

Proposed Product Category for Biobased Designation

The following biobased product information has been collected to support product category designation by USDA for the BioPreferred Program. This summary reflects data available as of December 28, 2007.

Title: Candles and Wax Melts

Description: Products composed of a solid mass and either an embedded wick that is burned to provide light or aroma, or that are wickless and melt when heated to produce an aroma.

Companies Supplying Product Category: 267 companies supplying Candles and Wax Melts have been identified through internet searches, manufacturer's directories, trade associations, and company submissions.

Industry Associations Investigated: The following industry associations have been investigated for member companies supplying Candles and Wax Melts:

- United Soybean Board Association
- National Corn Growers Association
- Village Chandler
- National Candle Association
- American Floral Industry Association
- Candle Solutions
- International Guild of Candle Artisans
- Michigan Corn Growers Association
- Ohio Corn Growers Association
- The International Group, Inc.

Commercially Available Products Identified: Of the companies identified, 708 Candles and Wax Melts are commercially available on the market.

Product Information Collected: Specific product information including company contact, intended use, biobased content, and performance characteristics have been collected on 85 Candles and Wax Melts.

Industry Performance Standards: Product information submitted by biobased manufacturers and suppliers indicate that have typically been tested to the following industry standards:

- ASTM International F2417-04 Standard Specification for Fire Safety for Candles

Samples Tested for Biobased Content: 9 samples of Candles and Wax Melts have been submitted to independent laboratories for biobased content testing as specified by ASTM standard D6866-04.

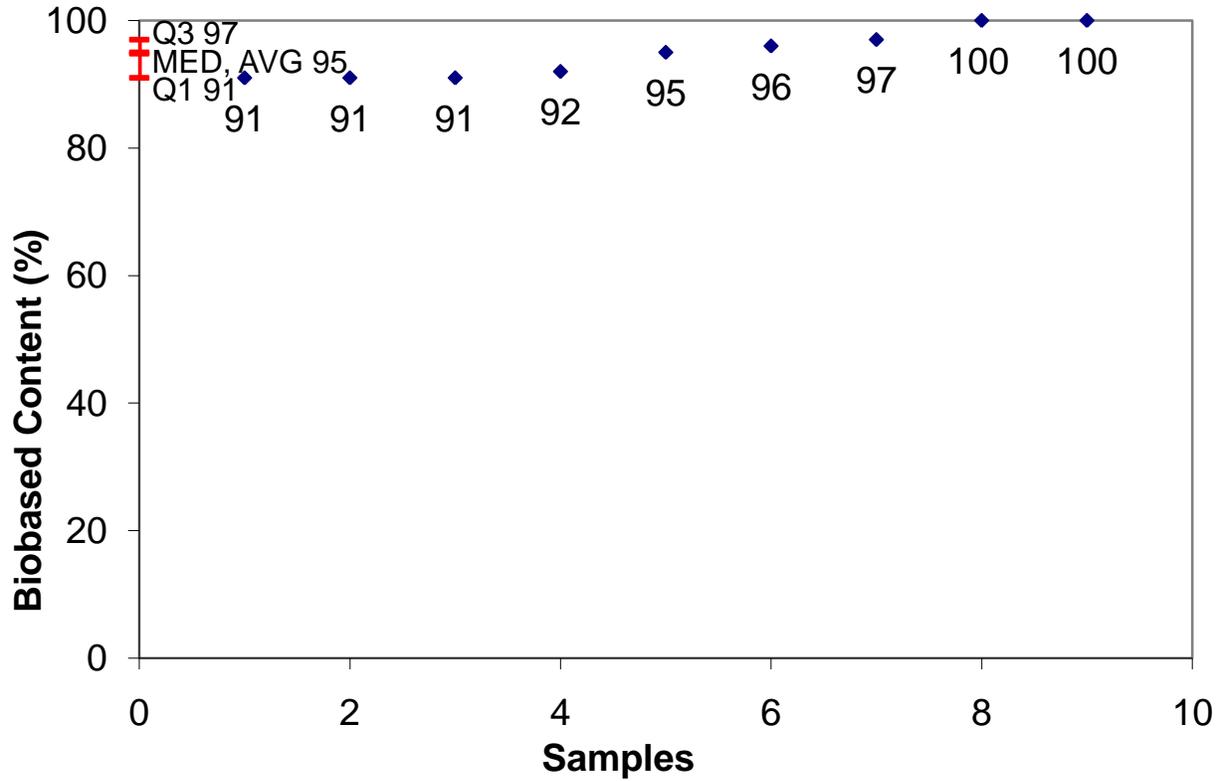
Biobased Content Data: Results from biobased content testing of Candles and Wax Melts indicate a range of content percentages from 91% minimum to 100% maximum biobased content as defined by ASTM D 6866-04. A detailed distribution of biobased content levels is included as Appendix A.

