Product Category Rules (PCR)

(Approved PCR ID: PA-AF-04)

Pre-sensitized plates for lithographic printing

Release date: November 10, 2010

The Carbon Footprint of Products Calculation and Labeling Pilot Program

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http://www.cfp-japan.jp/english/pcr/pcrs.html

* This approved PCR will expire at the end of the CFP Pilot Project (scheduled until March 31, 2012).
If this PCR is revised during the Pilot Project, the revised PCR will become effective.

(Provisional Translation)

Product Category Rule of "Pre-sensitized plates for lithographic printing" (Approved PCR ID: PA-AF-04)

Foreword

- The contents provided in this PCR may be changed and revised as needed for further refinement, through PCR revision procedures, as a result of continued discussions with relevant stakeholders during the period of the Japanese CFP Pilot Project.
- This PCR will expire at the end of the Project (scheduled until March 31, 2012).

- This English translation of the original Japanese PCR is provided for information purpose.

No.	Items	Contents
1	Scope	- This PCR prescribes rules, requirements and instructions applicable to "pre-sensitized plates for lithographic printing made with aluminum as substrate" (hereinafter called "PS plate") under the CFP Pilot Project. - PS plate is regarded as intermediate goods for printing products; however, it can be a final product for printing companies. Therefore, this PCR covers a whole life cycle of PS plate so that it can be used for intermediate goods or final products.
2	Definitions of products	
2-1	Descriptions of product category	(1) This PCR covers "pre-sensitized plate for lithographic printing" used for printing (including packaging materials such as inserting paper). (2) Verification shall be applied by defining the "product name" or the "product series-(group of similar products categorized by the same exposure wavelength, etc.)". - When product series is defined, the maximum value among the product series in each lifecycle stage shall be adopted and calculated. - The validity of the product series definition shall be verified. - Thickness and size shall not be used for product series definition.
2-2	Components of products	(1) Substrate Rolled aluminum plate made with primary or recycled aluminum. (2) Photosensitive material（photosensitive layer） Materials spread on substrate (including its backside), such as undercoat layer, main function layer, and protective layer (protective film). They are treated as functional resin. (3) Packaging materials Outer box, inner package (including cardboard), inserting paper (paper to protect the PS plate surface), and protective film
3	Referenced Standards and PCRs	There is no PCR referenced.
4	Terms and Definitions	(1) Lithographic Printing Printing method using flat plates whose image areas are lipophilic and non-image areas are hydrophilic and oil-repelling, that allow ink selectively adhered to those image areas. Since ink is transferred from a plate to a rubber blanket, so that the image of the plate is normal image (called offset method). (2) Pre-sensitized plates for lithographic printing Offset printing plate coated with photosensitive layer supplied by manufacturer. [JIS B 9621(2000)] There are a conventional type PS plate, a thermal type PS plate (CTP

		(computer to plate) system), and photopolymer type (visible type) PS plate (CTP system).
5	Range of assessment	
5-1	Calculation unit	Calculation unit shall be per square meter (m^2) of the representative thickness of the product series (major thickness among the used products).
5-2	Life cycle stages	All life cycle stages shall be covered. (1) Raw material acquisition stage (2) Production stage (3) Distribution stage (4) Use and maintenance stage (5) Disposal and recycling stage
6	General requirements applied to all stages	
6-1	Life cycle flow chart	- Life cycle flow chart is shown in Annex A (normative). - Correlation diagram for the life cycles between “printing products” and “PS plates” is shown in Annex E (informative).
6-2	Range of data collection	(1) As for equipments and facilities used in all processes, GHG emissions generated when using them shall be included; i.e. at the time of manufacturing equipments/facilities, at the time of disposal of them shall be excluded. (2) When on-site electricity is used, the amount of fuels used shall be collected as primary data, and calculate GHG emissions associated it.
6-3	Data collection period	(1) Primary data shall be collected over the most recent one year. (2) When the data of the most recent one year can not be used, its reason shall be clearly reported, and its accuracy shall be assured. (3) As for primary data, locality and seasonality shall not be taken into account.
6-4	Allocation	(1) Weight ratio shall be used. (2) Other allocation method may be used according to product characteristics. However, the allocation method and its validity shall be verified.
6-5	Cut-off criteria	(1) When conducting cut-off, the range of cut-off shall be within 5% of the total life cycle GHG emissions covered by this PCR, and the range shall be clearly reported. Cut-off shall, however, be conducted, provided that it is difficult to use any scenarios, similar data, and estimated data. (2) Packaging materials (skids and its attachments) repeatedly used shall be conducted cut-off, since they have small contributions to the total.
6-6	Others	[Transport related rules] (1) Transports between all sites shall be collected. (2) Use either by the fuel consumption method, the fuel cost method, or the ton-kilometer method, collecting as much primary data as possible. (3) Transport distance may be measured by using the information from navigation software, in addition to actual measurement. (4) Calculation methods for GHG emissions associated with fuel consumption during transport are shown in Annex B (normative). [Rules related to wastes] (1) As for the wastes, GHG emissions related to the transport from a site discharged to a final treatment site, and to waste treatment in the site, shall be calculated in the stage it discharged. (2) GHG emissions associated with combustion of carbon derived from fossil fuel in the wastes to be incinerated shall be calculated. (3) Regarding items to be recycled, GHG emissions of the transport process

