Product Specification Criteria
Paper Beverage Cartons (PSC-ID：BD-01)

2004/07/01

Note: These standards have been prepared for the development of EcoLeaf™ environmental labels. Use for any other purpose without consent of the EcoLeaf™ program office is strictly prohibited.

No.	Major key	Minor key	Class	Requirements
1	Preconditions	Target product	Description	Packaging containers made primarily of paper, and meant to hold beverages and liquid foods.
2			Scope	Product and packaging included in smallest retail unit However, not included are items other than those provided by paper carton manufacturers to function as containers. Examples • Caps and lids made by paper carton manufacturers and provided with containers are included. • Straws provided by content manufacturers are not included.

No.	Major key	Minor key	Class	Requirements
3		LCA scope	Life cycle stage and system boundary	1. Life cycle stage All life cycle stages (obtaining/making materials, carton manufacture, distribution, usage, and disposal/recycling) are covered. However: (1) Content manufacturing impact is not included. (2) The impact of filling the cartons is included by adding in the energy used (when filling with beverages) to operate special filling equipment provided as the production system. (3) Refrigeration energy in the distribution and usage stages is included only for cartons whose refrigeration is required by law (only scenarios (2) and (3) defined in item 2). (4) Transport impact from distribution point to consumer's home is not included. 2. System boundary This PSC establishes the following 4 scenarios according to anticipated uses. (1) Sealed paper cartons for room-temperature distribution (2) Sealed paper cartons that require refrigeration (3) Sealed paper cartons requiring refrigeration for school lunches (4) Paper cups (note: cup-type sealed cartons are included in (1) and (2) above) See Appendix 3, Life Cycle Scenario, 1 through 4.
4	Data collected (for product data sheet)	Product information (information on constituent elements of product itself)	Product materials or ingredient makeup	1. Class A parts (1) Part names Stock (including laminated stock) (2) Specifics and how to factor in portions of environmental impacts which you cannot determine yourself. A. Obtain past data for inclusion in accordance with

No.	Major key	Minor key	Class	Requirements
				Appendix 1, which for this PSC was excerpted and tailored from the needed parts of the paper/paperboard PSC prepared by the Japan Paper Association. However, if this is difficult, follow the procedure in Appendix 2, “Paper LCI Data Provided by the Japan Paper Association.” B. If you purchase laminated stock, determine and include the lamination process impact in accordance with the provisions of item number 5. C. For aluminum foil, polyethylene, and synthetic resin materials, use weight data to calculate and include the impacts using common intensities. 2. Material categories Following are the materials entered in the “(1) Product information” space on the product data sheet. Lump other materials under “others.” • Product stock • Polyethylene • Aluminum foil • Synthetic resins
5	Data collected (for product data sheet)	Manufacturing stage information (production site activity information)	Material and energy inputs, consumption, and emissions	I. Up to and including transport from the carton manufacturing process to the beverage maker’s filling site (Raw material manufacture, transport, printing, packaging, and transport of finished stock and other materials) Note: Follow item 4 1(2) on inclusion of data for portions related to manufacture of the stock. 1. Material and energy inputs Electricity, LPG, LNG, city tap water, industrial water supply, groundwater, fuel oil, diesel fuel 2. Emissions Calculate CO_2, NOx, and SOx from fossil fuels if they are energy-consumption emissions. 3. Treatment of environmental impacts related to byproducts and sub-materials, and the reason The following are not included.

No.	Major key	Minor key	Class	Requirements
				• Ink cans, solvent cans • Printing plates and cylinders Reason: They are not carton materials, and are in any case below the cut-off point. Byproducts: Products which arise secondarily in the manufacturing process and are sold, as distinguished from products whose manufacture is the main purpose. Sub-materials: Materials input and discarded at the manufacturing site, and are not shipped with products. 4. Yield Each company should use the average value of past data for each unit process. 5. Recycling Each company factors in recycling based on its own past data. 6. Impact of transport between manufacturing processes (1) Stock (class A parts) manufacturing process Use actual past data on transport between manufacturing sites. (2) From material manufacturing plant to filling plant (note: scenario 4 is not applicable to this item) Calculate according to this scenario: • Transport means: 10-ton truck • Transport distance: 200 km • Loading ratio: Maximum load based on each company's own freight packing rules
5	Data collected (for product data sheet)	Manufacturing stage information (production site	Material and energy inputs, consumption, and emissions	II. Beverage maker's filling site and thereafter Add in the impact of operating filling and cartoning machines only when cartoning is necessary. 1. Material and energy inputs