Products Submitted for BEES Analysis: Life-cycle cost and environmental effect data for 2 Candles and Wax Melts have been submitted to NIST for BEES analysis.

BEES Analysis: The life-cycle costs of the submitted Candles and Wax Melts range from \$3.55 minimum to \$7.50 maximum per usage unit. The environmental scores range from 0.0064 minimum to 0.0091 maximum. A detailed summary of the BEES results is included as Appendix B.

Appendix A - Biobased Content Data

Candles and Wax Melts

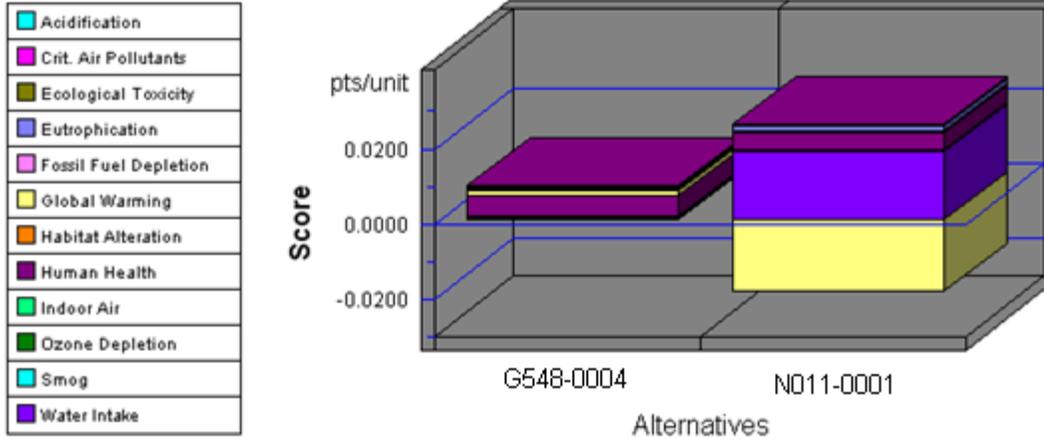


	Company	Product	C14	BEES
1	ER76	ER76-0001	91	
2	WZXA	WZXA-0002	91	
3	IPJB	IPJB-0006	91	
4	A1T7	A1T7-0001	92	
5	O956	O956-0047	95	
6	G548	G548-0002	96	
7	G548	G548-0004	97	Yes
8	W5V9	W5V9-0001	100	
9	N011	N011-0001	100	Yes

