Proposed Item for Biobased Designation

The following biobased product information has been collected to support item designation by USDA for the BioPreferred Program. This summary reflects data available as of May 18, 2007.

Title: Multipurpose Lubricants

Description: Products designed to provide lubrication under a variety of conditions and in a variety of industrial settings to prevent friction or rust. Greases, which are lubricants composed of oils thickened to a semisolid or solid consistency using soaps, polymers or other solids, or other thickeners, are not included in this item. In addition, task-specific lubricants, such as chain and cable lubricants and gear lubricants, are not included in this item.

Manufacturers Identified: 16 manufacturers producing Multi-Purpose Lubricants 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 producing Multi-Purpose Lubricants:

- Biobased Manufacturers Association
- United Soybean Board
- Independent Lubricants Manufacturers Association
- National Corn Growers Association
- American Corn Growers Association
- Corn Refiners Association
- American Soybean Association
- The Society of Tribologists and Lubrication Engineers
- The American Society of Mechanical Engineers, Tribology and Lubrication Division
- The National Lubricating Grease Institute

Commercially Available Products Identified: Of the manufacturers identified, 30 Multi-Purpose Lubricants 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 4 Multi-Purpose Lubricants.

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

- API GL-1 Service Designation denotes lubricants intended for manual transmissions operating under such mild conditions that straight petroleum or refined petroleum oil may be used
- satisfactorily
- ASTM D1748 Standard Test Method for Rust Protection by Metal Preservatives in the Humidity Cabinet

- ASTM D130 Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
- ASTM D665 Standard Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water
- ASTM D2266 Standard Test Method for Wear Preventive Characteristics of Lubricating Grease (Four-Ball Method)
- ASTM D482 Standard Test Method for Ash from Petroleum Products
- ASTM D92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
- ASTM D97 Standard Test Method for Pour Point of Petroleum Products
- ASTM D972 Standard Test Method for Evaporation Loss of Lubricating Greases and Oils
- ISO 32 Calibration in analytical chemistry and use of certified reference materials
- ISO 68 International Standards Organization Viscosity Grade
- SAE 30 J300 Engine Oil Viscosity Classification
- Vickers I-286-S Tests for pump wear

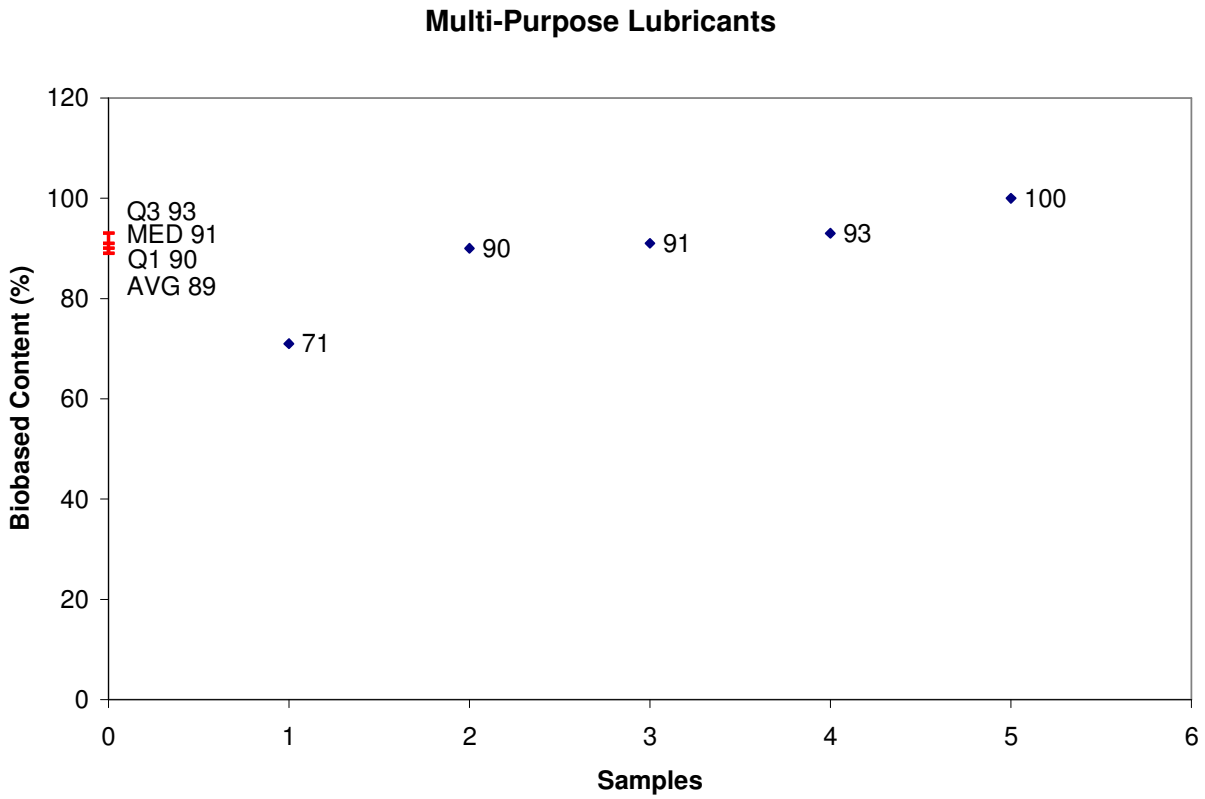
Samples Tested for Biobased Content: 5 samples of Multi-Purpose Lubricants have been submitted to independent laboratories for biobased content testing as specified by ASTM standard D6866-04.

