

GREEN POWER
Feeds Your Engine



2nd VegOil

Demonstration of 2nd Generation Vegetable Oil Fuels in Advanced Engines

**Workpackage WP4
Engine Oil Development**

**Deliverable N° 4.11:
Lubricant Supply
(inc. Base Oil, VM, Additive)**

Publishable

Version: 4.0

Hazelwood, 23rd December 2009

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This publication has been produced with financial support of the European Commission in the frame of the FP7 Seventh Framework Programme under the grant agreement N° TREN/FP7EN/219004/"2ndVegOil".

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1 Lubricant Supply

Appropriate amounts of engine lubricant were sent to the various test facilities for them to conduct their field trial and bench testing exercises. The table below summarises the quantity of engine lubricant supplied. All lubricant deliveries for first reporting period have been sent and received by the relevant test facility.

TEST LOCATIONS:	Type of Testing	Tractor/Engine Types - Timing	Lubricant Supply
Germany	Field Trial	4 Tractors/ Stage 3 (1 for TFZ, other 3 converted to Stage 3B for France Austria and Poland) 2 tractors/Stage 3B - Summer '10. 2 Tractors/Stage 4 - Feb '11)	<i>60l E7 sent to TFZ. 60l E7 and 120l E9 sent to JDWM (March '09)</i>
France	Field Trial	2 tractors/Stage 3A - March 2009 1 tractors/ Stage 3A (JDWM) - add retrofit DPF March 2010	<i>2 x 60l of E7 sent (March '09).</i>
Austria	Field Trial	4 tractors/Stage 3A - March 2009 1 tractor/Stage 3A (JDWM) - add retrofit DPF March 2010	<i>2 x 60l E7 2 x 60l E9 (Sent Feb '09)</i>
Poland	Field Trial	4 tractors - Stage 3A 1 tractor - Stage 3A (JDWM)	<i>240l of E7 sent (March '09).</i>
TU-Kaiserslautern	Bench Testing (Stage 4 Development)		<i>1 x 200l of E9 sent in Oct 09</i>
LVK - TU-Munich	Bench Testing (Stage 4 Development, hybrid simulation)		<i>1 x 200l of E9 sent in Oct 09</i>
VWP	Bench Testing (engine conversion)		<i>Sent 60l E7 & 20l E9 in Feb 09</i>

The following photograph shows, as an example, a representative oil drum (with attached despatch note) just before delivery to TU-Kaiserslautern.





Below is a copy of the despatch note for the 60 litres of ACEA E7 engine lubricant sent to John Deere Mannheim.