Appendix B - BEES Analysis Results

Functional Unit: 45 hours of use

Environmental Performance



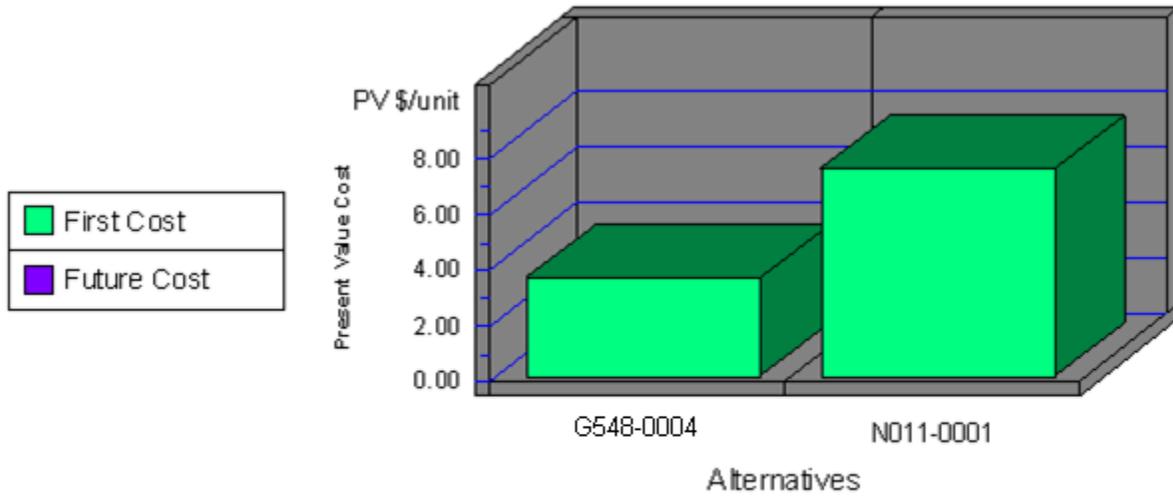
Note: Lower values are better

Category	G548-0004	N011-0001
Acidification--3%	0.0000	0.0000
Crit. Air Pollutants--9%	0.0004	0.0004
Ecolog. Toxicity--7%	0.0004	0.0004
Eutrophication--6%	0.0004	0.0013
Fossil Fuel Depl.--10%	0.0004	0.0005
Global Warming--29%	0.0013	-0.0190
Habitat Alteration--6%	0.0000	0.0000
Human Health--13%	0.0053	0.0043
Indoor Air--3%	0.0000	0.0000
Ozone Depletion--2%	0.0000	0.0000
Smog--4%	0.0003	0.0003
Water Intake--8%	0.0006	0.0182
Sum	0.0091	0.0064

Candles and Waxes			
Impacts	Units	G548-0004	N011-0001
Acidification	millimoles H ⁺ equivalents	1.12E+03	1.18E+03
Criteria Air Polutants	microDALYs	8.56E-01	8.79E-01
Ecotoxicity	g 2,4-D equivalents	5.00E+00	5.10E+00
Eutrophication	g N equivalents	1.19E+00	4.26E+00
Fossil Fuel Depletion	MJ surplus energy	1.53E+00	1.76E+00
Global Warming	g CO ₂ equivalents	1.19E+03	-1.68E+04
Habitat Alteration	T&E count	0.00E+00	0.00E+00
Human Health--Cancer	g C ₆ H ₆ equivalents	2.50E+00	1.82E+00
Human Health--NonCancer	g C ₇ H ₈ equivalents	4.88E+04	5.05E+04
Indoor Air Quality	g TVOCs	0.00E+00	0.00E+00
Ozone Depletion	g CFC-11 equivalents	3.48E-05	4.88E-05
Smog	g NO _x equivalents	1.06E+01	1.10E+01
Water Intake	liters of water	3.92E+01	1.20E+03
Functional Unit	-----	45 hours of use	

1 Following are more complete descriptions of units: Acidification: millimoles of hydrogen ion equivalents; Criteria Air Pollutants: micro Disability-Adjusted Life Years; Ecological Toxicity: grams of 2,4-dichlorophenoxy-acetic acid equivalents; Eutrophication: grams of nitrogen equivalents; Fossil Fuel Depletion: megajoules of surplus energy; Global Warming: grams of carbon dioxide equivalents; Habitat Alteration: threatened and endangered species count; Human Health-Cancer: grams of benzene equivalents; Human Health-NonCancer: grams of toluene equivalents; Indoor Air Quality: grams of Total Volatile Organic Compounds; Ozone Depletion: grams of chloroflourocarbon-11 equivalents; Smog: grams of nitrogen oxide equivalents; and Water Intake: liters of water.