Biobased Content Data: Results from biobased content testing of Multi-Purpose Lubricants indicate a range of content percentages from 71% 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 Multi-Purpose Lubricants have been submitted to NIST for BEES analysis.

BEES Analysis: The life-cycle costs of the submitted Multi-Purpose Lubricants range from $11.25 minimum to $11.78 maximum per usage unit. The environmental scores range from 0.0188 minimum to 0.0500 maximum. A detailed summary of the BEES results is included as Appendix B.

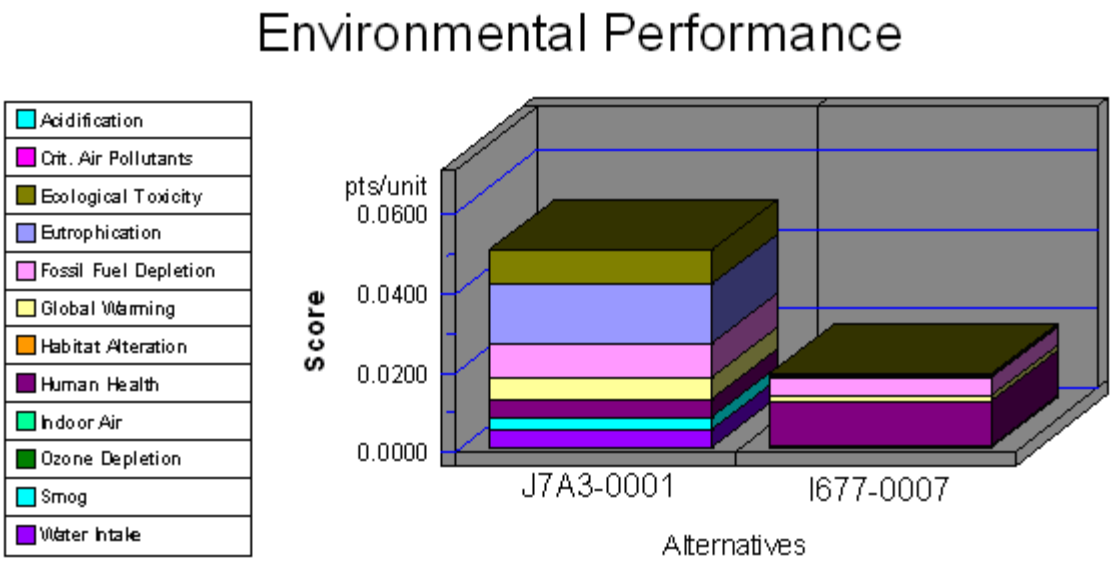
Appendix A - Biobased Content Data



	Manufacturers Identified	Products Identified	C14	BEES
1	EPBV	EPBV-0002	71	
2	JY3G	JY3G-0037	90	
3	BP37	BP37-0009	91	
4	I677	I677-0007	93	Yes
5	J7A3	J7A3-0001	100	Yes