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From: Origin ID ZLXA 01332 845476 SHAMUN COOPER LUBRIZOL LTD THE KNOWLE NETHER LANE HAZELWOOD DERBY, DE564AN UNITED KINGDOM	CL64529072423	Ship Date: 19MAR09 ActWgt: 60 KG Dimmed 45 X 30 X 30 CM System#: 9325455/FWST0715 Account#: S 188805248
SHIP TO: 49 0 6218295531 BILL SENDER STEFANIE DIERINGER JOHN DEERE WERKE MANNHEIM JOHN-DEERE STRASSE 90 MANNHEIM, 68163 DE	REF: SUC/0640 DESC: 1 LUBRICANTS - NON HAZARDOUS DESC: 2 DESC: 3 DESC: 4	COUNTRY MFG: GB CARRIAGE VALUE: UKL CUSTOMS VALUE: 15UKL T/C: S 188805248 D/T: R SIGN: S Cooper EIN/VAT:
	TRK# 9840 3330 6175 0430	INTL PRIORITY A3
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Lubrizol		DESPATCH ADVICE AVIS D'EXPEDITION	
		Page 1 / 1	
Shipper/Expéditeur: LUBRIZOL THE KNOWLE, NETHER LANE HAZELWOOD Derbyshire DE56 4AN UNITED KINGDOM		Ship Date/Date d'Expédition: March 19, 2009 Delivery Date/Date de livraison: March 18, 2009 Delivery No./No.de livraison: 81175651 LZ Sales Order No./No.de Commande: 927947 Cust. PO No./Réf. du Client: CRJN	
Ship to/Destinataire: 1000000080 JOHN DEERE WERKE MANNHEIM ATTN. STEFANIE DIERINGER (5852) JOHN-DEERE STRASSE 90 68163 MANNHEIM GERMANY		Invoice to/Facturer A: 1000000080 HAZELWOOD SEGMENT MANAGEMENT DERBY UNITED KINGDOM	
Loading Point/Lieu de Chargement: Hazelwood Package Truck/Air		Vessel/Navire:	
Delivery Point/Lieu de Livraison: MANNHEIM		Port of Loading/Port de Chargement:	
Seal No/Identification des Plombs:		Port of Discharge/Port de déchargement:	
Transportation ID No/Identification de Véhicule:		Mean of Transport/Moyen de Transport:	
Transport Details/Détails de Transport: Carrier/Transporteur: FEDERAL EXPRESS EUROPE INC Forwarder/Transitaire: Incoterms: CPT Actual Carrier/Transporteur Réel: Attn. Stefanie Dieringer (5852) - sample from Craig Jones			
Qty Nbre	Materials, Special Marks & Instructions Produit, Marques et Instructions Spéciales	Gross Weight Poids Brut Kg	Net Weight Poids Net Kg
60.0	OS241963H 3X25L PLASTIC CANS	53.1	53.1
60.0	Total	53.1	53.1

2 Engine Lubricants Selection for 2nd VegOil Project

The engine lubricants chosen to be researched as part of the 2nd VegOil project are:

- OS240946 = a lubricant which is capable of meeting the ACEA E9-2008 specification
- OS241936 = a lubricant which is capable of meeting the ACEA E7-2008 specification

The ACEA 2008 nomenclature and specifications for E7 and E9 lubricants is detailed in Appendix A in deliverable 4.1.

The composition of the engine lubricant formulations (e.g. engine lubricant additives, viscosity modifiers and base oil type) to be used in the 2nd VegOil project are detailed in Table 1.

Table 1 Engine Lubricant Formulations to be used in 2nd VegOil Project

		ACEA E7 Engine Lubricant	ACEA E9 Engine Lubricant
Lubrizol Oil Code		OS241936	OS240946
Viscosity Grade		15W-40	15W-40
ExxonMobil AP/E 150N	Group I Base Oil	59.4	-
ExxonMobil AP/E 600N	Group I Base Oil	20	-
Chevron 220R (220N)	Group II Base Oil	-	71.1
Chevron 600R (600N)	Group II Base Oil	-	6.1
Lubrizol® 4986E	Engine Lubricant Additive	12.6	-
Lubrizol® 40007	Engine Lubricant Additive	-	16.5
Lubrizol® 7077	Viscosity Modifier	7.7	-
Lubrizol® 7075F	Viscosity Modifier	-	6.1
Lubrizol® 6662	Pour Point Depressant	0.3	0.2

The Product Data Sheets for Lubrizol® 4986E, Lubrizol® 40007, Lubrizol® 7077 and Lubrizol® 7075F are shown in Appendix B. The Product Data Sheets for Lubrizol® 4986E and Lubrizol® 40007 detail the performance claims that can be made if these engine lubricant additives are blended with the appropriate base oils and viscosity modifiers. The Product Data Sheets for Lubrizol® 7077 and Lubrizol® 7075F detail the typical amounts of viscosity modifier that needs to be added to the formulation to obtain different viscosity grades.

The Material Safety Data Sheets for the engine lubricants (OS241936 and OS 240946) are shown in Appendix C.

