

Data Sources Underlying the Computers Electronics Environmental Benefits Calculator - Notebook Computer 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 g		Assumes baseline products comply with RoHS requirements.
	Average mercury content (not including lamps) per unit	0 g		Assumes no Hg in LCDs when lamps are excluded.
	Average cadmium content per unit	.001 g	CIWMB, 2006.	The maximum amount of Hg per lamp for notebook computers declared on the EPEAT Registry in 2010-2011 was 3.0 mg.
	Average hexavalent chromium content per unit	0.008 g	CIWMB, 2006.	This is assumed not to include NiCd batteries. NiCad batteries haven't been used in these products for about 10 years. (Burkitt, 2006.)
	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	0 lamps		Modeling as LED lights; no Hg lamps
	Average mercury content in lamps	0g		Modeling as LED lights; no Hg lamps
Material Use				
Criteria	Attribute	Value	Reference*	Notes
4.2.1.1-3	Percent recycled content of plastic (resin) in product	0%	EPEAT Registry, 2012.	97% of laptops listed on the EPEAT Registry in 2011 declared 0% post consumer recycled content. It is assumed that a baseline product would not exceed the performance of EPEAT-Registered products.
	Average amount of plastic in product	0.8476 kg	Swico Recycling, 2016; EPEAT Registry, 2012.	Average EPEAT product weight * % plastic from Swico data. EPEAT data 2007 - 2011.
	Average amount of recycled plastic (resin) content in product	0 kg	Calculated.	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, 2012.	99% of laptops listed on the EPEAT Registry in 2011 declared 0% renewable/biobased content. It is assumed that a baseline product would not exceed the performance of EPEAT-Registered products.
	Average amount of molded plastic parts in product	0.8476 kg	Swico Recycling, 2016; EPEAT Registry, 2012.	Assumption; same as total plastic in product. EPEAT data 2007 - 2011.
	Average amount of renewable/biobased material in molded plastic in product	0 kg	Calculated.	Calculated using % renewable/biobased content of plastic and average amount of plastic in product. See rows above.
Packaging				
Criteria	Attribute	Value	Reference*	Notes
	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	0.552 kg	Dell, 2012; Lenovo, 2012. Company published product	Average amount taken from a sample of environmental data sheets. Sample size includes 20 devices from 2009 - 2012 from 2 manufacturers.

4.8.3.1-2	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	0.184 kg	Dell, 2012; Lenovo, 2012. Company published product	Average amount taken from a sample of environmental data sheets. Sample size includes 20 devices from 2009 -2012 from 2 manufacturers.
	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	0.038 kg	Dell, 2012; Lenovo, 2012. Company published product	Average amount taken from a sample of environmental data sheets. Sample size includes 20 devices from 2009 -2012 from 2 manufacturers.
	Average amount of recycled content of other packaging	0 kg	Calculated.	Calculated using % recycled content and average amount of other packaging. 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	0.774 kg	Calculated.	Assumption. Sum of all packaging types.

Baseline Assumptions for Use and End-of-Life (EOL)

Criteria	Attribute	Value	Reference*	Notes
USE	Percentage of units with power management features enabled	8%	ENERGY STAR, 2014.	
USE	Average lifetime of unit	54 months	FEC 2012	Assumes that the notebook average life span is the same as a CPU.
EOL	Average weight of product	3 kg	Swico Recycling, 2016.	From Swico Recycling's survey of >250,000 laptops.
EOL	Average hazardous waste content in unit	0.453 kg	Calculated.	Sum of printed wire boards and resin (plastic) in wire and cable. See rows below. Assumes that printed wire boards and cable contains lead.
EOL	Average weight of printed wire boards	0.438 kg	Swico Recycling, 2016.	Calculated as the percentage value of PWBs from Swico and the weight value from Swico (row 181).
EOL	Average weight of leaded glass	n/a		
EOL	Average weight of resin (plastic) in wire and cable	0.015 kg	Swico Recycling, 2016.	Calculated as the percentage value of cables from Swico and the weight value from Swico.
EOL	% material collected for recycling that is recycled	100%		Assumption.
EOL	% material collected for recycling that is reused	0%		Assumption.

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

Reduced Toxicity

Criteria	Attribute	Value	Reference*	Notes
	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.

4.1.1.1	Lead content	0 g		Applies to solder and wire & cable applications.
	Cadmium content	0 mg		
	Hexavalent chromium content	0 mg		
	PBB content	0 mg		
	PBDE content per unit	0 mg		

Material Use

Criteria	Attribute	Value	Reference*	Notes
4.2.1.1	Recycled plastic (resin) content, manufacturer's declaration	varies by %	Varies by EPEAT tier.	
	Amount of recycled resin in product	declared % x baseline resin content in kg		
4.2.1.2	10% recycled plastic (resin) content	10% x baseline resin content in kg	% defined by EPEAT standard.	
4.2.1.3	25% recycled plastic (resin) content	25% x baseline resin content in kg	% defined by EPEAT standard.	
4.8.3.1	Recycled content of packaging, corrugated, manufacturer's declaration	varies by %	Varies by EPEAT tier.	
	Recycled content of packaging, plastic/foam, manufacturer's declaration	varies by %	Varies by EPEAT tier.	
	Recycled content of packaging, other, manufacturer's declaration	varies by %	Varies by EPEAT tier.	
	Amount of recycled content in packaging, corrugated	declared % x amt corrugated in kg		
	Amount of recycled content in packaging, plastic/foam	declared % x amt plastic/foam in kg		
	Amount of recycled content in packaging, other	declared % x amt other in kg		
4.8.3.2	CPG recycled content of packaging, corrugated	25%	% defined by EPEAT standard.	
	Amount of recycled corrugated in packaging to meet CPG	25% x amt corrugated in kg		
4.8.5.1	Packaging reused	5 times	Defined by EPEAT standard	
	Packaging avoided per unit by packaging reuse	5 x amt pkg in kg		

