

# Data Sources Underlying the Imaging Equipment Electronics Environmental Benefits Calculator - Printer (Black and White) Data

The full criteria can be found online at <https://www.epeat.net/resources/criteria-2/>

Baseline Assumptions for Conventional Products for Purchasing				
Reduced Toxicity				
Criteria	Attribute	Value	Reference*	Notes
4.1.1.1	Average lead content per unit	0.9691 g	Fraunhofer, 2007. SimaPro, 2013.	
	Average mercury content (not including lamps) per unit	0 g	Fraunhofer, 2007. SimaPro, 2013.	
	Average cadmium content per unit	0.001746 g	Fraunhofer, 2007. SimaPro, 2013.	
	Average hexavalent chromium content per unit	0.200327 g	Fraunhofer, 2007. SimaPro, 2013.	
	Average PBB content per unit	0 g		PBB is no longer manufactured (AEAT, 2001; BSEF, 2000).
	Average PBDE content per unit	0 g	WA State Department of Ecology, 2006; Bromine Science and Environmental Forum, 2010.	The manufacture of Penta-PBDE and Octa-PBDE was discontinued in 2004 (WA State Department of Ecology, 2006). Deca-BDE use in electronics was added to the RoHS restricted substances in the European Union, starting 2008, and several U.S. states have prohibited its use in computers and other products. Further, member companies of the BSEF are voluntarily phasing out the production and use of Deca-BDE in the U.S. market by the end of 2012 (BSEF, 2010).
4.1.3.2-3	Average number of lamps per unit	2		EPA assumption.
	Average mercury content in lamps	0.005 g	Fraunhofer, 2007. SimaPro, 2013.	
Material Use				
Criteria	Attribute	Value	Reference*	Notes
4.2.1.1-3	Percent recycled content of plastic (resin) in product	0	EPEAT Registry, 2015.	
	Average amount of plastic in product	9.9158 kg	Swico Recycling, 2010; EPEAT Registry, archived data from 2007-2011.	Average EPEAT product weight * % plastic from SWICO (2010) data.
	Average amount of recycled plastic (resin) content in product	0 kg		Calculated using % recycled content of plastic and average amount of plastic in product. See rows above.
4.2.2.1-2	Percent renewable/biobased material in product	0	EPEAT Registry, 2015.	
	Average amount of molded plastic parts in product	9.9158 kg	Swico Recycling, 2010; EPEAT Registry, 2007-2012.	Assumption; same as total plastic in product. EPEAT data from 2007 - 2011.
	Average amount of renewable/biobased material in molded plastic in product	0 kg		Calculated using % renewable/biobased content of plastic and average amount of plastic in product. See rows above.

Packaging				
Criteria	Attribute	Value	Reference*	Notes
4.8.3.1-2	Percent recycled content of corrugated packaging	0		This baseline value is assumed to be 0%, thus providing full credit for recycled content of packaging.
	Average amount of corrugated per unit package	4.057 kg	Fraunhofer, 2007. SimaPro, 2013.	
	Average amount of recycled content of corrugated packaging	0 kg	Calculated.	Calculated using % recycled content and average amount of corrugated in packaging. See rows above.
	Percent recycled content of plastic/foam packaging	0		This baseline value is assumed to be 0%, thus providing full credit for recycled content of packaging.
	Average amount of plastic/foam per unit package	0 kg	Fraunhofer, 2007. SimaPro, 2013.	
	Average amount recycled content of plastic/foam packaging	0 kg	Calculated.	Calculated using % recycled content and average amount of plastic in packaging. See rows above.
	Percent recycled content of other packaging	0		This baseline value is assumed to be 0%, thus providing full credit for recycled content of packaging.
	Average amount of other packaging per unit package	0 kg	Fraunhofer, 2007. SimaPro, 2013.	
	Average amount of recycled content of other packaging	0 kg		Calculated using % recycled content and average amount of other packaging in product. See rows above.
4.8.5.1	Packaging avoided per unit by packaging reuse	0 kg		This baseline value is assumed to be 0, thus providing full credit for packaging reuse.
	Average amount of packaging per product	4.057 kg		EPA assumption. Sum of all packaging types. See rows above.
Energy				
Criteria	Attribute	Value	Reference*	Notes
4.5.1.1-2	Annual unit energy consumption (UEC) with default enabling rate	182.5 kWh/y		This baseline value is a conventional unit with default enabling rate. Calculated using assumptions shown 2014 ENERGY STAR power management calculators.
Baseline Assumptions for Use and End-of-Life				
Criteria	Attribute	Value	Reference*	Notes
USE	Percentage of units with power management features enabled	100%	ENERGY STAR, 2014.	Assumption, used in ENERGY STAR power management calculators.
USE	Average lifetime of unit	72 months	FEC, 2012.	This baseline value is for the initial user.
EOL	Average weight of product	18.92 kg	Swico Recycling, 2010.	Based on survey of over 400,000 computers in European waste stream.
EOL	Average hazardous waste content in unit	0.99 kg	Calculated.	Sum of printed wire boards and insulation resin (plastic) on wire and cable. See rows below. Assumes printed wire boards and cables contain lead.
EOL	Average weight of printed wire boards	0.82 kg	Swico Recycling, 2010.	Calculated based on SWICO's weight (row 40) and the percent content of PWBs.
EOL	Average weight of leaded glass	na		
EOL	Average weight of cold cathode fluorescent lamps (CCFL)	0.00001		Maximum mercury in scanning lamps

