generated the first EPD by this tool.

In this context, the scope of this review had the following two objectives:

1. EAA organised environmental surveys among its members to collect and consolidate the process data for the aluminium coil coating process. These data have been integrated into a process model developed with the GaBi software in order to develop the associated LCI data. It was to be checked if these consolidated process data and the LCI data on the aluminium coil coating process have been developed properly according to the ISO 14044 rules.

The issue was therefore not a critical review of a Full LCA according to ISO 14040/44 but a review of

- the LCI data generation of one unit process that shall be in line with the rules of the standard and
- the combined modelling of this unit process together with the recently published and reviewed data of the European Aluminium Industry (EAA 2008) in order to generate data for the declared unit.

For this purpose the internal report on the unit process “coating” and the modelling of the declared unit were checked (see clause 1). This step prepares the verification of the EPD according to ISO 14025.

September 9th 2009 EAA (Mr. Leroy) provided the reviewer with an internal report, made additional information available on request and enabled direct communication with the practitioner (PE-International, Mr. Forell) generating the LCI data for the unit process “coil coating sheet production” and the modelling of the declared unit. Questions were discussed in three telephone conferences in a notedly open atmosphere and the report was revised for more transparency. The revised version is the basis for this verification report.

2. EPD generation by a software tool, using the data and the modelling explicated in the internal report, is intended for the use by EAA members. Based on product specificities that can be filled into an input mask by the user, the EPD tool supplies LCA based calculations for the specified aluminium coil coated sheet per declared unit. The user cannot influence the modelling. Results are LC indicators as well as text for additional information, both required by the PCR document on which the EPD are based.

   September 9th 2009 EAA (Mr. Leroy) provided the reviewer with one EPD in the long version and four EPD in the short version generated by the web-tool and in addition with the opportunity to test the tool online and to generate own EPD in order to check the logic of the tool.

   The objective was the verification of the web-tool according to ISO 14025, using the five EPD as examples. For this purpose in a first step, the delivered EPD were checked against the PCR document and in a second step the logic of the tool by variations of product specificities in the input mask (see clause 2). Open questions were as well discussed in the above-mentioned telephone conferences, the tool slightly modified according to PCR information requirements and the EPD revised. The revised versions are basis for this verification report.

1. Data generation for aluminium coil coated sheet

The first check of the internal report resulted in some questions concerning the representativity of the data, the data quality and the system modelling. These questions were communicated in written form to the commissioner and the practitioner of the study and discussed in an open atmosphere in telephone calls as well as by written communication. As a result, the internal report was revised with regard to transparency, checked again and assessed to be a proper basis for the web tool in order to generate EPD.

Clause 1.1 summarizes important methodological aspects of the generation of the unit process “coating”, clause 1.2 refers to the cradle-to-gate data set for the aluminium coil coated sheet.

1.1 Data collection and consolidation for the coil coating process

1.1.1 Representativity

To generate the LCI data of the coating process primary data of five plants for 2005 or 2006 were used. The collected data in five European plants of four companies represent slightly more than 50% of the European market of aluminium coil coated sheet.

The consolidation of the collected data take into account the volume of production, the proportion going to the building sector and the calculation of an average product based on weight and coating area.

The data are a proper basis for the assessment of burdens, connected with the aluminium coil coating process in the building sector.

1.1.2 Reference flow

The reference flow of the process data was chosen according to the declared unit of 1 m^2. Because the aluminium coil coated sheet is a pre-product for building products this choice is meaningful.

1.1.3 System boundaries

The system boundary for the unit process “coating” is gate-to-gate. For energy, coating material and ancillary material downstream burdens are included and for waste for incineration, a credit for electricity and thermal energy is calculated. In both cases, generic data from GaBi data bank were used. This data set is meaningful for use as unit process in the calculation of aluminium coil coated sheet. (see clause 1.2).

1.1.4 Cut-off criteria

The data set includes the inputs into the process for the most part. Few ancillary processes are not included but specified in the EPD and EAA mentions the effort to include these processes in future. A sensitivity analysis to check the percentage of the cut off inputs and connected impacts could improve the credibility (see also clause 1.2.3).

1.1.5 Allocation rules

Since the data represent the coil coating process, no co-product allocation was necessary. The credit for waste incineration is in line with the system modelling.

1.2 Data set for aluminium coil coated sheet

In order to generate a data set for aluminium coil coated sheet as basis for the EPD the unit process data for „coating“ are combined with additional data of the study EAA 2008.