		and up to and including recycling preparation process shall be calculated. (4) GHG reduction amount by indirect effects shall not be included.
7	Requirements for raw material acquisition stage	
7-1	Range of the processes	Following processes shall be covered. (1) “Functional resin” production process (2) “Aluminum plate” production process (including production of recycled aluminum) and transport process (3) “Acid” production process (4) “Alkali” production process (5) “Organic solvent” production process (e.g., methanol) (6) “Outer box” production process (7) “Inner package (including cardboard)” production process (8) “inserting paper (paper to protect the surface of PS plate)” production process For the processes from (1) to (8), data collection shall be track back up to resource mining process. However, when inputs are acquired from other companies, the following processes shall be excluded; - packaging materials used for acquiring inputs, - production process and transport processes of the packaging materials
7-2	Data collection items	Details of data collection items are shown in Annex D.1 (normative).
7-3	Primary data collection items	Details of primary data collection items are shown in Annex D.1 (normative).
7-4	Primary data Collection method and Requirements	There are two methods for collecting primary data. Either method can be used. (1) Pile up method: Collect and add up the input/discharge amount of items, per work or per equipment/facility operation (e.g., operating hours, operating area size, and operating distance, etc.) necessary for process execution. (e.g., operating time of facility × electricity consumption of facility = consumption amount of electricity) (2) Allocation method: Allocate “actual results per business during certain period” among “products produced” (e.g., allocating the total fuel consumption amount during the assessment year among products produced.)
7-5	Scenario	As for transport from supplier site, primary data on transport distance, transport means, and loading ratio should be collected. If it is impossible, however, the scenario in Annex C (normative) may be used.
7-6	Other	[Collection of data from multiple suppliers] - If raw materials are acquired from multiple suppliers, primary data should be collected for all the suppliers. - If there are many various suppliers, primary data shall be collected for 50% or more of the total amount, and use the average value of the primary data collected for the rest of the data, as a secondary data. [Rules related to recycled materials and reused products] - If recycled materials and reused products are used as inputs, GHG emissions related to the manufacture and transport of them shall include the emissions emitted after the processes for ones readying for the recycling preparations

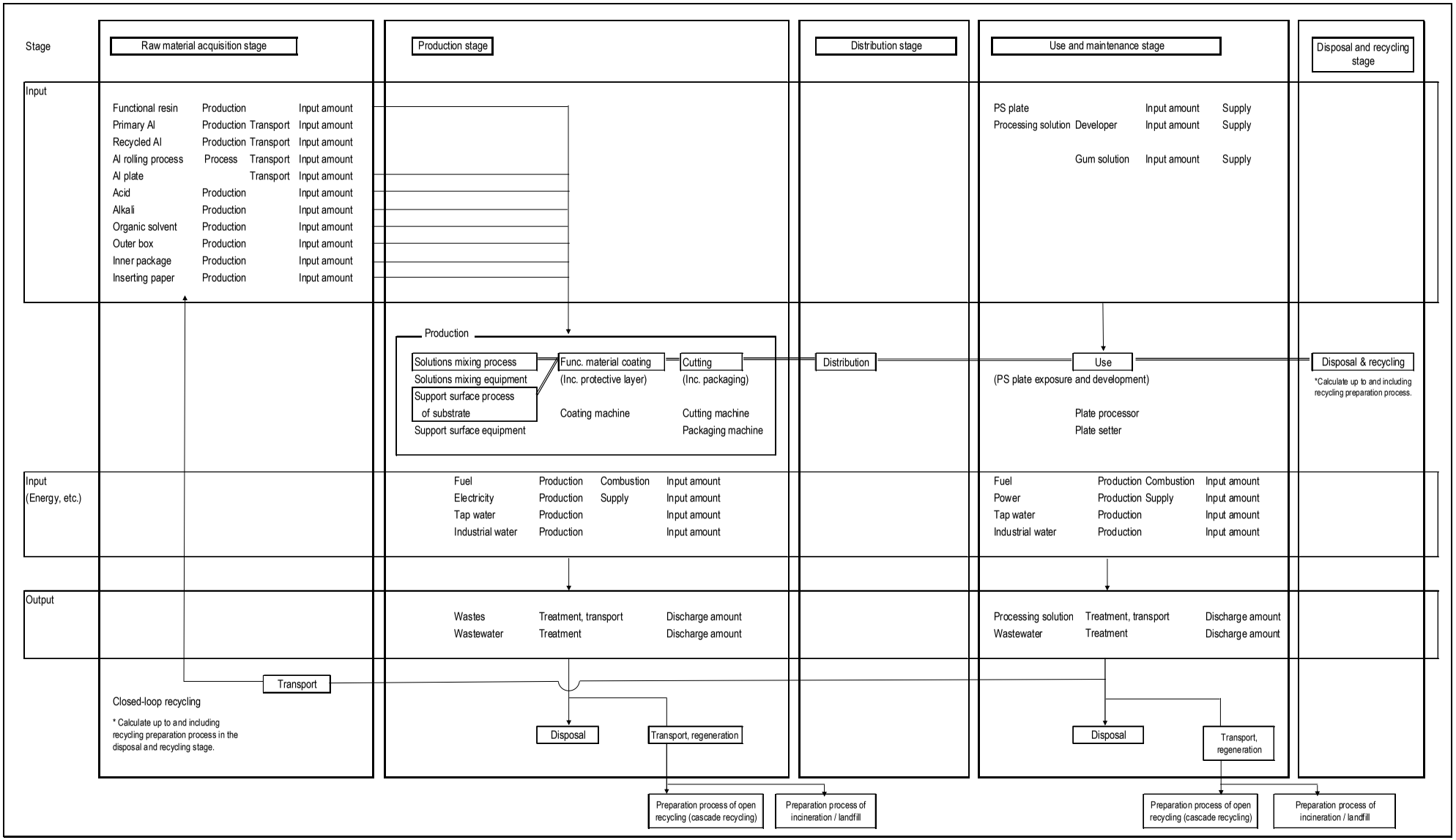
		(e.g., regeneration process etc.) or the reusing (e.g., cleaning, slipping layers, etc.). - When verifying CFP values, confirm its validity (e.g., whether the evidence is indicated clearly, etc.). [When using the method of No.7-4-(1)] - Apply the pile up calculation in the same way to the products other than the product covered by this PCR, produced in the same site. - To conduct above calculation, operation unit of equipment/facility (e.g., operating hours, operating area size, and operating distance, etc.) may be adopted from such information sources as operating diaries, and operating records (e.g., operating management software). [When using the method of No.7-4-(2)] - Weight shall be used for allocation. - When using area for allocation, the grounds of the validity shall be verified.
8	Requirements for the production stage	
8-1	Range of the processes	Following processes shall be covered. (1) Solutions mixing process (2) Support surface process of substrate (3) Coating process of functional materials (4) Cutting process (5) Packaging process
8-2	Data collection items	Details of data collection items are shown in Annex D.2 (normative).
8-3	Primary data collection items	Details of primary data collection items are shown in Annex D.2 (normative).
8-4	Primary data Collection method and Requirements	Conform to No.7-4.
8-5	Scenario	As for transport of wastes generated from the production stage, primary data on transport distance, transport means, and loading ratio should be collected. If it is impossible, however, the scenario in Annex C (normative) may be used.
8-6	Other	[Collection of data from multiple production sites] - If products are produced in multiple production sites, primary data shall be collected on all the production sites. - If there are many various production sites, however, primary data on major production sites may be used as the data of the rest of the sites, on condition that the sum of the production amount of the major production sites accounts for 95% or more of the total production amount of all the sites [Other] Conform to [When using the method of No.7-4-(1)] and [When using the method of No.7-4-(2)], described in No.7-6.
9	Requirements for the distribution stage	
9-1	Range of the processes	Following process shall be covered. - Transport process of “pre-sensitized plates for lithographic printing,” from manufacturing site to consumers.
9-2	Data collection items	Details of data collection items are shown in Annex D.3 (normative).
9-3	Primary data collection items	Details of primary data collection items are shown in Annex D.3 (normative).