No.	Major key	Minor key	Class	Requirements
		activity information)		Electricity, LPG, LNG, city tap water, industrial water supply, groundwater, fuel oil, diesel fuel 2. Emissions Calculate CO_2, NOx, and SOx from fossil fuels if they are energy-consumption emissions. 3. Treatment of environmental impacts related to byproducts and sub-materials, and the reason No provisions in particular. 4. Yield To determine loss/yield when filling, use the data from the most recent version of “Basic Study on the Present State of and Trends in the Recycling of Paper Beverage Cartons,” issued by the Committee for Milk Container Environmental Issues. However, in-house data may also be used.
6	Data collected (for product data sheet)	Distribution stage information	Final product transport conditions	1. Domestic transport Approach • Include delivery from primary distribution center until products are put on store shelves. • Calculate maximum load from carton size and weight. • Calculate operating impact of refrigerated trucks from amount of fuel used (see item 9). (1) Sealed paper cartons for room-temperature distribution A. Beverage plant to warehouse Means: 10-ton truck (transport at room temperature by non-refrigerated truck) Distance: 150 km one way Note: Calculate empty truck plus pallets and cases for return trip. B. Warehouse to supermarket (outbound trip only)

No.	Major key	Minor key	Class	Requirements
				Means: 2-ton truck (transport at room temperature by non-refrigerated truck) Distance: 28 km one way (2) Sealed paper cartons that require refrigeration A. Beverage plant to warehouse Means (outbound): 10-ton refrigerated truck, temperature set at 4°C Means (return): 10-ton truck (transport at room temperature by non-refrigerated truck) Distance: 150 km one way Note: Calculate empty truck plus pallets and cases for return trip. B. Warehouse to supermarket (outbound trip only) Means: 2-ton refrigerated truck, temperature set at 4°C Distance: 28 km one way (3) Sealed paper cartons requiring refrigeration for school lunches Means: 2-ton insulated truck Distance: 40 km one way (deliveries to 4 schools), adding 40 km for return trip. (4) Paper cup beverages Means: 10-ton truck Distance: 250 km one way Load: 9-oz paper cups: 10-ton truck carrying 450 cases each with 2,500 paper cups 7-oz paper cups: 10-ton truck carrying 500 cases each with 2,000 paper cups 2. Overseas transport (1) When overseas production is included, sea and air transport impact between the producing country and Japan, and the land

No.	Major key	Minor key	Class	Requirements
				transport impact abroad, are factored in by adding them to the domestic transport impact. (2) If a company does not collect actual data on the transport method and the amount of fuel used, it is permissible to set the transport means, standard distance, and loading ratio based on its own situation, and make this the overseas transport scenario, but the soundness of the scenario basis is subject to verification. (3) Give a general description of overseas distribution channels in “3. Distribution stage information” of the Product Data Sheet. 3. Distribution packaging materials (1) Items included Packaging that is shipped with the products from filling plants and removed when products are stocked on store shelves. Packing materials such as shrink wrap, cardboard, and crates that are used for transporting products. (2) How to factor in It is assumed that crates are used 60 times.