EOL	Average weight of resin (plastic) in wire and cable	0.168 kg	Swico Recycling, 2010.	Calculated based on SWICO's weight for computers and their percent content for cables. Assumes the weight of cables is the weight of the resin.
EOL	% material collected for recycling that is recycled	100%		EPA assumption.
EOL	% material collected for recycling that is reused	0%		EPA assumption.

**EPEAT Default Assumptions for Purchasing, Use, and End-Of-Life**

**Reduced Toxicity**

Criteria	Attribute	Value	Reference*	Notes
4.1.1.1	RoHS Compliance	n/a		Applies to all tiers--bronze, silver, and gold -- unless otherwise noted. The calculator assumes "RoHS compliance" results in the elimination of restricted substances, since the quality and precision of available data does not easily allow extrapolation to individual "homogeneous" materials, which is the unit of measure for the maximum concentrations defined by RoHS.
4.1.2.1	Further reduction of the use of EU RoHS Directive hazardous substances (cadmium)	0 mg		
4.1.3.1	Reporting on amount of mercury in light sources	varies		Range is 0 mg to >1g; units could be mg or g of mercury
4.1.5.1	Compliance with provisions of European Union Battery Directive	Y/N		
4.1.6.1	Reducing BFR/CFR/PVC content of external plastic casings	0.1% by weight		Applies to external plastic casings >25 g
4.1.6.2	Eliminating or reducing BFR/CFR content of printed circuit board laminates	0.1% by weight		
4.1.6.3	Eliminating or reducing BFR/CFR/PVC content of product	0.1% by weight		

**Material Use**

Criteria	Attribute	Value	Reference*	Notes
4.2.1.1	Recycled plastic (resin) content, manufacturer's declaration	varies by %	Varies by tier and product type.	
4.2.1.1	Amount of recycled resin in product	declared % x resin content by kg		
4.2.1.2	Postconsumer recycled plastic content minimum	5 g	% defined by EPEAT standard.	Any product containing plastic parts whose combined weight exceeds 100 g shall contain at least 5 g of postconsumer recycled plastic.
4.2.1.3	Minimum 5-10% postconsumer recycled plastic content	5-10% x resin content in kg	% defined by EPEAT standard.	Product containing 5 kg of plastic or less shall contain on average a minimum of 10% postconsumer recycled plastic. Postconsumer recycled plastic content shall be calculated as a percentage of total plastic (by weight) in product.
4.2.1.4	Minimum 25% postconsumer recycled plastic content	25% x resin content in kg	% defined by EPEAT standard.	For total resin content, see Sheet 8a.
4.2.3.1	Declaration of product weight	Varies by kg		

