Form 1(F-01s-02)

Product Environmental Aspects Declaration

EP and IJ printer (PCR number: AD-04)

No. AD-11-147
Date of publication
May/17/2011

Color Laser Printer HL-4570CDWT

Specifications:

- **Electrophotographic Printer (EP)**
- **Color**
- **Printing Speed: 28 ppm in both color and black**
- **Maximum Printing Size: A4**
- **Flexible Wireless & Wired Interfaces**
- **Duplex Printing**

http://www.brother.co.jp/

For inquiry:
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Environmental Management Dept.
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The following data is calculated by assuming the product prints 470,400 sheets in 5-year usage period.

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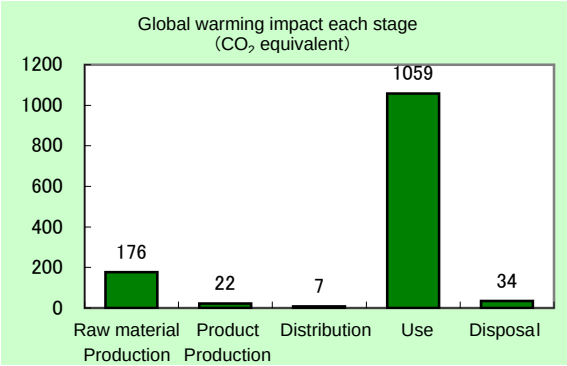
< Main environmental impact in the product lifecycle >

- Energy consumption 22,200MJ
- Global warming impact (CO_2 equivalent) 1,300kg
- Acidification impact (SO_2 equivalent) 2.11kg



- Electric power consumption in 5 years of “Use stage” is 463kWh.
- The above data does not include the environmental impact of the paper that is used for printing.

Notes:

1. Original LCA data is available on PEIDS: Product Environmental Information Declaration Sheet, and Product Data Sheet.
2. Unified rules and requirements for EcoLeaf LCA, for intended product category, are available as a PCR: Product Category Rule. Visit EcoLeaf website under JEMAI homepage at http://www.jemai.or.jp/ecoleaf_e/ for details.
3. The units used for EcoLeaf calculations are based on Japanese domestic data. Overseas data has not been applied.

[Supplemental environmental information]

The product assembly and main parts of toner and photoconductor are produced at plants certified with ISO 14001.
The product conforms to the International Energy Star Program.
The product has obtained the ECO Mark certification (3R & Energy-Saving Design).

PCR review was conducted by: PCR Deliberation Committee, February 01, 2011, Name of representative: Yohji Uchiyama, University of Tsukuba, Graduate School
Independent verification of the label and data, according to ISO 14025:2006 ☐ internal ■ external Third party verifier *: Shozo Nakamuta
Program operator: Japan Environmental Management Association for Industry Email: ecoleaf@jemai.or.jp

* In the case of a business entity certified as an Ecoleaf-data-collection system, the names of certification auditors are written.

Form 2-A(F-02As-02)

Product Environmental Information Data Sheet (PEIDS)

Document control no.	F-02As-02
Product vendor	Brother Industries,LTD.
EcoLeaf registration no.	AD-11-147

Unit Function DB version	v2.1
Characterization Factor DB version	v2.1

PCR name	EP and IJ printer		Product type	HL-4570CDWT			
PCR code	AD-04	Product weight (kg)	27.6	Package (kg)	12.2	Weight total (kg)	39.8