No.	Major key	Minor key	Class	Requirements
7	Data collected (for product data sheet)	Usage stage information	Product usage conditions	Factor in according to a scenario limited to carton use, only when necessitated by carton characteristics. In the case of scenario (2) sealed paper cartons that require refrigeration Based on design specifications, use the following formula to determine environmental impact of refrigerated stocking in a store. Formula: [(423 W/h x 24 h) ÷ 50% operation) ÷ (effective volume ÷ 2)* * The coefficient 2 is based on the empirical rule that the display amount assuming 1-liter gabletop cartons is half the effective volume of a refrigerated display case. Assumptions • Refrigeration period: 1 day • Temperature: 5°C • Refrigerated display case is made by Fuji Electric, which has the largest market share. Multi-shelf type with effective volume of 1,627 liters and power consumption of 423 W/h. In the case of scenario (3) sealed paper cartons (for milk) requiring refrigeration for school lunches Determine environmental impact of refrigerated storage in school based on design specifications. Formula: [(501 W/h x 24 h) ÷ 50% operation] ÷ (area of carton bottom x 1,200 cartons) Assumptions • 1,200 students • Refrigeration period: 1 day • Temperature: 5°C • Refrigerated display case is a Matsushita Electric NS-K661R1 (effective volume 1,635 liters and power consumption of 501 W/h)

No.	Major key	Minor key	Class	Requirements
8		Waste/ recycling stage information	Product waste/ recycling conditions	1. Assumptions (1) Waste generated by consumers Treated as municipal solid waste (MSW), or paper cartons and packaging, or paper beverage cartons for recycling. (2) Waste generated by paper stock manufacturing plants and filling plants Treated as industrial waste or recycled. (3) Data applying to each part of scenario Use data released by the Environment Ministry every July. (4) Factor in deductions achieved by recycling as deductions which substitute chemical pulp. Using these assumptions, include these factors according to the approach in items 1 through 4 of the recycling scenario in Appendix 4. 2. Definitions of product and part recovery rates, and their specification method (1) Sealed paper cartons that require refrigeration, and (2) Sealed paper cartons requiring refrigeration for school lunches Use the data from the most recent version of “Basic Study on the Present State of and Trends in the Recycling of Paper Beverage Containers,” issued by the Committee for Milk Container Environmental Issues. (3) Cartons that can be kept at room temperature Assume that all cartons are discarded if the anticipated recycling rate is below 10%. (4) Paper cups Assume that all paper cups are discarded if the anticipated recycling rate is below 10%. 3. Open recycling and reuse When open recycling and reuse are included Each company can calculate these categories by creating scenarios considered appropriate, and while taking careful note of the following items. The soundness of scenario bases is subject to verification. (1) Processes regarded within the scope of “indirect effects” (2) Deductions and impacts within the scope of “indirect effects”

No.	Major key	Minor key	Class	Requirements
9	Product Environmental Information Disclosure Sheet (PEIDS)	Items in common and inventory analysis	LCI calculation formula	• Impact of PE and Al lamination processes is the amount of electric power used. • Use the EcoLeaf common intensities to calculate impact of operating refrigerated trucks. Use 101 (diesel fuel), 103 (gasoline), 111(diesel) and calculate from amount of fuel used.
10		Impact analysis	Additional impact category	Nothing in particular.
11	Breakdown data sheet (PDS-related)	Data processing	Allocation rule	Not unified; each company decides as it sees fit.
12		Data collection	Coverage	1. Coverage ratio Collect data covering at least 60% of the total production of the products concerned. However, this does not necessarily apply when purchased pulp is less than 60%. 2. Time period Use average of actual data for a year (especially energy data). 3. Treatment of new products When data are unobtainable because products are new or for other reasons, it is permissible to substitute data (including intensities) that include the conditions used in designing or planning. However, data must be updated when new annual data have been confirmed.

No.	Major key	Minor key	Class	Requirements
13			Cut-off rules	1. Items to which cut-off rules do not apply Parts and materials that are responsible for the carton's primary functions. 2. Items to which cut-off rules apply (processes, parts, materials consumed and emitted, etc.) None specified. 3. Reference value (limit that makes cut-off possible) Under 1%. 4. Index Percentage of accounted for by product mass (empty carton).
14	Breakdown data sheet (PEIDS-related)		Common Intensity selection	Material name: Number and name (of applicable EcoLeaf common intensity) 1. Aluminum plate manufacturing: 08 2. Processing into aluminum sheet: 86 3. LDPE pellet manufacturing: 27 4. 10-ton refrigerated truck: 93 (3% increase over 10-ton truck) 5. 2-ton refrigerated truck: 91 (5% increase over 2-ton truck) 6. 2-ton insulated truck: 91 (5% increase over 2-ton truck) Note: Items 4, 5, and 6 are based on interviews with refrigerated truck makers.
15			Intensity addition	None.
16			Addition of characterization factor	None.