9-4	Primary data Collection method and Requirements	Not stipulated.
9-5	Scenario	As for transport, primary data on transport distance, transport means, and loading ratio should be collected. If it is impossible, however, the scenario in Annex C (normative) may be used.
9-6	Other	[Data collection from multiple distribution routes] - As for product transport, if there are multiple transport routes, primary data shall be collected on all the routes, and weight-averaged by the amount of product transported. Product weight shall be for the product distribution amount. - If there are many various transport routes, however, primary data shall be collected for 50% or more of the total amount of product transported. Regarding a route whose primary data cannot be collected, the average value of those primary data collected shall be used as secondary data.
10	Requirements for the use and maintenance stage	
10-1	Range of the processes	Following process shall be covered. - Press plate process (or the equivalent process) of exposure and developing (including water washing and drying), - "Printing process" shall be excluded.
10-2	Data collection items	Details of data collection items are shown in Annex D.4 (normative).
10-3	Primary data collection items	Details of primary data collection items are shown in Annex D.4 (normative).
10-4	Primary data Collection method and Requirements	[Input amount of "processing solution" and discharge amount of "waste liquid"] The input amount of "processing solution" and the discharge amount of "waste liquid" shall be calculated based on the scenarios in No.10-5.
10-5	Scenario	[Scenario for usage] (1) Plate - Environmental burden of the use stage shall be calculated under the assumption that product standard size is 1030 mm x 800 mm (called B1 size)/plate, the amount processed is 1000m^2, and operating times are 8 hours/day and 23 days/month. - In the case that the plate is applied for newspaper, however, the environmental burden of the use stage shall be calculated under the assumption that product standard size is 398 mm ×1100 mm/plate, the amount processed is 2200 m^2, and operating times are 17 hours/day and 30 days/month. - Convert these burdens to "per m^2 of product". (2) Equipment - It shall be calculated under the assumption that the standard (representative) equipment for the applicable product (plate), recommended by individual companies in catalogue, etc., is used. - It shall be calculated under the assumption that the applicable equipment (plate setter, plate processor) is used with its standard mode (recommended mode, values in catalogue). - Electricity consumption includes startup, standby mode, and operation mode of equipment. Developing process includes water washing and drying. (3) Consumables - The input amount of processing solutions, and the waste liquid amount of the processing solutions used shall be calculated (if the agent is diluted, adopt the

		value after dilution). - It shall be calculated under the assumption that standard processing solution for plate and equipment are used. - Tap water, industrial water, and containers of processing solution shall be excluded. - Other consumables (maintenance tools (e.g., maintenance component for exposure part)) shall be excluded. - The frequency of replacing processing solution shall be calculated based on the standard usage conditions (recommended conditions, values in catalogue).
10-6	Other	Not stipulated.
11	Requirements for the disposal and recycling stage	
11-1	Range of the processes	Following process shall be covered. Transport and the recycling preparation processes of; > "pre-sensitized plates for lithographic printing" used for printing, and > packaging materials.
11-2	Data collection items	(1) Weight amount of, - "pre-sensitized plates for lithographic printing" used for printing, and - "packaging materials to be disposed of". (2) GHG emissions per unit related to the process of transport, landfill, incineration, and recycling preparation of, - "pre-sensitized plates for lithographic printing" used for printing, and - "packaging materials" disposed of.
11-3	Primary data collection items	- Collect primary data on the items listed in No.11-2.
11-4	Primary data Collection method and Requirements	Not stipulated.
11-5	Scenario	[Transport scenario] Conform to the transport scenario for wastes in the production stage. [Scenario for wastes treatment] If it is difficult to collect primary data, the following scenario may be used (values are the ratio of generated amounts by treatment method). (1) "Pre-sensitized plates for lithographic printing" used for printing are assumed to be recycled as aluminum scraps. It is reported that 100% of aluminum scraps are recycled, according to the "*study report on the project of feasibility study for 3R systematization - project on feasibility study for recycling from aluminum expanded material scraps to expanded materials*" (the "survey commissioned by the Ministry of Economy, Trade and Industry in FY 2006," by the Japan Aluminum Association (March, 2007)). (2) For packaging materials such as outer box, inserting paper, and inner packaging, open-recycling shall be set as 98% (*1), and incineration as 2%. (*1) Source: "*Investigation into the State of By-Products Generation (2006 Results)*," Clean Japan Center (issued on March 2008)
11-6	Other	Not stipulated.
12	Items applied secondary data	(1) The data provided in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" (hereinafter called "GHG Emission Factor Database"). Use the database of the latest version. (2) Of secondary data which is not included in the GHG Emission Factor Database, but the data prepared as "reference data" by the CFP Pilot Project