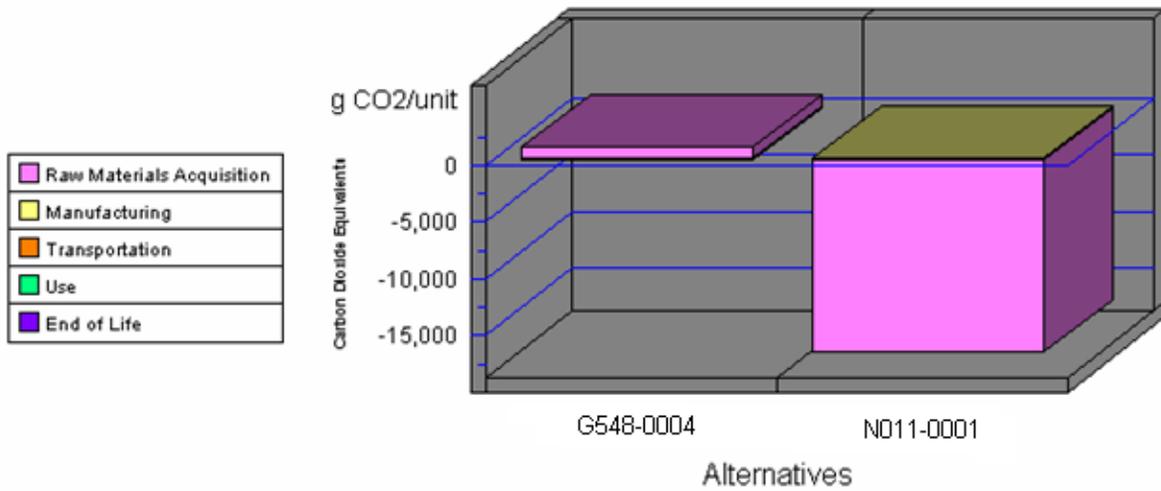
Economic Performance



Category	G548-0004	N011-0001
First Cost	3.55	7.50
Future Cost- 3.0%	0.00	0.00
Sum	3.55	7.50

*This is a consumable product. Therefore, future costs are not calculated.