Appendix A

List of Acronyms

ACEA – European Automobile Manufacturers Association

E7 – An engine lubricant which meets the ACEA E7 engine lubricant specification

E9 – An engine lubricant which meets the ACEA E9 engine lubricant specification

DPF – Diesel Particulate Filter

VM – Viscosity Modifier

Appendix B

Product Data Sheets for Engine Lubricant Additives and Viscosity Modifiers



Product	Type
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2.1.1 LUBRIZOL® 4986E 2.1.2 Heavy Duty Diesel Engine Oil Additive

An engine oil additive for the formulation of Super High Performance Diesel (SHPD) lubricants meeting the requirements of ACEA E7, API CI-4 and MB-Approval 228.3

Application

Recommended for use at: 12.6 % by weight

When blended with appropriate base oils and viscosity modifier, the formulated lubricant meets the following performance specifications as a SAE 15W-40 viscosity grade:

- ACEA E7-08 (2008) • ACEA A3/B4-04 (2007) • ACEA E5-02 (2002) • ACEA E3-96 Issue 4 (2002)
- API CI-4 • API CH-4 • API CG-4 • API CF-4
- API CF • API SL • MB-Approval 228.3 • MB-Approval 229.1
- MAN 3275 • MTU Type 2 • Volvo VDS-3 • Mack EO-M Plus
- Renault Truck RLD/RLD-2 • CUMMINS CES 20076 • CUMMINS CES 20077 • CAT ECF-2
- CAT ECF-1-a • ZF TE-ML 07C

Physical Characteristics

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	Minimum	Target	Maximum
FLASH POINT, C, PMCC		150	
LBS PER U.S. GAL @ 15.6 C		8.11	
LBS PER IMP GAL @ 15.6 C		9.74	
POUR POINT, C		-18	
SPECIFIC GRAVITY @ 15.6 C	0.953	0.973	0.993
VISCOSITY @ 100 C, CST		112	
VISCOSITY @ 40 C, CST		1860	



Chemical Characteristics

	Minimum % Weight	Typical	Maximum % Weight
CALCIUM	2.03	2.26	2.49
NITROGEN	0.58	0.64	0.70
PHOSPHORUS	0.80	0.89	0.98
SULFATED ASH		9.1	
SULFUR		3.0	
ZINC	0.87	0.93	1.07

Unloading, storage and blending instructions

2.1.3 LUBRIZOL® 4986E

General handling instructions - In general, The Lubrizol Corporation recommends, as a minimum, the use of neoprene or nitrile rubber gloves and safety glasses or chemical splash goggles. The Material Safety Data Sheet should be consulted for specific information and for information on health and safety when handling this product.

Fire and explosion hazard data

Flash Point (method)	Classification
150°C PMCC	N/A

Temperature recommendations

Unloading	Pumping Temperature	55°C	131°F
	Maximum temperature*	70°C	158°F

Storage

Maximum temperature for long-term storage	45°C	113°F
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Blending

Maximum base oil temperature for mechanical or in-line mixing	70°C	158°F
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Equipment recommendations

Type of Pump	Positive Displacement
Type of transfer line	Ball Launched, Insulated, Steam Traced Using 107°C/225°F Steam Max.
Transfer line size	3 inch/8 cm. Min.

Heat source

Type	Steam 107°C/225°F Max.
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Storage tank	Suction Heater Recommended
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Viscosity data	cSt	SUS
at 25°C, 77°F	5244	24260
at 40°C, 104°F	1860	8618
at 100°C, 211°F	112	523

Notes

Pour Point	-18°C, 0°F
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Additional Recommendations

* Holding the material in excess of this temperature may cause chemical degradation. Use steam for heating and tracing only when the material is in motion to avoid localized overheating. Cold Temperature Storage - If product has been stored below its pour point temperature it should be heated to 21°C/70°F before using.