		Secretariat.
13	Communication requirements	
13-1	Unit to be displayed on the label	(1) Calculation unit shall be used. - The communication methods described in the "*Basic Guideline of the Carbon Footprint of Products*" and the "*Guide of Establishing Product Category Rules*" can be used. In this case, however, its appropriateness shall be discussed by the CFP verification panel. (2) Also, for calculated products or products series, the following shall be displayed; - a list of "the thickness of all sizes, and the GHG emissions of each of those sizes" assumed, and - with the above list, explanatory texts shall be displayed, such as "the numerical values displayed in the carbon footprint label indicate the calculation results by using the representative thickness (e.g., "0.24mm-thick") of this product (line)," and "for GHG emissions for each thickness, please refer to the list".
13-2	Label position and Size	(1) Follow the common rules, the "*Specifications of CFP label and Displaying Other Information*". (2) In addition to display on product packaging, CFP information also may be displayed on the website and on promotional materials such as brochure.
13-3	Contents of additional information	Following items may be adopted as additional information. (1) GHG reduction ratio relative to conventional product (2) Display by each process (each stage) (3) Use ratio of amount of recycled aluminum (4) Indications relating to closed-loop recycling (supplemental remarks are provided in Annex F). Example 1: "The use ratio of amount of recycled aluminum in this product is XX %. If it is 100%, CO_2 emissions of this product are YY kg." Example 2: "When a closed-loop recycling system is applied to the PS plates after used, the CO_2 emissions are X kg. When not applied, Y kg." (5) Weight (kg) per m^2 (6) Information on product thickness

Annex A (normative): Life cycle flow chart



Annex B (normative): Calculation method for GHG emissions associated with fuel consumption during transport

B.1 Fuel consumption method

1) Collect data on "fuel consumption [L]" for each mean of transport, and convert the fuel unit, "L," to "kg" by using following equation.

"Fuel consumption" [kg] = "fuel consumption" [L] x "fuel density" "γ" [kg/L]

Fuel density of gasoline: γ = 0.75kg/L

Fuel density of light oil: γ = 0.83kg/L

2) Calculate life cycle GHG emissions [kg-CO_2e] by multiplying "fuel consumption [kg]" and the "life cycle GHG emissions related to supply and use of fuel [kg-CO_2e/kg]" (secondary data) for each type of fuel

B.2 Fuel cost method

1) Collect data on "fuel cost [km/L]" and "transport distance [km]" for each mean of transport, and calculate fuel consumption by using the following equation.

"Fuel consumption" [kg] = "transport distance" [km] / "fuel cost" [km/L]) x "fuel density" γ [kg/L]

2) Calculate life cycle GHG emissions [kg-CO_2e] by multiplying fuel consumption [kg] and the "life cycle GHG emissions related to supply and use of fuel [kg-CO_2e/kg]" (secondary data) for each type of fuel.

B.3 Ton-kilometer method

1) Collect data on "loading ratio [%]" and "transport load (transport ton-kilometer) [t-km]" for each mean of transport.

2) Calculate life cycle GHG emissions by multiplying the transport load (transport ton-kilometer) [t-km] by the "life cycle GHG emissions related to fuel consumption per transport ton-kilometer" [kg-CO_2e/t-km] (secondary data) for different transport loads for each mean of transport.

Annex C (normative): Transport scenario

In this PCR, transport scenario is set for each stage when primary data cannot be obtained.
The ton-kilometer method is adopted for calculation.

Life cycle stage	Scenario
Raw material acquisition stage	Raw materials transport scenario 1) Domestic transport <Distance> 500 km <Means> 20-ton truck <Loading ratio> 75 % 2) International transport Calculate by adding "marine transport by container ship (4,000 TEU or less)" to the "domestic transport scenario (road transports both before and after marine transport)". For maritime transport distance, see the "database of distance between countries / regions" (*).
Production stage	Wastes transport scenario <Distance> 100 km <Means> 4-ton truck <Loading ratio> 25 %
Distribution stage	Product transport scenario 1) Domestic transport <Distance> 500 km <Means> 4-ton truck <Loading ratio> 25 % 2) International transport Calculate by adding "marine transport by container ship (4,000 TEU or less)" to the "domestic transport scenario (road transports both before and after the marine transport)". For maritime transport distance, see the "database of distance between countries / regions" (*).

*The CFP Pilot Project Secretariat will prepare the "database of distance between countries / regions" for using as "reference data".

Annex D (normative): Details of data collection items

D.1: The raw material acquisition stage

Table 1 shows data collection items of life cycle GHG emissions and its category for the raw material acquisition stage.

Table 1: Data collection items in the raw material acquisition stage

Data collection items of life cycle GHG emissions	GHG emissions per unit	Activity data (per m^2 of product) three significant figures	Stage in which GHG emissions are included
"Functional resin" (up to and including production)	Either primary data or secondary data can be used.	Apply primary data of the production stage (input amount).	Raw material acquisition stage
"Primary aluminum" (production and transport)			
"Recycled aluminum" (production and transport)			
"Aluminum rolling" (aluminum domestic transport and rolling)			
"Acid" (hydrocloric acid, sulfric acid, and nitric acid) (up to and including production)			
"Alcali" (up to and including production)			
"Organic solvent" (e.g., methanol) (up to and including production)			
"Outer box" (up to and including production)			
"Inner package" (up to and including production)			
"Inserting paper" (up to and including production)			
Fuel for transporting "aluminum plate" to the production site (up to and including production, and incineration)		Apply primary data (transport amount).	