Energy Star®					
Criteria	Attribute	Value	Reference*	Notes	
4.5.1.1	Energy Star® 2.* Compliant annual unit energy consumption (UEC)	135.57 kWh/y	2014 Energy Star	Office Equipment Calculator for std format laser monochrome printer at default speed of 40; Assumes 100% enabled.	
Federal Electronics Challenge					
Criteria	Attribute	Value	Reference*	Notes	
EOL	Reuse ratio	1 for 1		Reuse assumes a 1 for 1 trade (i.e., for every unit reused, one unit is not produced.)	
EPEAT Registration Tier Assumptions for Purchasing					
Reduced Toxicity		Bronze	Silver	Gold	Notes
4.1.1.1-R	Compliance with provisions of European RoHS Directive	yes	yes	yes	Required criteria; all registered products must meet. The calculator assumes "RoHS compliance" results in the elimination of restricted substances, since the quality and precision of available data does not easily allow extrapolation to individual "homogeneous" materials, which is the unit of measure for the maximum concentrations defined by RoHS.
4.1.3.1-R	Reporting on amount of mercury used in light sources, Number of lamps with Hg	0	0	0	
4.1.3.1-R	Reporting on amount of mercury used in light sources, maximum average Hg content per lamp	0	0	0	
4.1.3.2-O	Low threshold for amount of mercury used in light sources (Max average of 3 mg Hg/lamp)	yes	yes	yes	Criterion must be consistent with declared values in above rows.
4.1.3.3-O	Elimination of intentionally added mercury used in light sources	yes	yes	yes	Criterion must be consistent with declared values in above rows.
Material Use					
Reduced Toxicity		Bronze	Silver	Gold	Notes
4.2.1.1-R	Manufacturer's declared percent recycled content for product	1.2%	10.0%	17.0%	EPEAT Registry, 2015.
4.2.1.2-O	Minimum content of postconsumer recycled plastic (>=10%)	no	yes	yes	Criterion must be consistent with declared values in above rows.
4.2.1.3-O	Higher content of postconsumer recycled plastic (>=25%)	no	no	no	Criterion must be consistent with declared values in above rows.
Energy					
Reduced Toxicity		Bronze	Silver	Gold	Notes
4.5.1.1-R	ENERGY STAR®	yes	yes	yes	Required criteria; all registered products must meet.
Packaging					
Reduced Toxicity		Bronze	Silver	Gold	Notes
4.8.3.1-R	Declaration of recycled content in packaging, % recycled content for corrugated/paper fiber packaging	24%	50%	60%	EPEAT Registry, 2015.

4.8.3.1-R	Declaration of recycled content in packaging, % recycled content for plastic/foam/resin packaging	0%	0%	0%	
4.8.3.1-R	Declaration of recycled content in packaging, % recycled content for other packaging	0%	0%	0%	
4.8.3.2-O	Minimum postconsumer content guidelines (CPG) (Recycled content of corrugated packaging >=25%)	no	yes	yes	Criterion must be consistent with declared values in above rows.
4.8.5.1-O	Reusable packaging	no	no	no	
<b>Distribution of Products Used in Government</b>					
	<b>Product Type</b>	<b>Distribution</b>	<b>Reference*</b>	<b>Notes</b>	
USE	MFD-color	10.1%	FEC, 2012.	Products reported in use during FY2011.	
USE	B&W Printer	64.0%	FEC, 2012.	Products reported in use during FY2011.	
USE	B&W MFD	25.9%	FEC, 2012.	Products reported in use during FY2011.	
USE		100%			
<b>ENERGY INFORMATION</b>					
<b>Criteria</b>	<b>Attribute</b>	<b>Value</b>	<b>Reference*</b>	<b>Notes</b>	
USE	Electricity cost	0.103 \$/kWh	ENERGY STAR, 2014.		
USE	Discount rate	4%	ENERGY STAR, 2014.	A real discount rate of 4 percent is assumed, which is roughly equivalent to the nominal discount rate of 7 percent (4 percent real discount rate + 3 percent inflation rate).	
USE	% of units turned off at night	0%	ENERGY STAR, 2014.	Assumption, used in ENERGY STAR power management calculators.	
USE	% power managed	100%	ENERGY STAR, 2014.	Assumption, used in ENERGY STAR power management calculators.	
USE	Time in "active" or "idle" mode	8760 hours/year	Calculated.	Calculated using assumptions shown 2014 ENERGY STAR power management calculators.	
USE	Time in "sleep" mode	hours/year			
USE	Time in "off" mode	hours/year			
<b>Baseline Units</b>					
<b>Criteria</b>	<b>Attribute</b>	<b>Value</b>	<b>Reference*</b>	<b>Notes</b>	
USE	Average power in "active" or "idle" mode	20.8 watts	ENERGY STAR, 2014.		
USE	Average power in "sleep" mode	watts			
USE	Average power in "off" mode	watts			
USE	Weighted average UEC	182.5 kWh/y	Calculated.	Calculated using assumptions shown 2014 ENERGY STAR power management calculators.	

ENERGY STAR 2.* Qualified Units				
Criteria	Attribute	Value	Reference*	Notes
USE	Average power in "active" or "idle" mode	15.48 watts	ENERGY STAR, 2014.	
USE	Average power in "sleep" mode	watts		
USE	Average power in "off" mode	watts		
USE	Weighted average UEC	135.57 kWh/y	Calculated.	Calculated using assumptions shown 2014 ENERGY STAR power management calculators.

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