Appendix B - BEES Analysis Results

Functional Unit: 1 Gallon of Multi-Purpose Lubricant

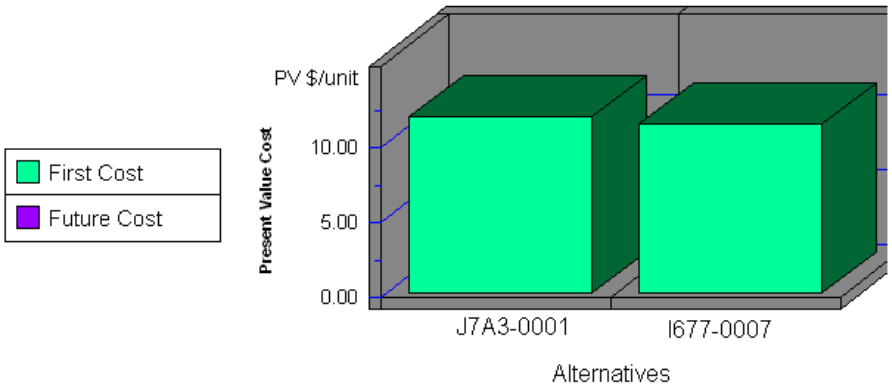


Note: Lower values are better

Category	J7A3-0001	I677-0007
Acidification–5%	0.0000	0.0000
Crit. Air Pollutants–6%	0.0002	0.0001
Ecolog. Toxicity–11%	0.0083	0.0006
Eutrophication–5%	0.0152	0.0005
Fossil Fuel Depl.–5%	0.0086	0.0044
Global Warming–16%	0.0055	0.0013
Habitat Alteration–16%	0.0000	0.0000
Human Health–11%	0.0045	0.0112
Indoor Air–11%	0.0000	0.0000
Ozone Depletion–5%	0.0000	0.0000
Smog–6%	0.0031	0.0006
Water Intake–3%	0.0046	0.0001
Sum	0.0500	0.0188

Appendix B (continued)

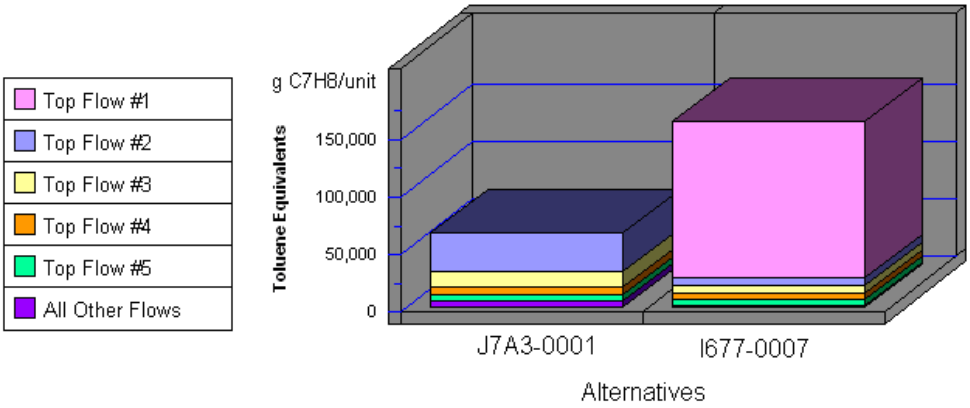
Economic Performance



Category	J7A3-0001	I677-0007
First Cost	11.78	11.25
Future Cost-- 3.9%	0.00	0.00
Sum	11.78	11.25

*No significant/quantifiable durability differences were identified among competing alternatives. Therefore, future costs were not calculated.

Human Health by Sorted Flows*



Note: Lower values are better

Category	J7A3-0001	I677-0007
Cancer--(a) Ethylene Oxide (C2H	0.00	136,292.97
Cancer--(w) Arsenic (As3+, As5+	33,490.85	6,438.38
Cancer--(w) Phenol (C6H5OH)	12,690.06	6,269.63
Cancer--(a) Dioxins (unspecifie	6,598.47	6,086.20
Cancer--(a) Arsenic (As)	6,344.73	4,607.81
All Others	5,621.64	2,340.67
Sum	64,745.74	162,035.66

*Sorted by five topmost flows for worst-scoring product

Appendix B (continued)

Multi-Purpose Lubricants			
Impacts	Units	J7A3-0001	I677-0007
Acidification	millimoles H^+ equivalents	4.70E+03	8.63E+02
Criteria Air Pollutants	microDALYs	5.33E-01	1.95E-01
Ecological Toxicity	g 2,4-D equivalents	6.13E+01	4.64E+00
Eutrophication	g N equivalents	5.85E+01	1.82E+00
Fossil Fuel Depletion	MJ surplus energy	6.06E+01	3.10E+01
Global Warming	g CO_2 equivalents	8.72E+03	2.11E+03
Habitat Alteration	T&E count	0.00E+00	0.00E+00
Human Health	g C_7H_8 equivalents	6.47E+04	1.62E+05
Indoor Air Quality	g TVOCs	0.00E+00	0.00E+00
Ozone Depletion	g CFC-11 equivalents	2.86E-05	9.55E-06
Smog	g NO_x equivalents	7.82E+01	1.40E+01
Water Intake	liters of water	8.11E+02	2.02E+01
Functional Unit	----------	1 gallon of multi-purpose lubricant	

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 engangered species count; Human Health: 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.