Secondary data may be applied to GHG emissions of production and tranport of upstream raw materials, by collecting primary data on the part of the "aluminum plate" process above. Examples are provided in from the chart 1 to 3. Either chart can be used.

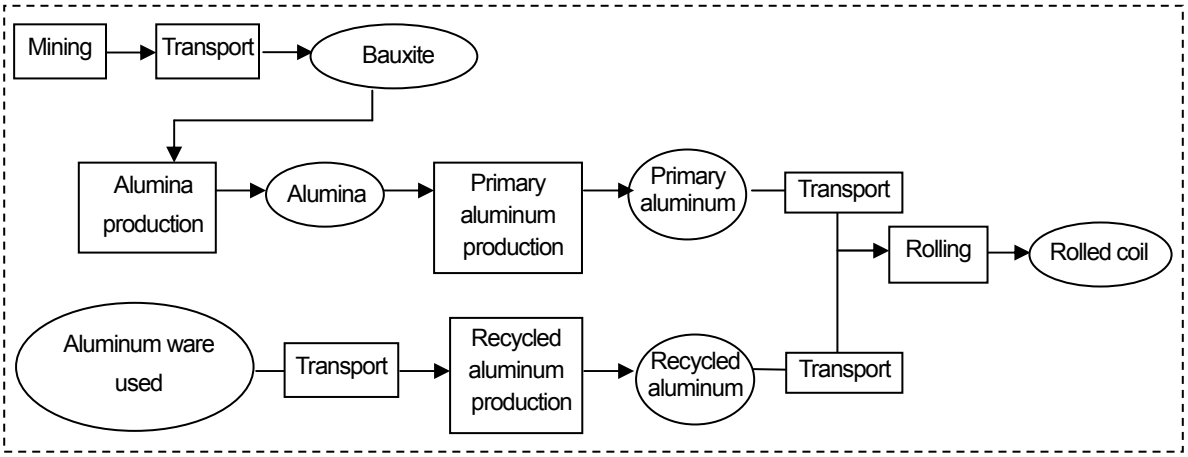


Chart 1: When secondary data (inside the dotted lines) are applied to "primary aluminum production" process, "recycled aluminum production" process, and "rolling".

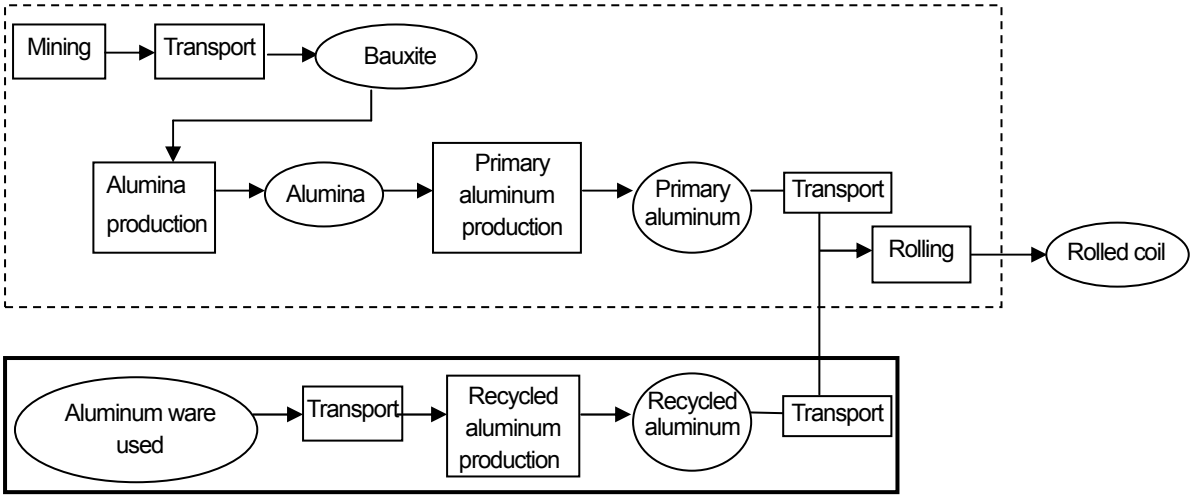


Chart 2: When secondary data (inside the dotted lines) are applied to "primary aluminum production" process and "rolling," and primary data (inside the solid lines) are applied to "recycled aluminum production" process only.

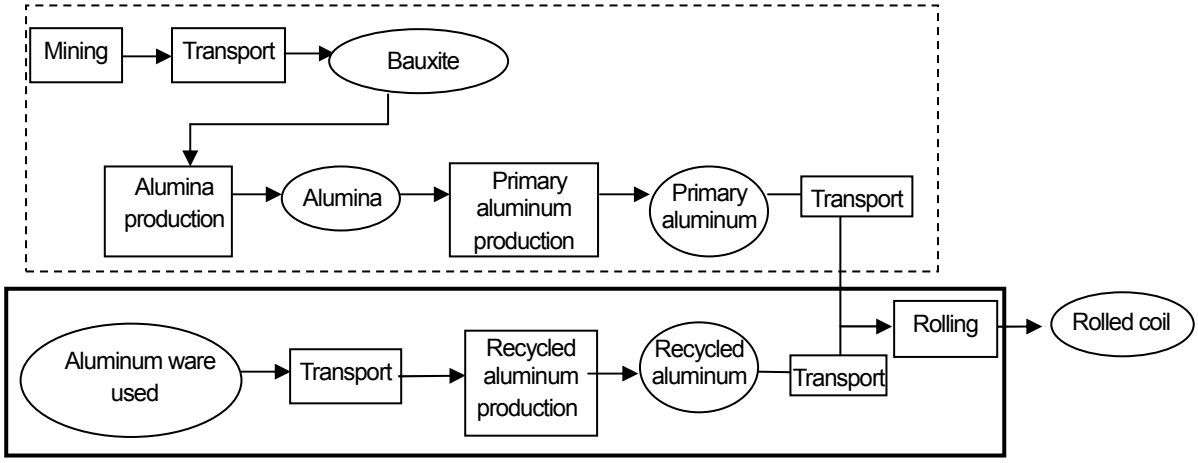


Chart 3: When secondary data (inside the dotted lines) are applied to "primary aluminum production" process only, and primary data (inside the solid lines) are applied to "recycled aluminum production" process and "rolling".