In/Out items \ Life Cycle Stage					Unit	Production		Distribution	Use	Disposal	Total
						Raw material	Product				
Energy Consumption					MJ	3.24E+03	3.92E+02	9.63E+01	1.84E+04	3.74E+01	2.22E+04
					Mcal	7.74E+02	9.37E+01	2.30E+01	4.39E+03	8.92E+00	5.29E+03
Inventory anaiyses	Impact by Resource Consumption	Exhaustible resources	Energy resources	Coal	kg	1.99E+01	2.37E+00	2.25E-04	1.02E+02	2.25E-01	1.24E+02
				Crude oil (for fuel)	kg	3.21E+01	3.68E+00	2.10E+00	1.58E+02	3.98E-01	1.97E+02
				LNG	kg	6.32E+00	1.20E+00	3.25E-02	3.93E+01	1.16E-01	4.70E+01
				Uranium content of an ore	kg	5.87E-04	1.60E-04	1.52E-08	3.75E-03	1.52E-05	4.51E-03
			Mineral resources	Crude oil (for material)	kg	1.36E+01	6.88E-03	0	6.85E+01	0	8.21E+01
				Iron content of an ore	kg	1.23E+01	0	0	3.99E+01	0	5.22E+01
				Cu content of an ore	kg	3.98E-01	0	0	6.97E-02	0	4.68E-01
				Al content of an ore	kg	5.53E-01	0	0	5.17E+00	0	5.72E+00
				Ni content of an ore	kg	3.85E-02	0	0	2.53E-01	0	2.91E-01
				Cr content of an ore	kg	5.61E-02	0	0	3.56E-01	0	4.12E-01
				Mn content of an ore	kg	6.63E-02	0	0	2.52E-01	0	3.19E-01
				Pb content of an ore	kg	1.75E-02	0	0	5.66E-03	0	2.32E-02
				Sn content of an ore	kg	-	-	-	-	-	
				Zn content of an ore	kg	1.73E-01	0	0	5.56E-02	0	2.28E-01
				Au content of an ore	kg	-	-	-	-	-	
				Ag content of an ore	kg	-	-	-	-	-	
				Silica Sand	kg	8.04E-01	0	0	4.87E-01	0	1.29E+00
				Halite	kg	3.46E+00	1.91E-04	0	1.18E+01	1.20E-02	1.52E+01
				Limestone	kg	2.90E+00	1.24E-02	0	1.06E+01	3.18E-01	1.39E+01
				Natural soda ash	kg	6.87E-02	0	0	4.69E-05	0	6.88E-02
		Renewable resources		Wood	kg	2.33E+01	3.43E+00	0	1.49E+02	0	1.75E+02
				Water	kg	1.56E+04	2.01E+03	1.70E-01	6.53E+04	1.91E+02	8.31E+04
	Impact by Emission/Discharge to the environment	to Atmosphere		CO2	kg	1.72E+02	2.19E+01	6.83E+00	1.04E+03	3.43E+01	1.28E+03
				SOx	kg	1.10E-01	1.48E-02	4.36E-03	7.56E-01	1.80E-02	9.03E-01
				NOx	kg	2.26E-01	1.90E-02	3.59E-02	1.40E+00	3.84E-02	1.72E+00
				N2O	kg	1.48E-02	5.21E-04	1.10E-03	5.89E-02	4.82E-05	7.53E-02
				CH4	kg	1.56E-03	4.29E-04	4.07E-08	9.93E-03	4.08E-05	1.20E-02
				CO	kg	2.27E-02	3.19E-03	1.00E-02	2.20E-01	7.02E-03	2.63E-01
				NMVOC	kg	3.05E-03	8.40E-04	7.98E-08	1.94E-02	7.99E-05	2.34E-02
				CxHy	kg	6.97E-03	1.90E-04	1.03E-03	2.94E-02	1.31E-04	3.78E-02
				Dust	kg	2.24E-02	8.95E-04	3.35E-03	1.13E-01	2.19E-03	1.42E-01
		to Water domain		BOD	kg	-	-	-	-	-	
				COD	kg	-	-	-	-	-	
				N total	kg	-	-	-	-	-	
				P total	kg	-	-	-	-	-	
				SS	kg	-	-	-	-	-	
		to Soil system		Unspecified Solid Waste	kg	1.63E+00	4.32E-02	0	7.47E+01	1.50E+01	9.14E+01
				Slag	kg	4.02E+00	0	0	1.24E+01	0	1.64E+01
				Sludge	kg	1.01E+00	0	0	1.11E+01	0	1.21E+01
				Low level radio-active waste	kg	4.11E-04	1.12E-04	1.07E-08	2.62E-03	1.06E-05	3.15E-03
Impact assessment	by Resource Consumption	Exhaustible resources		Energy resources (crude oil equivalent)	kg	5.72E+01	7.97E+00	2.14E+00	3.02E+02	8.07E-01	3.70E+02
				Mineral resources (Iron ore equivalent)	kg	1.39E+02	3.79E-03	0	3.15E+02	0	4.53E+02
	by Emission/Discharge to the environment	to Atmosphere		Global Warming (CO2 equivalent)	kg	1.76E+02	2.21E+01	7.13E+00	1.06E+03	3.43E+01	1.30E+03
				Acidification (SO2 equivalent)	kg	2.68E-01	2.81E-02	2.95E-02	1.73E+00	4.48E-02	2.11E+00