Effective: 10/9/2009 9:18:48 AM



Product	Type
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2.1.4 LUBRIZOL® 40007 2.1.5 Heavy Duty Diesel Engine Oil Additive

An advanced API CJ-4 Heavy Duty Diesel Additive Package

Application

Recommended for use at: 16.5 % by weight

Specifically formulated for use with Lubrizol viscosity modifiers to produce lubricants required for EPA 2007 compliant diesel engines equipped with after treatment devices such as diesel oxidation catalysts and particulate filters. LUBRIZOL® 40007 used in combination with Group II base oils meet the following performance categories in the 15W-40 viscosity grade:

- API CJ-4
- API SM
- CAT ECF-3
- ACEA E7-04 Issue 2 (2007)
- MTU Type 2.1
- Deutz DQC III-05
- API CI-4 PLUS
- CUMMINS CES 20081
- CAT ECF-2
- MB-Approval 228.31
- Volvo VDS-4
- API CI-4
- Mack EO-O Premium Plus
- CAT ECF-1-a
- MAN 3575
- Volvo VDS-3
- API CH-4
- Detroit Diesel DDC 93K218
- ACEA E9-08 (2008)
- MAN 3275
- Renault Truck RLD-3

LUBRIZOL® 40007 provides unsurpassed control of soot , protection of highly stressed piston rings and cylinder liners as well as exceptional protection of valve train systems used in modern diesel engines.

Physical Characteristics

	Minimum	Target	Maximum
FLASH POINT, C, PMCC		171	
LBS PER U.S. GAL @ 15.6 C		7.86	
LBS PER IMP GAL @ 15.6 C		9.44	
POUR POINT, C		-21	
SPECIFIC GRAVITY @ 15.6 C	0.922	0.942	0.962
VISCOSITY @ 100 C, CST		109	
VISCOSITY @ 40 C, CST		1818	

Chemical Characteristics

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	Minimum % Weight	Typical	Maximum % Weight
CALCIUM	1.27	1.41	1.56
NITROGEN	0.60	0.66	0.73
PHOSPHORUS	0.59	0.65	0.72
SULFATED ASH		5.9	
SULFUR		2.31	
ZINC	0.66	0.73	0.80

Benefits

LUBRIZOL® 40007 is engineered to provide:

- Exceptional control of soot related viscosity thickening
- Unsurpassed protection against wear due to corrosion of bearing and cylinder liners
- Exceptional protection of diesel and gasoline engine valve train components
- The highest level of prevention against damaging deposits common in high temperature modern multi-cylinder diesel engines

Unloading, storage and blending instructions

2.1.6 LUBRIZOL® 40007

General handling instructions - In general, The Lubrizol Corporation recommends, as a minimum, the use of neoprene or nitrile rubber gloves and safety glasses or chemical splash goggles. The Material Safety Data Sheet should be consulted for specific information and for information on health and safety when handling this product.

Fire and explosion hazard data

Flash Point (method)	Classification
171°C PMCC	N/A

Temperature recommendations

Unloading	Pumping Temperature	55°C	131°F
	Maximum temperature*	70°C	158°F

Storage

Maximum temperature for long-term storage	45°C	113°F
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Blending

Maximum base oil temperature for mechanical or in-line mixing	70°C	158°F
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Equipment recommendations

Type of Pump	Positive Displacement
Type of transfer line	Ball Launched, Insulated, Steam Traced Using 107°C/225°F Steam Max.
Transfer line size	3 inch/8 cm. Min.

Heat source

Type	Steam 107°C/225°F Max.
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Storage tank	Suction Heater Recommended
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Viscosity data	cSt	SUS
at 25°C, 77°F	5143	23790
at 40°C, 104°F	1818	8424
at 100°C, 211°F	109	509

Notes

Pour Point	-21°C, -5°F
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Additional Recommendations

* Holding the material in excess of this temperature may cause chemical degradation. Use steam for heating and tracing only when the material is in motion to avoid localized overheating. Cold Temperature Storage - If product has been stored below its pour point temperature it should be heated to 21°C/70°F before using.

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Lubrizol

Product	Type
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2.1.7 LUBRIZOL® 7077

2.1.8 Viscosity Improver

A 25 SSI* shear stable non-dispersant olefin copolymer viscosity modifier.