No.	Major key	Minor key	Class	Requirements
17	Product environmental aspects declaration (PEAD)	Product specification	Provisions on product specification entries	1. Product name 2. Application (choose from among the following) (1) Sealed paper cartons for room-temperature distribution (2) Sealed paper cartons that require refrigeration (3) Sealed paper cartons requiring refrigeration for school lunches (4) Paper cups 3. Carton capacity

No.	Major key	Minor key	Class	Requirements
18		Section E	Data disclosure	1. Required items Required are the following items, as designated by 3.2.5(1) of the guidelines. • Global warming impact (CO_2 equivalent in kg) • Acidification impact (SO_2 equivalent in kg) • Energy consumption (MJ) 2. Optional items Not prescribed. Each company should choose appropriately from among those below, which are from the 7 optional items given in 3.2.5(1) of the guidelines. • Ozone layer depletion (CFC-11 equivalent in kg) • Eutrophication (PO_4 equivalent in kg) • Energy resources (crude oil equivalent in kg) • Mineral resources (iron ore equivalent in kg) • Soil waste (kg) 3. Notes: Add the following as standard notes. (1) “Environmental impacts specified by this label do not include impacts related to manufacture of the carton contents.” (2) “Energy for operating dedicated filling equipment used in the filling process, which is part of the beverage production system, is included.” (3) “The environmental impact of the paper stock manufacturing process is included in accordance with X.” For “X” substitute the name of one of the 2 methods (given below) specified in item 4-2-(2)-A.” • Past data • LCI data for “paper” provided by the Japan Paper Association. (4) “Refrigeration energy used in the distribution and usage stages is included only when in the case of “cartons requiring refrigeration,” which by law must be refrigerated. 4. Method of representation Follow these instructions if graphs are used. (1) It is recommended that bar graphs are used to show the global warming impact for each stage. (2) When open recycling and reuse are included: • “Recycling effectiveness” of each stage is expressed by a dotted line independent of and not integrated into actual impact. • Write the recycling effectiveness breakdown in the margin.

No.	Major key	Minor key	Class	Requirements
19		Other environment-related information (optional items)	Provisions on entries	Information whose factualness can be confirmed by a third party 1. Type I and Type III environmental labels obtained 2. Acquisition of ISO 14001 certification 3. Certificates, approvals, or awards from national or industry organizations Information showing initiatives on design for the environment 4. Use of eco-friendly materials Names of materials and where they are used in products are specified. Divide materials into those which are required and optional.

Cautions on display of an EcoLeaf logo on the product
When placing the EcoLeaf logo on a beverage carton, the clarifying statement “Carton LCA information is available to the public” is put near the logo to indicate that environmental information released under the EcoLeaf program does not include the beverage itself. The container may also display the company name, logo, or other information that identifies who has released the carton information.

Appendix 1 Determining the Environmental Impact of Manufacturing Stock for Paper Beverage Cartons

(This appendix is excerpted and customized from the needed parts of the Japan Paper Association's "Paper/Paperboard Product-Specific Criteria," October 29, 2002 version.)

Target product

One ton (weight of transaction) of paper stock.

Note: Observe the following qualifiers for packaging and packing materials (packaging paper, plastic sheets, chipboard, etc.):

- Reused items are exempted (pallets, paper tubes, etc.).
- Labels are exempted (cut-off applies).

Affected stages

Afforestation, chipping, transport, pulping, papermaking, shipping to user

Data collected

Raw materials used: Logs, chips, purchased pulp, etc.

Mineral resources: Quicklime, limestone, fillers, pigments, etc.

Inorganic chemicals: Caustic soda, sulfuric acid, hydrochloric acid, silicate of soda, aluminum sulfate, chlorine, chlorate, sodium hypochlorite, hydrogen peroxide, oxygen, etc.