[Notes for readers: EcoLeaf common rules]

I. Stage related

A. "Production" stage is intended for two sub-stages listed below.
(1) "Raw material" production: consists of mining, transportation and raw material production.
(2) "Product" production: consists of the parts processing, assembly and installation.
B. "Distribution" stage is intended for transportation of produced product. Transportation of consumables and maintenance goods (e.g., replacement parts) for use of the product are included into "Use" stage.
C. "Use" stage in intended for use of the product (active mode, standby mode, etc.) and production, transportation to disposal of consumables/maintenance goods (e.g., replacement parts).
D. "Disposal" stage in intended for environmental impacts by product disposal.

II. Inventory analyses

A. Data of mineral ore on "Exhaustible resources" are presented in weight of pure ingredients (e.g., iron, aluminum) in the ore.
B. Data on energy resources are presented based on origin in calorific value. e.g. Data on uranium ore presents weight of uranium concentrate, which is available for use as an atomic fuel.
C. Data of discharge to water system are in actual figure (not calculated using unit function in inventory analyses).

III. Impact analyses

Result of the "Impact analyses" is found in converting results of inventory analyses into total amount of a reference material (e.g. CO_2 in case of "Global Warming").
A. Impact "by resource consumption" represents magnitude of impacts to resource depletion.
B. Impact "by emission/discharge to environment" represents magnitude of impacts to Atmosphere, Water and Soil system.

IV. Data entry format

A. Exponential notation, after the decimal point to two, should be used.
B. Indicate "0" instead exponential notation, if the result of calculation or estimation is considered as "zero" or negligible in comparison to related results.
C. Indicate "—" if calculation nor estimation can not be done, in order to differentiate to indicate "zero".
D. Row total of the data is automatically calculated, excluding a row includes "—" item. Row total of such is presented as a blank (no data).
(BGD for material production are for production from mineral ore. Those data do not include reclaiming processes like recovery from scrap.)

[Notes for readers: Target product specific]

1. Product weight includes the accessories as standard equipment, a toner cartridge and a drum unit. Packaging weight includes packaging material and appended goods (e.g., user's manual, other printed matter, polyethylene bags).
2. Production stage includes the production/distribution impact of the parts making up a machine and the initial set of a toner cartridge and a photo conductor, as well as the impact of product assembly.
3. Distribution stage's impact is calculated according to the PCR. The transportation distance of a product from an overseas factory to the port of Japan is based on actual distance. The transportation distance in Japan uses 100 km as average distance
4. Use stage's impact is calculated according to the PCR. It includes the impact of printing 470400 sheets, calculated by supposing a user use a machine for 5 years.
It also includes the electricity consumption of a machine calculated based on 5-year use, supposing a month consists of 4 weeks, with weekly electricity consumption calculated by the TEC test procedure.
The production, distribution, and disposal/recycle impact of the consumables used in those 5 years is also included.
The distribution impact of consumables is calculated under the same condition of products:
The transportation distance of consumables from an overseas factory to the port of Japan is based on actual distance. The transportation distance in Japan uses 100 km as average distance.
Since we have not collected consumables as a producer, which are newly introduced, they are assumed to be collected as general waste, crushed and separated as combustible/non-combustible material.
This stage includes the incineration impact of combustible materials and the landfill impact of non-combustible materials of consumables.
5. Disposal stage: Since we have not collected machines as a producer, they are assumed to be collected as general waste, crushed and separated as combustible/non-combustible material.
This stage includes the incineration impact of combustible materials and the landfill impact of non-combustible materials of machines.