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.
	Reporting on amount of mercury used in light sources, Number of lamps with Hg	1	0	0	
	Reporting on amount of mercury used in light sources, maximum average Hg content per lamp	0.000	0.000	0.000	
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	
4.1.3.3-O	Elimination of intentionally added mercury used in light sources	yes	yes	yes	

Material Use

Reduced Toxicity		Bronze	Silver	Gold	Notes
4.2.1.1-R	Manufacturer's declared percent recycled content for product	0%	0%	0%	
4.2.1.2-O	Minimum content of postconsumer recycled plastic (>=10%)	no	no	no	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.
4.2.2.1-R	Declaration of renewable/biobased plastic content				<i>Not used in versions 3.0 or 4.0.</i>
4.2.2.2-O	Minimum content of renewable/biobased plastic (>=10%)				<i>Not used in versions 3.0 or 4.0.</i>
4.2.3.1-R	Declared product weight (kg)				<i>Not used in versions 3.0 or 4.0.</i>

Energy

Reduced Toxicity		Bronze	Silver	Gold	Notes
4.5.1.1-R	ENERGY STAR®	yes	yes	yes	Required criteria; all registered products must meet.
4.5.1.2-O	ENERGY STAR® Early Adopter				<i>Not used in versions 3.0 or 4.0.</i>

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	60%	63%	65%	Values shown are based on EPEAT registry, not specific level required in IEEE standard.
	Declaration of recycled content in packaging, % recycled content for plastic/foam/resin packaging	0%	10%	20%	
	Declaration of recycled content in packaging, % recycled content for other packaging	0%	4%	13%	

4.8.3.2-O	Minimum postconsumer content guidelines (CPG) (Recycled content of corrugated packaging >=25%)	no	yes	yes	Assumption bronze level does not meet 25% minimum. EPEAT manufacturers declarations indicate >25%; however, it is optional reporting with few data points.
4.8.5.1-O	Reusable packaging	no	no	no	

Distribution of Products Used in Government

	Product Type	Distribution	Reference	Notes
USE	CPU	30.3%	FEC, 2012.	Products reported in use during FY2011.
USE	CRT	0.1%	FEC, 2012.	Products reported in use during FY2011.
USE	LCD	47.0%	FEC, 2012.	Products reported in use during FY2011.
USE	Notebook	22.7%	FEC, 2012.	Products reported in use during FY2011.
USE		100%		

ENERGY INFORMATION

Criteria	Attribute	Value	Reference*	Notes
USE	Electricity cost	0.103 \$/kWh	ENERGY STAR, 2014.	National average: US Department of Energy, Annual Energy Outlook 2013 (Early Release edition), (converted from 2011 to 2012 dollars)
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	36%	ENERGY STAR, 2013; 2014.	Assumption, used in ENERGY STAR power management calculators.
USE	% power managed	8%	ENERGY STAR, 2013; 2014.	Assumption, used in ENERGY STAR power management calculators.
USE	Time in "active" or "idle" mode	1,182 hours/year	Calculated.	Calculated using assumptions shown 2013 ENERGY STAR power management calculators.
USE	Time in "sleep" mode	724 hours/year	Calculated.	Calculated using assumptions shown 2013 ENERGY STAR power management calculators.
USE	Time in "off" mode	6,854 hours/year	Calculated.	Calculated using assumptions shown 2013 ENERGY STAR power management calculators.

Baseline Units

Criteria	Attribute	Value	Reference*	Notes
USE	Average power in "active" or "idle" mode	14.82 watts	ENERGY STAR, 2013.	
USE	Average power in "sleep" mode	1.21 watts	ENERGY STAR, 2013.	
USE	Average power in "off" mode	0.606 watts	ENERGY STAR, 2013.	
USE	Weighted average UEC	89.19 kWh/y	Calculated.	Calculated using assumptions shown 2013 ENERGY STAR power management calculators.

ENERGY STAR 5.* Qualified Units

Criteria	Attribute	Value	Reference*	Notes
USE	Average power in "active" or "idle" mode	14.1 watts	ENERGY STAR, 2013.	
USE	Average power in "sleep" mode	1.4 watts	ENERGY STAR, 2013.	
USE	Average power in "off" mode	0.8 watts	ENERGY STAR, 2013.	
USE	Weighted average UEC	85.6 kWh/y	Calculated.	Calculated using assumptions shown 2013 ENERGY STAR power management calculators.

ENERGY STAR 6.* Qualified Units				
Criteria	Attribute	Value	Reference*	Notes
USE	Average power in "active" or "idle" mode	8.6 watts	ENERGY STAR, 2014.	
USE	Average power in "sleep" mode	0.9 watts	ENERGY STAR, 2014.	
USE	Average power in "off" mode	0.5 watts	ENERGY STAR, 2014.	
USE	Weighted average UEC	52.1 kWh/y	Calculated.	Calculated using assumptions shown 2013 ENERGY STAR power management calculators.

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