Application

Recommended for use in suitable base stocks to prepare multigrade crankcase engine oils meeting international requirements for shear stability. Approximate treating levels for stay-in-grade (Seq VIII, Orbahn Shear) performance are:

SAE 5W-30	6.3 – 9.5 wt %	6.3 – 9.5 vol %
SAE 10W-30	4 – 6.3 wt %	4 – 6.3 vol %
SAE 10W-40	8 – 11 wt %	8 – 11 vol %
SAE 10W-50	12.1 – 16.8 wt %	12.1 – 16.8 vol %
SAE 15W-40	7 – 9 wt %	7 – 9 vol %
SAE 20W-40	1.2 – 3.8 wt %	1.2 – 3.8 vol %
SAE 20W-50	5.5 – 8 wt %	5.5 – 8 vol %

Physical Characteristics

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	Minimum	Target	Maximum
FLASH POINT, C, PMCC		200	
LBS PER U.S. GAL @ 15.6 C		7.25	
LBS PER IMP GAL @ 15.6 C		8.71	
OIL BLEND VIS @ 100 C, CST	12.50	12.75	13.00
POUR POINT, C		2	
SPECIFIC GRAVITY @ 15.6 C	0.850	0.870	0.885
VISCOSITY @ 100 C, CST	950.0	1125.0	
VISCOSITY @ 40 C, CST		12500	

Special Handling

Viscosity Modifier (VM) additives are sensitive to contamination. The most common problems result from their direct contact with other concentrated motor oil and gear oil additives. Very small levels of additive contamination can produce gels that are difficult to solubilize in oil.

For this reason, it is imperative that all equipment to be used in the manufacture and transfer of VM additives be thoroughly cleaned and inspected to ensure no residue from previous additives is present. Ideally, the system should be dedicated to handling VM additives only.

Quality Control

It should be noted that the viscosity of the concentrate should not be used as a measure of the amount of polymer in solution. The thickening contributed by the polymer to the finished lubricant may vary slightly from batch to batch but is guaranteed to be limited to a range corresponding to the following parameters: An 10.0% by weight solution of LUBRIZOL® 7077 in a HVI-200N paraffinic base stock (95 VI minimum, viscosity @ 100 degrees C=6.1 cSt) will have a viscosity @ 100 degrees C, cSt of 12.5(min) - 13.0(max).

Comments

* 30 pass Orbahn shear

Unloading, storage and blending instructions

2.1.9 LUBRIZOL® 7077

General handling instructions - In general, The Lubrizol Corporation recommends, as a minimum, the use of neoprene or nitrile rubber gloves and safety glasses or chemical splash goggles. The Material Safety Data Sheet should be consulted for specific information and for information on health and safety when handling this product.

Fire and explosion hazard data

	Flash Point (method)	Classification
	200°C PMCC	N/A

Temperature recommendations

Unloading	Pumping Temperature	115°C	239°F
	Maximum temperature*	125°C	257°F

Storage

Maximum temperature for long-term storage	45°C	113°F
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Blending

Maximum base oil temperature for mechanical or in-line mixing	125°C	257°F
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Equipment recommendations

Type of Pump	Positive Displacement
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Type of transfer line Ball Launched, Insulated, Steam Traced Using 121 °C/250°F
 Steam Max.

Transfer line size 4 inch/10 cm. Min.

Heat source

Type Steam 121°C/250°F Max.

Storage tank Suction Heater Recommended

Viscosity data	cSt	SUS
at 25°C, 77°F	27813	128658
at 40°C, 104°F	12500	57919
at 100°C, 211°F	1125	5247

Notes

Pour Point 2°C, 36°F

Additional Recommendations

A higher storage temperature may be required due to viscosity at 45°C.* Holding the material in excess of this temperature may cause chemical degradation. Use steam for heating and tracing only when the material is in motion to avoid localized overheating. Cold Temperature Storage - If product has been stored below its pour point temperature it should be heated to 21°C/70°F before using.
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Product	Type
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2.1.10 LUBRIZOL® 7075F 2.1.11 Viscosity Improver

A 35 SSI* shear stable non-dispersant olefin copolymer viscosity modifier.