D.2. Production stage

Table 2 shows the data collection items of life cycle GHG emissions and its category for the production stage.

Table 2: Data collection items in the production stage

	Data collection items of life cycle GHG emissions	GHG emissions per unit	Activity data (per m^2 of product) three significant figures	Stage in which GHG emissions are included
Materials and energy which are input	"Functional resin" (production)	Apply values adopted from the raw material acquisition stage.	Apply primary data (input amount or discharge amount).	Raw material acquisition stage
	"Aluminum plate" (production)			
	"Acid" (hydrocloric acid, sulfric acid, and nitric acid) (production)			
	"Alkali" (production)			
	"Organic solvent" (e.g., metanol) (production)			
	"Outer box" (production)			
	"Inner package"(production)			
	"Inserting paper" (production)			
	"Fuels (heavy oil, light oil, kerosene, gasoline, LNG, LPG, city gas)" (up to and including production, and incineration)	Apply secondary data.		Production stage
	"Electricity" (production, supply)			
	"Tap water" (up to and including production)			
	"Industrial water" (up to and including production)			
Wastes	Fuels for transporting wastes (up to and including production, and incineration), and waste treatment (applicable process only)			
	"Wastewater treatment" (applicable process only)			

D.3: The distribution stage

Table 3 shows the data collection items of life cycle GHG emissions associated with transport and its category for the distribution stage.

Table 3: Data collection items on transport

Data collection items of life cycle GHG emissions	GHG emissions per unit	Activity data (per m^2 of product) three significant figures	Stage in which GHG emissions are included
Fuels for transport (up to and including production, and incineration) (the fuel consumption method)	Secondary data (Emission factor of fuel)	Primary data or secondary data (input amount of fuels)	Distribution stage
Fuels for transport (up to and including production, and incineration) (the fuel cost method)	Secondary data (Emission factor of fuel)	Primary data or secondary data (transport distance, fuel cost)	
Fuels for transport (up to and including production, and incineration) (the ton-kilometer method)	Secondary data (Emission factor of fuel)	Primary data or secondary data (ton-kilometer; transport load (concerning loading ratio))	

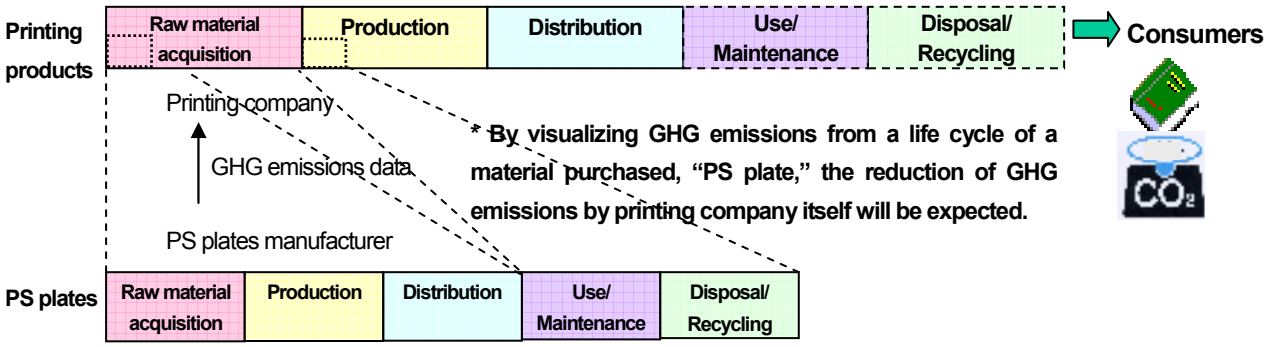
D.4: The use and maintenance stage

Table 4 shows the data collection items of life cycle GHG emissions per m^2 of the pre-sensitized plate for lithographic printing and its category for the use and maintenance stage.

Table 4: Data collection items in the use and maintenance stage

	Data collection items of life cycle GHG emissions	GHG emissions per unit	Activity data (per m^2 of product) three significant figures	Stage in which GHG emissions are included
Materials and energy which are input	"Fuels (heavy oil, light oil, kerosene, gasoline, LNG, LPG, city gas)" (production and incineration)	Apply secondary data.	Apply primary data (input amount or disposal amount).	Use and maintenance stage
	"Electricity" (production, supply)			
	"Tap water" (up to and including production)			
	"Indusctrial water" (up to and including production)			
	"processing solution" (developer, gum solution)			
Wastes	Disposal treatment of "processing solution (developer, gum solution)" (applicable process only)	Either primary data or secondary data can be used.		
	"Wastewater treatment" (applicable process only)	Apply secondary data.		

Annex E (informative): Correlation diagram on life cycles between "printing products" and "PS plates"



Annex F (informative): Supplemental remarks for additional information, "display related to a closed-loop recycling"

For supplemental remarks for additional information of "closed-loop recycling," from the chart 4 to 6 are shown as examples.

- Aluminum usage amounts of printing company B and C are assumed as 50 kg each.
- Losses by melting in producing recycled aluminum are assumed as 20%.

The ratios of both printing company B and C are;
primary aluminum: recycled aluminum = 50 kg : 0 kg (primary aluminum is assumed to be 100 %).