Organic substances and chemicals: Starch, latex, etc. Give equivalent in terms of 100% purity.

(Note: The product data sheet may give the total of the above chemicals used instead of showing the amount of each chemical.)

Water resources used: Industrial water supply (t), river water (t), groundwater (t), tap water (t)

Transport of raw materials

- Chips: Japan Paper Association study data may be used for afforestation and logging.
- Calculate marine transport according to actual circumstances.
- As background data of transportation, Japan Paper Association data may be used to estimate emissions corresponding to unit of transport distance.
- Impact of raw material transport is excluded from calculation if included in goods delivered.

Energy used: Purchased power (kWh), purchased steam (eq t), crude oil (kL), fuel oil (kL), LNG (t), LPG (t), diesel fuel (kL), kerosene (kL), gasoline (kL), coal (t), petroleum coke (t), town gas (1,000 m^3), natural gas (1,000 m^3), wood waste (t), old tires (t), RPF (recycle plastic fuel / refused paper and plastic fuel ?) (t), etc.

コメント [rf1]: Although this usually means coal gas, it is a rather broad term that sometimes even includes natural gas.

Notes

1. Purchased steam is the standard steam equivalent of 2,675 MJ/t (639 kcal/kg).
2. Other energy resources included are expressed as crude oil equivalent.
3. If power is sold, deduct the corresponding fuel and CO_2.
4. Black liquor is counted as the raw material chips, so is not included here.

Atmospheric emissions

- Conform to items covered by LCI public data study (3 items: NOx, SOx, particulates)
- CO_2 is calculated from fuel (use coefficient in enforcement order of Environment Ministry law), but CO_2 from biomass and waste fuels is not included (RPF plastic and old tires are excluded from biomass).
- Include methane and N_2O that are from combustion and the landfilling of organic sludge (use coefficient in enforcement order of Environment Ministry law).

  Note: According to “Greenhouse Gas Emissions by the Papermaking Industry (2000, CO_2 equivalent),” a study by the Japan Paper Association, the proportions of methane and N_2O in greenhouse gases are small and CO_2 accounts for at least 98.3%. Therefore, an expanded estimate may be obtained for greenhouse gas amount by dividing CO_2 by 0.983 (note if you have done this).

Water emissions

Conform to items covered by LCI public data study (5 items: BOD [rivers], COD [marine areas], SS, T-P, and T-N).

Waste

Total of emissions is final disposal amount (landfill). Write in heat recovery at your discretion.

> Note: Material amount of process wastes is expressed in BDs. Changes are possible depending on results from Working Group 2 of the LCA National Project Inventory Research Group.

コメント [rf2]: Write out fully

Byproducts

Sold power, etc. Use of waste is not considered a byproduct.

Primary hazardous chemicals

Include at your discretion. It is recommended that substance names and other information be given in “Environmental-Related Qualitative Information.”

Life Cycle Analysis

LCI calculation

- Do not include CO_2 emissions from biomass.

Allocation rule

- Allocate according to production volume when a factory produces 2 or more products.
- Prioritize allocation to black liquor energy and environmental impact KP, and allocate the leftover portion to the papermaking process according to the KP allocation ratio.
- To determine cogeneration heat value, allocate steam produced with electric power at 3,600 MJ/MWh (860 kcal/kWh) and steam at 2,675 MJ/t (639 kcal/kg), while incorporating boiler efficiency.

コメント [rf3]: I suggest writing this out fully. (=Kraft pulp?) Depending on the meaning of this abbreviation the sentence may need to be revised.

Data collection coverage

- Collect data from product-related sites and processes.
- Collect data at stable times.
- Use annual averages for data that feature seasonal variations.
- Data common to multiple sites is converted to data per unit production.

コメント [rf4]: It might be a good idea to note *what* is stable here. Plant operations, etc.

Cut-off rule: Items subject to cut-off

- Raw materials which account for under 1.0% of product weight
- Materials used in weights of under 10 kg when producing 1 ton of product

Explicitly state reason when applying the cut-off rule to any other material.

Common intensity selection

Bundle and calculate inorganic chemicals, organic substances, and organic chemicals using EcoLeaf common intensity No. 24, “sodium hydroxide.”