1.2.1 Declared Unit/Functional Unit

The PCR requires a declared unit, if possible a functional unit. Since the aluminium coil coated sheet is a pre-product of building products, a declared unit of 1 m^2 is meaningful.

1.2.2 System boundaries

Since the production of possible building products is not under the regime of the aluminium industry, this phase is not included in the system boundary. The exclusion of the use phase is also plausible, because different products can be produced of the aluminium coil coated sheet. Included however is the aluminium recycling. This makes sense, because the recycling process of scrap is under the regime of the aluminium industry (EAA 2008).

In the modelling of the declared unit the data set for the coil coating process was connected with generic data for aluminium sheet production and scrap recycling published in the report EAA 2008.

1.2.3 Cut-off criteria

EAA 2008 mentions the 1 % rule for inputs, outputs and impacts as well as the internal report for the generation of data for the coating process. For hazardous and toxic materials and substances, the cut-off rules do not apply. These cut off rules are also included in the PCR (EAA 2007).

Because these cut-off criteria are not verifiable in case of the impacts, a modified wording was developed and the information of not considered processes as well as the intention to regard these processes in future is included. This meets reality better than the general statement in the PCR. In this sense, the greatest possible transparency is given in the report and in the EPD.

A paragraph is added into the EPD that gives information of toxic emissions related to the production state.

1.2.4 Allocation rules

The study uses the end-of-life recycling approach (avoided burden or credit approach) for recycled aluminium. The avoided burden of primary production is subtracted. This method is widely used in LCA practice and this approach is also included into the PCR document as well as into the Environmental profile Report (EAA 2008). The PCR specifies that the avoided burden approach shall only be used, if the recycled material fulfils the same product specifications as the primary material. Assumed a homogenous fraction of building product scrap this is plausible.

1.2.5 Impact assessment

Based on the LCI data the impact categories are calculated according to the demand in the PCR document were also the indicators and sources for calculation are specified (CML 2001, IPCC, WHO).

1.3 Conclusions

As a result of the reviewing process of an LCA according to ISO 14040/44 the following questions shall be answered:

- Are the methods used to carry out the LCA are consistent with the international standards?
- Are the methods used scientifically and technically valid?
- Are the data used appropriate and reasonable in relation to the goal of the study?
- Does the interpretation reflect the limitations identified and the goal of the study?
- Is the study report - in this case the internal report - transparent and consistent?

These points can be confirmed.

One remark shall be added:
An interpretation phase is not explicit included because the study was conducted in the ISO 14025 system in order to generate EPD based on a PCR-document. The PCR specifies in clause 7.2 “interpretation”, that the data shall be calculated per declared unit. This is done in the internal LCA-report. However, the internal report describes estimations and restrictions and the practitioner and the commissioner have communicated consequences for the calculations to the reviewer during the discussions. In this sense it can be confirmed, that the identified limitations are properly taken into account.

2. Verification of the EPD Tool and example EPD according to ISO 14025

The EPD generation by the web-tool is based on the modelling that is described in the internal report and checked in step 1 (see clause 1). Using the example of one long and four short EPD with different product specifications the conformity according to the PCR Aluminium Building Products (14th March 2007) was checked.

2.1 Consistency of generated EPD with the PCR requirements

2.1.1 EPD long version

Example: EAA-2010-01-25-6480-ENG

The following table 1 summarises the verification process and the result of the EPD long version.

Table 1: Verification of EPD long version

Item according to PCR	fulfilled	Comments (Birgit Grahl)	EAA response	fulfilled after changes
General information				
Information on program operator	ok			
Date of Publication	ok			
Name and Address of company issuing the EPD	ok			
Description of the building product				
Description of the declared/functional unit and of application	ok			
Description of the Life cycle stages of the building product	ok			
Components/Materials	ok			
Additional Information on production/assembly				
		The PCR requires in clause 3 the addressing of all material flows contributing more than 5% weight to the material flow of the complete product system.	A basic description of composition of the paint for coil coating and the paint production process is included.	ok
		Clause 3 in the PCR requires that the description of the end-of-life procedures of the packaging should be included if possible. Because Figure 2 in the EPD characterizes “coil	A paragraph specifying the consideration of packaging material in the EPD is included.	ok