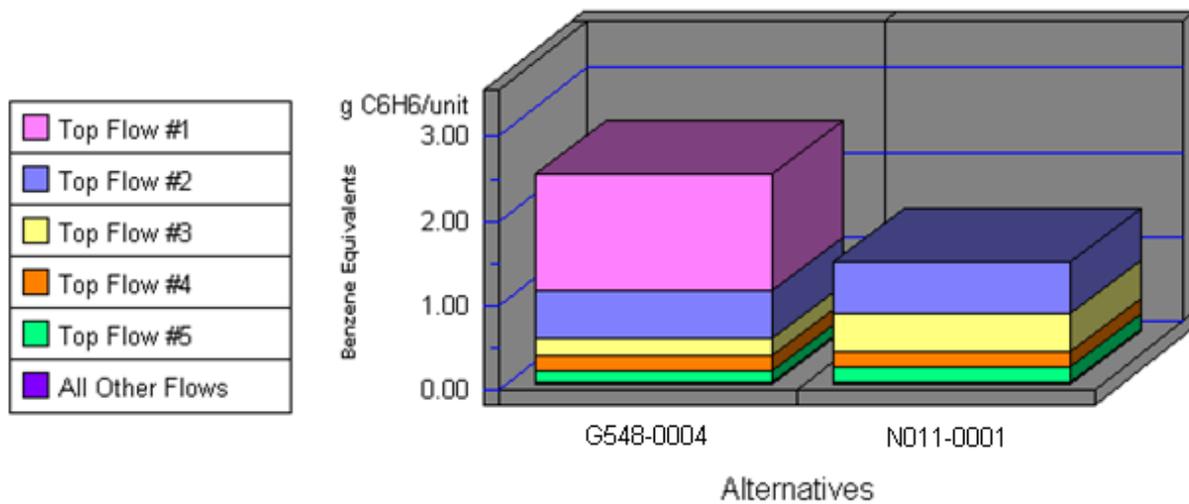
Global Warming by Life-Cycle Stage



Note: Lower values are better

Category	G548-0004	N011-0001
1. Raw Materials Acquisition	1005	-16993
2. Manufacturing	163	158
3. Transportation	19	47
4. Use	0	0
5. End of Life	0	0
Sum	1187	-16788

Human Health Cancer by Sorted Flows*

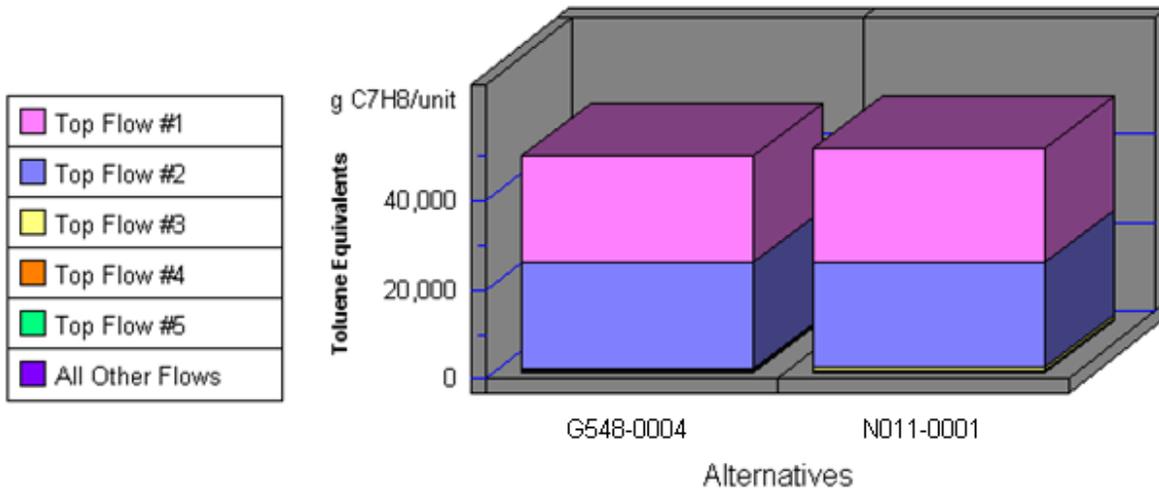


Note: Lower values are better

Category	G548-0004	N011-0001
Cancer--(a) 2,4 - D (C8H6Cl2O3)	1.39	0.00
Cancer--(a) Lead (Pb)	0.57	0.60
Cancer--(a) Dioxins (unspecifie	0.20	0.45
Cancer--(a) Arsenic (As)	0.17	0.19
Cancer--(w) Phenol (C6H5OH)	0.15	0.17
All Others	0.02	0.04
Sum	2.50	1.45

*Sorted by five topmost flows for worst-scoring product

Human Health Noncancer by Sorted Flows*



Note: Lower values are better

Category	G548-0004	N011-0001
Noncancer--(a) Lead (Pb)	23,973.03	25,475.20
Noncancer--(a) Aluminum (Al)	23,818.30	23,670.95
Noncancer--(a) Dioxins (unspeci)	248.99	563.71
Noncancer--(a) Mercury (Hg)	357.38	369.77
Noncancer--(w) Lead (Pb++, Pb4+)	145.90	96.54
All Others	301.92	312.94
Sum	48,845.53	50,489.11

*Sorted by five topmost flows for worst-scoring product