PSC intensity addition

Data from Japan Paper Association label research group study (afforestation, chips, etc.)

Use the data obtained in studies by the Japan Paper Association when necessary.

Appendix 2 Paper LCI Data Provided by the Japan Paper Association

(Use the data in the “Intensity” column of the table. “Maximum” and “Minimum” values are for reference.)

July 1, 2004
Input Report (for paper production plants)
Additions and revisions made on October 29, 2002

Input items		Code	Unit	Intensity	~~Maximum~~	~~Minimum~~
Energy/water						
	Gasoline, kerosene, diesel fuel					
	Fuel oil (mainly fuel oil C, some fuel oil A)					
	LPG					
	Petroleum coke					
	Crude oil					
	Coal					
	LNG					
	Natural gas					
	Town gas					
	Demolition waste					
	Purchased electricity					
	Purchased steam					
	Water (fresh water)					
	Afforestation to chipping fertilizer, pesticides					
	Diesel fuel					
	Electricity					
	Marine transport of chips fuel					

	oil C					
Raw materials						
	Wood chips					
	Roundwood					
	Waste paper (including pulped waste paper)					
	Pulp					
Mineral resources and pigments						
	Quicklime					
	Limestone (including slaked lime)					
	Calcium carbonate					
	White carbon					
	Talc, clay, kaolin					
Inorganic chemicals						
	Caustic soda					
	Sulfuric acid					
	Hydrochloric acid					
	Liquid chlorine (Cl_2)					
	Sodium hypochlorite (NaClO)					
	Chlorate ($NaClO_3$)					
	Hydrogen					

	peroxide (H_2O_2)					
	Oxygen (O_2)					
	Sodium silicate					
	Aluminum sulfate					
Organic substances and chemicals						
	Starch					
	Sizing agents					
	SBR latex*					

*Styrene-butadiene rubber

(For paper production plants) Output Report

Output items		Code	Unit	Intensity	Maximum	Minimum
Main products						
	Paper					
Environmental Impact (Global warming)						
	CO_2					
	CH_4					
	N_2O					
	HPC, PFCs, SF_6					
	Afforestation to chipping — CO_2					
	Marine transport of chips — CO_2					
(Air pollution)						
	NOx					
	SOx					
	Particulates					

	Afforestation to chipping — NOx					
	SOx					
	Marine transport of chips — NOx					
	SOx					
(Water pollution)						
	BOD (rivers)					
	COD (marine areas)					
	SS					
	T-P					
	T-N					
(Waste)						
	Landfilled waste (organic and inorganic)					
	Amount reclaimed (for recycling)					

Appendix 3-1 Life Cycle Scenario

1. Sealed paper cartons for room-temperature distribution and storage

1	Materials
	Impact of obtaining and manufacturing materials
2	Manufacturing (cartons)
	Carton manufacturing impact
3	Transport (cartons)
	Carton transport impact
4	Manufacturing (food)
	Beverage filling impact
5	Transport (final product)
	Product transport impact
6	Usage
7	Disposal
	Recovery and discarding impact
	Recovery and recycling impact, and deduction
8	Stock mfg
	Log transport
	Afforestation, logging
9	Transport
10	Making Al sheet
11	Resource extraction > Al plate mfg
13	Making PE sheet
14	Resource extraction > pellet mfg
15	Carton material mfg (rolls, reels, blanks, etc.)
	Printing
	Lamination
	Rolling
	Packing
16	Transport
	Means
	Loading ratio
	Distance
17	Food and beverage manufacturing
	This part not included here.
18	Filling
	Cartoning
	Energy
19	Diagram key
	Directly determine environmental impact and include.
	Find and include environmental impact using given EcoLeaf common intensity number to calculate from mass data.
	Specify scenario with PSC and include impact.
20	Scenario for factoring in product transport-related impact
	(1) Beverage plant to warehouse
	Means: 10-ton truck (transport at room temperature by non-refrigerated truck)