		coating process and packaging" as covered by the EPD, the information should be included.		
		Clause 3 PCR requires the description of occupational health and safety aspects if relevant. Although the EPD declares Cr(VI) pre-treatment only a general statement on OHS is given in clause 2 in the EPD. This problem also applies to clause 4.2 of the PCR respectively clause 3 in the EPD.	A paragraph addressing the Chromium pre-treatment is included.	ok
Additional information concerning integration and application of the product in a building				
Characterisation of the product in delivery condition	ok			
Fitting, Erection, Installation in the Building		The specification of "environmental aspects" in clause 3 EPD lead over to the question, which environmental aspects may occur in the use phase, if there is no proper installation.	Paragraph slightly clarified.	ok
Additional information supporting potential modelling of the use stage of the product		In clause 4 EPD the sentence "A service life of 50 years is used for the calculations" is misleading, because as far as I understood the lifetime is not included into the calculation of the LC-Indicators.	Paragraph modified for clarification.	ok
Additional information for end of life processes	ok			
Life Cycle Assessment				
LCA requirements Cut-off-criteria		Clause 7.1 PCR requires for "cut off criteria" the limit of 1% for material flows (checked by mass and energy contribution) and impact categories. The quantification of the impacts caused by outputs that are not quantified is a methodological problem. Clause 6.1 EPD contains general sentences that just repeat the PCR	A new text was included giving a maximum of transparency.	ok

		requirements. The not included processes should be specified. According to PCR for hazardous and toxic materials and substances, the cut-off-rules do not apply.	A new text with information of emissions of hazardous and toxic substances according to the production stages is included.	ok
LCA requirements Data quality		Clause 7.1 PCR "data quality" requires technological representativity of more than 50% for Al production processes. Although the coil coating process is not an Al production process, this information meets the intention of the PCR. The technological representativity should be quantitatively added in Table 2.	Updated table includes this information.	ok
LC Indicators		Clause 7.2 PCR requires beside the specification of non-renewable energy resources also the breakdown of renewable energy (Hydropower, solar radiation, wind power). The latter is not included in clause 6.2 EPD.	Because this will request some time and some needs for IT work this breakdown is not included in the EPD. EAA is going to attend to it.	The problem shall be solved within the next year.
References	ok			
Review report	ok	Shall be available at EAA web page		

2.1.2 EPD short version

Examples: EAA-2010-01-25-6481-ENG
EAA-2010-01-25-6482-ENG
EAA-2010-01-25-6483-ENG
EAA-2010-01-25-6484-ENG

The following table 2 summarises the verification process and the result of the EPD short version.

Table 2: Verification of EPD short version

Item according to PCR	fulfilled	Comments (Birgit Grahl)	EAA response	fulfilled after changes
General information				
Information on program operator	ok			
Date of Publication	ok			
Name and Adress of company issuing the EPD	ok			
Product description	ok			
LC-Indicators	ok			
Additional information	ok			
Statement for verification	ok			
Statement of comparability with PCR	ok			
Availability of PCR and long version	ok			
References	ok			

2.2 Test results of the web-tool

The online test of the web-tool shows logic variations of calculated parameter in the EPD according to product specifications filled into the input mask. Plausibility checks according to the data given in the internal report were successful.

2.3 Conclusions

Long version:
Practically all information, required by the PCR is included into the EPD by the web-tool. Therefore, the web-tool and the above-specified EPD long version can be verified. Nevertheless, there is one remark concerning inconsistency that is not crucial if the program operator attend to it within the next year (see Table 1):

- The breakdown of renewable energy is required by the current PCR and not included in the EPD long version.

Short version:
All information, required by the PCR is included into the EPD by the web-tool. Therefore, the web-tool and the above-specified EPD short version can be verified.

Long and short version:
Not verifiable is the correct input of the product specifications filled into the input mask by the user of the tool.

3. Literature

EAA 2007 PCR Aluminium Building Products: EAA Environmental Product Declarations. Brussels, 14. March 2007.

EAA 2008 Environmental Profile Report for the European Aluminium Industry. Life cycle inventory data for aluminium production and transformation processes in Europe. Brussels, April 2008

EAA 2009 Internal report for external reviewing of the EPD tool on coil coated sheet. Brussels, October 2009

ISO 14025 ISO 14025:2006. Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures

ISO 14040 ISO EN 14040 2006. Environmental management – Life cycle assessment – Principles and framework.

ISO 14044 ISO EN 14044 2006. Environmental management – Life cycle assessment – requirements and guidelines.

4. Name and Address of the Reviewer

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