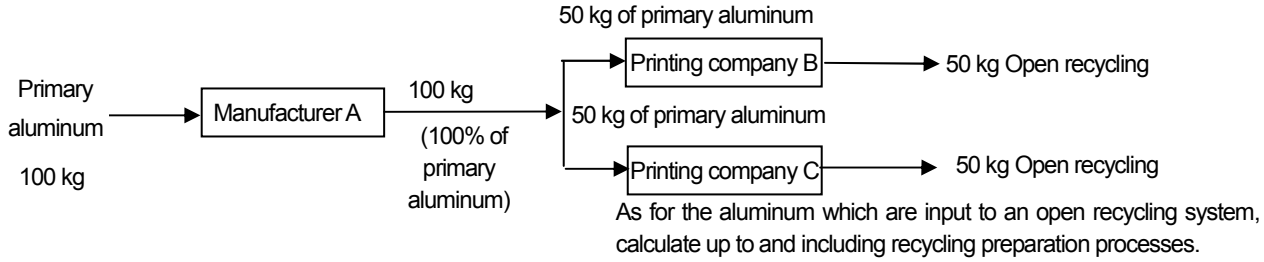


Chart 4: Open recycling

The ratios of both printing company B and C are; primary aluminum : recycled aluminum = 10 kg : 40 kg.

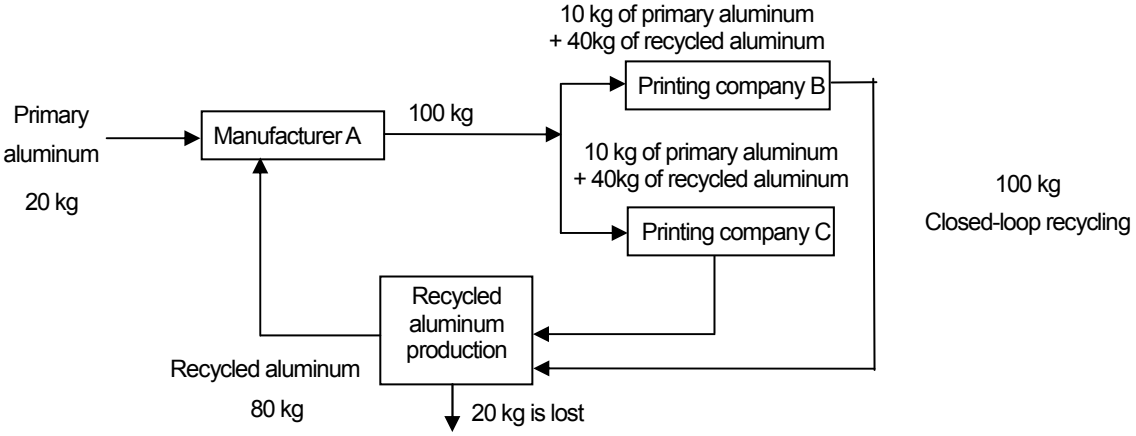


Chart 5: Closed recycling (in the case of 20% is lost when manufacturing recycled aluminum)

Printing company B: primary aluminum : recycled aluminum = 50 kg : 0 kg (100 % of primary aluminum)
Printing company C: primary aluminum : recycled aluminum = 10 kg : 40 kg

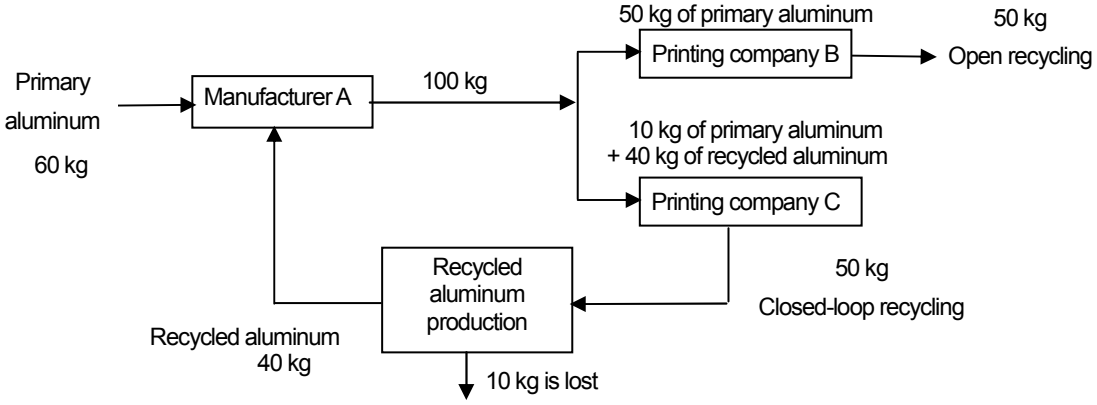


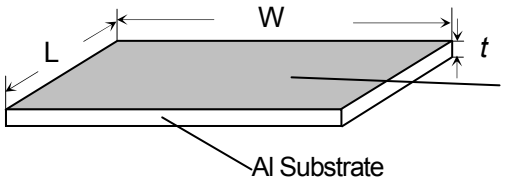
Chart 6: When open recycling and closed-loop recycling are mixed

Annex G (informative): Calibration method of primary data, concerning thickness of a "pre-sensitized plate for lithographic printing"

When the CFP of "pre-sensitized plates for lithographic printing," which was calculated from the representative thickness value indicated, will be used as primary data for calculating CFP of "printing products," etc., the GHG emissions are required to be calibrated by considering the thickness of the "pre-sensitized plates for lithographic printing" which are actually used in plate making process. The calibration method is shown below.

<In the case that representative thickness is assumed as "0.24 mm-thick">

G.1: Configuration of a pre-sensitized plate for lithographic printing: *t* (thickness) x W (width) x L (length)



Photosensitive layer (*)
(Photo sensitive layer here refers to all materials such as undercoat layer, main function layer, and protective later, etc., coated on the front side (including the back side)).