Form 3(F-03s-02)

Product data sheet

(Input data and parameters for LCA)

Document control no.	F-03s-02
Product vendor	Brother Industries,LTD.
EcoLEaf registration no.	AD-11-147

PSC name	EP and IJ printer(PCR ID:AD-04)	Product type	HL-4570CDWT				
LCA/LCIA in units of:	1	Product weight	27.6	Package (kg)	12.2	weight total (kg)	39.8

1. Product information (per unit): parts etc. by material and by process/assembly method

	Breakdown of primary materials				Math breakdown of parts, which need to apply Processing / Assembly base Units (Parts B,C)			
	Material name	Weight (kg)	Material name	Weight (kg)	Process name	Weight (kg)	Process name	Weight (kg)
Product	Steel	1.08E+01	Paper	1.09E+01	Press molding: Iron (kg)	1.11E+01	Parts assembly (kg)	1.05E+01
	Stainless steel	2.42E-01	Semiconductor substrate	1.55E+00	Press molding: Nonferrous metal (kg)	2.77E-01		
	Aluminum	4.47E-01	Wood	1.68E-04	Injection molding (kg)	1.42E+01		
	Other metal	4.34E-02	Medium-sized motor	9.19E-01	Glass molding (kg)	3.63E-01		
	Thermoplastic resin	1.39E+01	Lubricants	4.34E-03				
	Thermosetting resin	0						
	Rubber	5.44E-01						
	Glass	3.63E-01						
	Subtotal	2.64E+01	Subtotal	1.34E+01				
	Total			3.98E+01	Subtotal	2.59E+01	Subtotal	1.05E+01

Note

2. Production site information (per unit): Consumption and discharge/emission for production/processing/assembly within the site.

SOx and NOx should be indicated in SO_2, NO_2 equivalent.

Consumption	Classificatior	Material	Energy	Energy	Energy	Energy	Energy	Energy	Energy
	Distribution	Corrugated cardboard (kg)	Electricity (kwh)	Diesel truck: 20 ton (kg.km)	Diesel truck: 2 ton (kg.km)	Incineration: Industrial waste (kg)	LPG(NPG) as fuel (kg)	Gasoline as fuel (kg)	Freight by ship (kg.km)
	Quantity	1.61E+00	1.05E+01	1.44E+02	1.02E+02	1.62E+00	5.44E-02	9.59E-06	6.65E+02
	Note								
	Classificatior	Material	Energy	Energy	Energy				
	Distribution	PP (kg)	Kerosene as fuel (kg)	Heavy oil fuel (kg)	Diesel truck: 10 ton (kg.km)				
	Quantity	6.95E-03	9.10E-04	1.76E-01	1.06E+02				
	Note								
Emission / Discharge	Classificatior								
	Distribution								
	Quantity								
	Note								

Note

3. Distribution stage information (per unit): means, distance, loading ratio, consumptions and emissions/discharges.

Distribution	Means of transportation	Diesel truck: 20 ton (kg.km)	Diesel truck: 20 ton (kg.km)	Diesel truck: 20 ton (kg.km)	Diesel truck: 20 ton (kg.km)	Freight by ship (kg.km)	Freight by ship (kg.km)	Freight by ship (kg.km)	Freight by ship (kg.km)
	Conditions	Mass (kg)	Distance (km)	Loading Ratio (%w)	Load (kg·km)	Mass (kg)	Distance (km)	Loading Ratio (%w)	Load (kg·km)
	Quantity	3.98E+01	3.00E+01	2.45E+01	4.88E+03	3.98E+01	2.54E+03	1.00E+02	1.01E+05
	Note								
	Means of transportation	Diesel truck: 10 ton (kg.km)	Diesel truck: 10 ton (kg.km)	Diesel truck: 10 ton (kg.km)	Diesel truck: 10 ton (kg.km)				
	Conditions	Mass (kg)	Distance (km)	Loading Ratio (%w)	Load (kg·km)				
	Quantity	3.98E+01	1.00E+02	2.43E+01	1.64E+04				
	Note								

Note Electric power consumption in 5 years of "Use stage" is 463kWh.