Application

Recommended for use in suitable base stocks to prepare multigrade crankcase engine oils meeting the international requirements for shear stability. Approximate treating levels for stay-in-grade (Seq VIII, Orbahn Shear) performance are:

SAE 5W-30	6.3 – 9.5 wt %	6.3 – 9.5 vol %
SAE 10W-30	4.4– 6.3 wt %	4.4 – 6.3 vol %
SAE 10W-40	8 – 11 wt %	8 – 11 vol %
SAE 10W-50	12.1 – 16.8 wt %	12.1 – 16.8 vol %
SAE 15W-40	6 – 8 wt %	6 – 8 vol %
SAE 20W-40	1.2 – 3.8 wt %	1.2 – 3.8 vol %
SAE 20W-50	5.5 – 8 wt %	5.5 – 8 vol %

Physical Characteristics

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	Minimum	Target	Maximum
FLASH POINT, C, PMCC		188	
LBS PER U.S. GAL @ 15.6 C		7.22	
LBS PER IMP GAL @ 15.6 C		8.67	
OIL BLEND VIS @ 100 C, CST	11.2	11.7	12.2
POUR POINT, C		-3	
SPECIFIC GRAVITY @ 15.6 C	0.852	0.867	0.882
VISCOSITY @ 100 C, CST		1000	

Special Handling

Viscosity Modifier (VM) additives are sensitive to contamination. The most common problems result from their direct contact with other concentrated motor oil. Very small levels of additive contamination can produce gels that are difficult to solubilize in oil. For this reason, it is imperative that all equipment to be used in the manufacture and transfer of VM additives be thoroughly cleaned and inspected to ensure no other additives is present. Ideally, the system should be dedicated to handling VM additives only.

Quality Control

It should be noted that the viscosity of the concentrate should not be used as a measure of the amount of polymer in the solution. The thickening contributed by the polymer to the finished lubricant may vary slightly from batch to batch, but is guaranteed to be limited to a range corresponding to the following parameters: A 9.1% weight solution of LUBRIZOL® 7075F in a 200 Neutral Base Stock (95 VI minimum, paraffinic, viscosity @ 100 degrees C = 6.1 cSt) will have a viscosity @ 100 degrees C, cSt of 11.2 min. - 12.2 max.

Comments

* 30 pass Orbahn shear

Unloading, storage and blending instructions

2.1.12 LUBRIZOL® 7075F

General handling instructions - In general, The Lubrizol Corporation recommends, as a minimum, the use of neoprene or nitrile rubber gloves and safety glasses or chemical splash goggles. The Material Safety Data Sheet should be consulted for specific information and for information on health and safety when handling this product.

Fire and explosion hazard data

	Flash Point (method)	Classification
	188°C PMCC	N/A

Temperature recommendations

Unloading	Pumping Temperature	105°C	221°F
	Maximum temperature*	115°C	239°F

Storage

Maximum temperature for long-term storage	45°C	113°F
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Blending

Maximum base oil temperature for mechanical or in-line mixing	115°C	239°F
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Equipment recommendations

Type of Pump	Positive Displacement
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Type of transfer line	Ball Launched, Insulated, Steam Traced Using 121 °C/250°F Steam Max.
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Transfer line size	4 inch/10 cm. Min.
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Heat source

Type	Steam 121°C/250°F Max.
------	------------------------

Storage tank	Suction Heater Recommended
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Viscosity data	cSt	SUS
at 100°C, 211°F	1000	4664

Notes

Pour Point	-3°C, 27°F
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Additional Recommendations

A higher storage temperature may be required due to viscosity at 45°C.* Holding the material in excess of this temperature may cause chemical degradation. Use steam for heating and tracing only when the material is in motion to avoid localized overheating. Cold Temperature Storage - If product has been stored below its pourpoint temperature it should be heated to 21°C/70°F before using.

Effective: 4/13/2009 12:10:46 PM

Appendix C

MSDS for Engine Lubricants

OS240946



Safety Data Sheet
 OS240946

Prepared according to Annex II of EC Regulation 1907/2006.