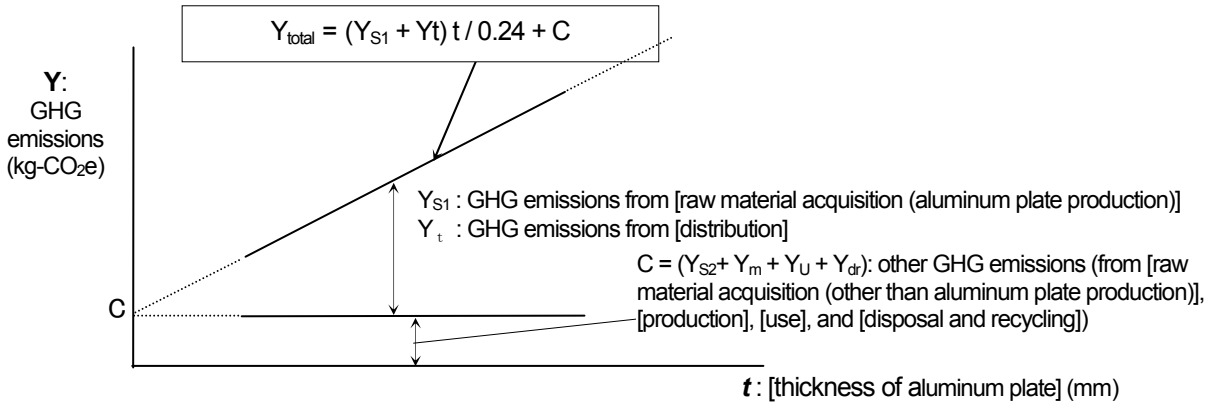
(*) Photosensitive layer burden per unit area is constant and does not depend on "*t*".

G.2: Equation based on characteristic relations

GHG emissions shall be calculated by assuming;
that environmental burdens of [raw materials (aluminum plate)] and [distribution] are proportional to the weight of the aluminum plate, and
that other environmental burdens ([raw materials other than aluminum plate], [production], [use], and [disposal and recycling]) are proportional to the area of the PS plate for lithographic printing.*

* In the case of a PS plate for lithographic printing which has different thickness;
- the amount of photosensitive layer coated is the same as the case of 0.24mm-thick,
- the energy needed for manufacturing the PS plate for lithographic printing is almost the same, and
- the burden in the plate making process when using is the same.

In addition, the amount, the energy, and the burden, are proportional to the area of the PS plate for lithographic printing.



GHG emissions per m^2 of pre-sensitized plate for lithographic printing (Y_{total}) (kg-CO_2e/m^2)

$$Y_{total} = (Y_{S1} + Y_t)\ t\ /0.24 + C$$

t	:	Thickness of "aluminum plate" (mm)
Y_{total}	:	GHG emissions (kg-CO_2e/m^2) from "all life cycle stages per m^2 of the PS plate for lithographic printing"
Y_{S1}	:	GHG emissions (kg-CO_2e/m^2) from "raw material acquisition (aluminum plate production)"
Y_{S2}	:	GHG emissions (kg-CO_2e/m^2) from "raw material acquisition (other than aluminum plate production)"
Y_m	:	GHG emissions (kg-CO_2e/m^2) from "production"
Y_t	:	GHG emissions (kg-CO_2e/m^2) from "distribution"
Y_U	:	GHG emissions (kg-CO_2e/m^2) from "use"
Y_{dr}	:	GHG emissions (kg-CO_2e/m^2) from "disposal and recycling"
C	:	GHG emissions (kg-CO_2e/m^2) from "all life cycle stages excluding the environmental burdens of [raw material acquisition (aluminum plate production)] and [distribution]" ($Y_{S2} + Y_m + Y_U + Y_{dr}$)

G.3: Calibration method

	GHG emissions in the case of 0.24 mm thickness ($kg\text{-}CO_2e/m^2$)	GHG emissions in the case of "t" thickness ($kg\text{-}CO_2e/m^2$)
Raw material acquisition (aluminum plate production)	Y_{S1}	$Y_{S1} \times t / 0.24$
Raw material acquisition (other than aluminum plate production)	Y_{S2}	Y_{S2}
Production	Y_m	Y_m
Distribution	Y_t	$Y_t \times t / 0.24$
Use	Y_U	Y_U
Disposal and recycling	Y_{dr}	Y_{dr}
Total	Y_{total}	$(Y_{S1}+Y_t) \times t / 0.240 + (Y_{S2}+Y_m+Y_U+Y_{dr})$

GHG emissions per actual plate product can be calculated by multiplying Y_{total} by size (W x L).

[PCR revision histories]

Approved PCR ID	Release date	Contents revised
PA-AF-02	March 26, 2010	In PCR of PA-AF-01, it is not clear to interpret the concept of the "display per sales unit". Therefore, GHG emissions display unit was changed to "per m^2". <Main parts revised> - No.1.1.1.1, Main product category - No.1.1.2, GHG emissions display unit - No.5, Communication method
PA-AF-03	September 8, 2010	(1) Changed corresponding to the revisions of the basic rules. (2) Adapting the contents to the new PCR draft template. (3) For handling of recycling of the wastes discharged from each stage (other than the disposal and recycling stage), up to and including recycling preparation process shall be calculated. (It applies to "No.2-(7): Handling of recycling standards" provided in the "Guide of Establishing Product Category Rules (PCR)".) (4) For handling of the wastes collected for value, up to and including the recycling preparation process shall be calculated. (It applies mutatis mutandis to "No.2-(7): Handling of recycling standards" provided in the "Guide of Establishing Product Category Rules (PCR)".)
PA-AF-04	November 10, 2010	(1) In PCR of PA-AF-03, "standard thickness shall be set as 0.24 mm" was stipulated in "No.2-2, Components of Products". In this PCR, however, the rule on standard thickness was eliminated in order to increase the versatility. (2) In accordance with the revision of the calculation unit described in (1) of No.5-1, adopted [per square meter (m^2), which is calculated from the representative thickness of the "product lines"] (the thickness that is most commonly used among the product lines). (3) Added use scenario for newspaper to No.10-5 in the use and maintenance stage. (4) Added international transport scenario to transport scenario in Annex C.