	Distance: 150 km one way Note: Empty truck plus pallets and cases for return trip (2) Warehouse to supermarket (outbound trip only) Means: 2-ton truck (transport at room temperature by non-refrigerated truck) Distance: 28 km one way
21	Product transport Means Loading ratio Distance Energy
22	Disposal Recycling Resources Energy Emissions Deduction

Appendix 3-2 Life Cycle Scenario

2. Sealed paper cartons that require refrigeration

1	Materials
	Impact of obtaining and manufacturing materials
2	Manufacturing (cartons)
	Carton manufacturing impact
3	Transport (cartons)
	Carton transport impact
4	Manufacturing (food)
	Beverage filling impact
5	Transport (final product)
	Product transport impact
6	Usage
	Storage impact
7	Disposal
	Recovery and discarding impact
	Recovery and recycling impact, and deduction
8	Stock mfg
	Log transport
	Afforestation, logging
9	Transport
10	Making PE sheet
11	Resource extraction > pellet mfg
12	Carton material mfg (rolls, reels, blanks, etc.)
	Printing
	Lamination
	Creasing/cutting
	Packing
13	Transport
	Means
	Loading ratio
	Distance
14	Food and beverage manufacturing
	This part not included here.
15	Diagram key
	Directly determine environmental impact and include.
	Find and include environmental impact using given EcoLeaf common intensity number to calculate from mass data.
	Specify scenario with PSC and include impact.
16	Scenario for factoring in product transport-related impact
	(1) Beverage plant to warehouse
	Means (outbound): 10-ton refrigerated truck, temperature set at 4°C
	Means (return): 10-ton truck (transport at room temperature by non-refrigerated truck)
	Distance: 150 km one way
	Note: Empty truck plus pallets and cases for return trip
	(2) Warehouse to supermarket (outbound trip only)

Means: 2-ton refrigerated truck, temperature set at 4°C
Distance: 28 km one way

17 Scenario for calculation of refrigeration impact
Based on design specifications, use the following formula to determine environmental impact of refrigerated stocking in a store.
Formula: [(power consumption x 24 h) ÷ 50% operation) ÷ (effective volume ÷ 2)*
* The coefficient 2 is based on the empirical rule that the display amount assuming 1-liter gabletop cartons is half the effective volume of a refrigerated display case.
Assumptions

- Refrigeration period: 3 days
- Temperature: 5°C
- Refrigerated display case is made by Fuji Electric, which has the largest market share. Multi-shelf type with effective volume of 1,627 liters and power consumption of 423 W/h.

18 Filling
Cartoning
Energy

19 Refrigeration

20 Product transport
Means
Loading ratio
Distance
Refrigeration energy

21 Usage
Refrigeration energy

22 Disposal
Recycling
Resources
Energy
Emissions
Deduction

コメント [rf5]: This is shown as *** in the Japanese version.

Appendix 3-3 Life Cycle Scenario

3. Sealed paper cartons requiring refrigeration for school lunches

1 Materials
Impact of obtaining and manufacturing materials

2 Manufacturing (cartons)
Carton manufacturing impact

3 Transport (cartons)
Carton transport impact

4 Manufacturing (food)
Beverage filling impact

5 Transport (final product)
Product transport impact

6 Usage
Storage impact

7 Disposal
Recovery and discarding impact
Recovery and recycling impact, and deduction

8 Stock mfg
Log transport
Afforestation, logging

9 Transport

10 Resource extraction > pellet mfg

11 Carton material mfg (including small gabletop cartons)
Printing
Lamination
Rolling
Packing

12 Reel transport
Means
Loading ratio
Distance

13 Scenario for factoring in product transport-related impact
Means: 2-ton insulated truck
40 km one way (deliveries to 4 schools), adding 40 km for return trip.

14 Food and beverage manufacturing
This part not included here.

15 Diagram key
Directly determine environmental impact and include.
Find and include environmental impact using given EcoLeaf common intensity number to calculate from mass data.
Specify scenario with PSC and include impact.