1	Substance/Product Identification
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Product Trade Name OS240946

Company Lubrizol Ltd.
 PO Box 88
 Belper
 Derbyshire
 DE56 1QV
 United Kingdom
 Telephone: +44 (0) 1332 842211
 Fax: +44 (0) 1332 842303

E-mail contact EURUS@lubrizol.com

This material is to be used for research purposes only, under the supervision of a technically qualified individual. The toxicological properties may have not been completely characterized. To determine your responsibilities under the EC Seventh amendment Directive 92/32/EEC, please see the Regulatory Information Section. If this material has been supplied to you under the terms of a secrecy or non-analysis agreement, the information included in this MSDS is hereby identified as "Confidential Information."

CAS Number Not applicable for mixtures.
Synonyms None.
Preparation/Revision Date 09 October 2009
Generic Chemical Name Mixture.
Product Type Experimental.
Emergency Phone Number FOR TRANSPORT EMERGENCY call CHEMTREC: (+1) 703-527-5887 (outside the U.S.); 1-800-424-9300 (in the U.S.)
MSDS No. 29050569-1505010-4136910-102103

2	Hazards Identification
----------	-------------------------------

Symbol(s) Not applicable.
Product Classification Not applicable.

3	Composition/Information on Ingredients
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Hazardous Ingredients

Comp	Percentage (by wt.)	Symbol(s)	Risk Phrase(s)	EU Number
Zinc alkylidithiophosphate	From 0 to 10.0 percent	N, Xi	R34 R41 R51/53	272-028-3

4	First Aid Measures
----------	---------------------------

Ingestion DO NOT INDUCE VOMITING. Get immediate medical attention.
Eyes Flush with water at least 30 minutes. Get medical attention if eye irritation develops or persists.
Skin Wash with soap and water. Get medical attention if irritation develops. Launder.



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Inhalation contaminated clothing before reuse.
 Remove exposed person to fresh air if adverse effects are observed.
Additional Information Note to physician: Treat symptomatically.

5	Fire Fighting Measures
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Flash Point 101 °C, 213.8 °F PMCC (Typical)
Extinguishing Media CO2, dry chemical, or foam. Water can be used to cool and protect exposed material.
Firefighting Procedures Recommend wearing self-contained breathing apparatus. Water may cause splattering.
Unusual Fire & Explosion Hazards None known.

6	Accidental Release Measures
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Spill Procedures Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations. Ventilate area if spilled in confined space or other poorly ventilated areas. Prevent entry into sewers and waterways. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.

7	Handling and Storage
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Pumping Temperature Not determined.
Maximum Handling Temperature Not determined.
Handling Procedures Keep containers closed when not in use. Wash thoroughly after handling. Empty containers retain material residue. Do not cut, weld, braze, solder, drill, grind or expose containers to heat, flame, spark or other sources of ignition.
Maximum Storage Temperature Not determined.
Storage Procedures Odorous and toxic fumes may form from the decomposition of this product if stored at temperatures in excess of 113 deg F (45 deg C) for extended periods of time or if heat sources in excess of 250 deg F (121 deg C) are used.
Loading Temperature Not determined.

8	Exposure Controls/Personal Protection
----------	--

Exposure Limits

EU
 Not applicable.

UK
 Not applicable.

Ireland
 Not applicable.

India
 Not applicable.

Cyprus
 Not applicable.

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Other Exposure Limits	Contains mineral oil. Under conditions which may generate mists, observe the OSHA PEL of 5 mg per cubic meter, ACGIH STEL of 10 mg per cubic meter.
Engineering Controls	Use with adequate ventilation.
Hand Protection	Nitrile.
Eye Protection	Safety Glasses.
Respiratory Protection	Use respirator with a combination organic vapor and high efficiency filter cartridge if recommended exposure limit is exceeded. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.
Clothing Recommendation	Long sleeve shirt is recommended. Launder contaminated clothing before reuse.