4. Use stage (per unit): use condition (mode, term) including active mode, standby mode and maintenance.

4.1 Product and accessories subject to this analysis

Product	Classificatior	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption	Process	Consumption
	Distribution	Electricity (kwh)	Diesel truck: 20 ton (kg.km)	Freight by ship (kg.km)	Diesel truck: 2 ton (kg.km)	Diesel truck: 10 ton (kg.km)	Electroplated steel Plate (kg)	Incineration: Industrial waste (kg)	Stainless steel plate (kg)
	Quantity	4.63E+02	2.97E+04	4.81E+05	3.65E+03	8.84E+04	3.80E+01	8.31E+00	1.59E+00
	Note	Electricity consumption for 5 years	Distribution of consumables used in 5 years	Distribution of consumables used in 5 years	Distribution of consumables used in 5 years	Distribution of consumables used in 5 years			
	Classificatior	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption
	Distribution	High density polyethylene (kg)	Copper plate (kg)	Aluminum plate (kg)	Low density polyethylene (kg)	PP (kg)	PS (kg)	Polycarbonate (kg)	PC-ABS(70/30)(kg)
	Quantity	4.50E-02	2.30E-01	4.89E+00	3.82E+00	5.22E+00	2.37E+01	4.34E+00	3.25E+00
	Note								
	Classificatior	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption
	Distribution	PA66 (Polyamide 66) (kg)	POM(polyacetal) (kg)	Expandable soft polyurethane (for bedding) (kg)	ABS (kg)	AS resin (kg)	MMA resin (kg)	PET (kg)	Expandable soft polyurethane (for automobile) (kg)
	Quantity	2.23E-01	5.12E+00	2.79E-02	8.36E+00	1.14E+01	4.39E-01	7.95E-01	8.97E-01
	Note								
	Classificatior	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption
	Distribution	Nitrile-butadiene rubber (NBR) (kg)	Assembled circuit board(kg)	Corrugated cardboard (kg)	Cardboard (kg)	Paper (Western style)	Injection molding (kg)	Press molding: Iron (kg)	Press molding: Nonferrous metal (kg)
	Quantity	6.88E+00	1.89E-03	5.49E+01	1.20E+01	1.94E+00	6.35E+01	3.54E+01	1.61E+01
	Note								
	Classificatior	Consumption	Consumption	Consumption	Consumption	Consumption	Consumption		
	Distribution	Parts assembly (kg)	LNG (kg)	Gasoline as fuel (kg)	Kerosene as fuel (kg)	Heavy oil fuel (kg)	Electricity (kwh)		
	Quantity	6.13E+00	9.79E-01	1.20E-04	1.14E-02	4.91E+00	1.80E+02		
	Note		Production of consumables used in 5 years	Production of consumables used in 5 years	Production of consumables used in 5 years	Production of consumables used in 5 years	Production of consumables used in 5 years		

Note

4.2 Disposition/Recycle information on consumables and replacement parts

Consumables	Classificatior	Consumption	Process	Process	Process				
	Distribution	Diesel truck: 4 ton (kg.km)	Shredding (kg)	Incineration to landfill	Landfill: General waste (kg)				
	Quantity	7.04E+03	1.08E+02	1.25E+02	4.62E+01				
	Note	Consumables not collected	Consumables not collected	Consumables not collected	Consumables not collected				

Note

5. Disposition/Recycle stage information (per product): process method and scenarios

Scenario	Classificatior	Consumption	Process	Process	Process				
	Distribution	Diesel truck: 4 ton (kg.km)	Shredding (kg)	Incineration to landfill	Landfill: General waste (kg)				
	Quantity	3.50E+03	2.40E+01	2.51E+01	1.11E+01				
	Note	Machines not collected	Machines not collected	Machines not collected	Machines not collected				

Note

6. Others