16 Scenario for calculation of refrigeration impact
Based on design specifications, use the following formula to determine environmental impact of refrigerated storage in a school.
Formula: [(501 W/h x 24 h) ÷ 50% operation] ÷ (effective area ÷ 2*)
(* The coefficient 2 is based on the empirical rule that school lunch milk occupies half the effective volume of a refrigerated display case.)

	Assumptions
•	1,200 students
•	Refrigeration period: one day
•	Temperature: 5°C
•	Refrigerated display case is a Matsushita Electric NS-K661R1 (effective volume 1,635 liters and power consumption of 501 W/h).
17	Filling
	Cartoning
	Energy
18	Refrigeration
19	Transport
	Means
	Loading ratio
	Distance
	Refrigeration energy
20	Usage (school)
	Refrigeration energy
21	Disposal
	Recycling
	Resources
	Energy
	Emissions
	Deduction

Appendix 3-4 Life Cycle Scenario

4. Paper cups

1	Materials
	Impact of obtaining and manufacturing materials
2	Manufacturing (cartons)
	Carton manufacturing impact
3	Transport (final product)
	Product transport impact
4	Usage
5	Disposal
	Recovery and discarding impact
	Recovery and recycling impact, and deduction
6	Stock mfg
	Log transport
	Afforestation, logging
7	Transport
8	Making PE sheets
9	Resource extraction > pellet mfg
10	Paper cup mfg
	Printing
	Lamination
	Packing
11	Cup transport
	Means
	Loading ratio
	Distance
12	Food and beverage manufacturing
	This part not included here.
13	Scenario for factoring in product transport-related impact
	Means: 10-ton truck
	Distance: 250 km one way
	Load: 9-oz paper cups: 10-ton truck carrying 450 cases each with 2,500 paper cups
	7-oz paper cups: 10-ton truck carrying 500 cases each with 2,000 paper cups
14	Diagram key
	Directly determine environmental impact and include.
	Find and include environmental impact using given EcoLeaf common intensity number to calculate from mass data.
	Specify scenario with PSC and include impact.
15	Filling
16	Disposal
	Recycling
	Resources
	Energy
	Emissions
	Deduction

Appendix 4-1 Recycling Scenario 1 Consumer/Paper Beverage Cartons
July 1, 2004

1	Post-consumer products
2	Recycle?
3	Use values released by industry.
4	Separate collection by mass retailers, municipalities, etc.
5	Managed as municipal solid waste (MSW)
6	Recyclable?
7	No
8	Yes
9	Waste paper collectors and wholesalers
10	Managed as industrial waste
11	Combustible?
12	No
13	Yes
14	MSW incineration (waste burned and ashes landfilled)
15	MSW landfilled
16	Recycling plant
17	Products made with recycled materials (deduction)

Appendix 4-2 Recycling Scenario 2 Consumer/Paper Containers and Packaging under the Container and Packaging Waste Recycling Law

1	Post-consumer products
2	Recycle?
3	Use values released by industry.
4	Separate collection by municipalities
5	Managed as municipal solid waste (MSW)
6	Separation criteria met?
7	No
8	Noncombustible
9	Yes
10	Recycled by recovery and recycling plants under Japan Containers and Packaging Recycling Association
11	Managed as industrial waste
12	MSW incineration (waste burned and ashes landfilled)
13	MSW landfilled
14	Products made with recycled materials (deduction)

Appendix 4-3 Recycling Scenario 3 Cartons for School Lunches/Paper Beverage Cartons

July 1, 2004

1	Post-consumer products
2	Recover?
3	Use values released by industry.
4	Back to dairy plant
5	Managed as municipal solid waste (MSW)
6	Recycle?
7	Waste paper collectors and wholesalers
8	Managed as industrial waste
9	Combustible?
10	No
11	Yes
12	MSW incineration (waste burned and ashes landfilled)
13	MSW landfilled
14	Recycling plant
15	Products made with recycled materials (deduction)

Appendix 4-4 Paper Cup Recycling Scenario
July 1, 2004

1	Post-consumer products
2	There are currently no industry-released values.
3	Recover?
4	Managed as municipal solid waste (MSW
5	Combustible?
6	Yes
7	No
8	MSW incineration (waste burned and ashes landfilled)
9	MSW landfilled