9	Physical and Chemical Properties
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Flash Point	101 °C, 213.8 °F PMCC (Typical)
Upper Flammable Limit	Not determined.
Lower Flammable Limit	Not determined.
Autoignition Point	Not determined.
Explosion Data	Material does not have explosive properties.
Vapour Pressure	Not determined.
pH	Not determined.
Specific Gravity	0.88 (15.6 °C)
Bulk Density	Not determined.
Water Solubility	Insoluble.
Percent Solid	Not determined.
Percent Volatile	Not determined.
Volatile Organic Compound	Not determined.
Vapour Density	Not determined.
Evaporation Rate	Not determined.
Odour	Mild
Appearance	Pale yellow liquid
Viscosity	Not determined.
Odour Threshold	Not determined.
Boiling Point	Not determined.
Pour Point Temperature	Not determined.
Melting / Freezing Point	Not determined.

The above data are typical values and do not constitute a specification.

10	Stability and Reactivity
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Stability	Material is normally stable at room temperature and pressure. See the Handling and Storage Section for further details.
Decomposition Temperature	Not determined.
Incompatibility	Oxidizing agents.
Polymerization	Will not occur.
Thermal Decomposition	Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion. Hydrogen sulfide and alkyl mercaptans and sulfides may also be released.

11	Toxicological Information
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OS240946

-- ACUTE EXPOSURE --

Eye Irritation	Not expected to cause eye irritation Based on data from components or similar materials.
Skin Irritation	Not expected to be a primary skin irritant. Based on data from components or similar materials. Prolonged or repeated skin contact as from clothing, wet with material may cause dermatitis. Symptoms may include redness, edema, drying, and cracking of the skin.
Respiratory Irritation	If material is misted or if vapors are generated from heating, exposure may cause irritation of mucous membranes and the upper respiratory tract. Based on data from components or similar materials.
Dermal Toxicity	The LD50 in rabbits is > 2000 mg/Kg. Based on data from components or similar materials.
Inhalation Toxicity	No data available to indicate product or components may be a toxic inhalation hazard.
Oral Toxicity	The LD50 in rats is > 5000 mg/Kg. Based on data from components or similar materials.
Dermal Sensitization	No data available to indicate product or components may be a skin sensitizer.
Inhalation Sensitization	No data available to indicate product or components may be respiratory sensitizers.

-- CHRONIC EXPOSURE --

Chronic Toxicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Carcinogenicity	This product contains mineral oils which are considered to be severely refined and not considered to be carcinogenic under LARC. All of the oils in this product have been demonstrated to contain less than 3% extractables by the IP346 test.
Mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Reproductive Toxicity	No data available to indicate either product or components present at greater than 0.1% that may cause reproductive toxicity.
Teratogenicity	No data available to indicate product or any components contained at greater than 0.1% may cause birth defects.
Other	No other health hazards known.

12	Ecological Information
----	-------------------------------

-- ENVIRONMENTAL TOXICITY --

Freshwater Fish Toxicity	Not determined.
Freshwater Invertebrates Toxicity	Not determined.
Algae Toxicity	Not determined.
Saltwater Fish Toxicity	Not determined.
Saltwater Invertebrates Toxicity	Not determined.
Bacteria Toxicity	Not determined.
Miscellaneous Toxicity	Not determined.

-- ENVIRONMENTAL FATE --

Biodegradation	At least 25% of the components in this product show moderate biodegradation based on OECD 302-type test data.
Bioaccumulation	Less than 1.0% of the components potentially bioconcentrate, based on octanol/water coefficients.
Soil Mobility	Not determined.
WGK	WGK = 2 according to the Water Hazardous Directive, VwVwS, dated May 17, 1999.

13	Disposal Considerations
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OS240946

Waste Disposal This material, if discarded, should not be considered a European hazardous waste.

14	Transport Information
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ICAO/IATA II	Not regulated
IMDG	Not regulated
IMDG EMS Fire	Not applicable.
IMDG EMS Spill	Not applicable.
IMDG MFAG	Not applicable.
MARPOL Annex II	Not determined.
USCG Compatibility	Not determined.
ADR/RID	Not regulated
ADR/RID Hazard ID No.	Not applicable.
South Africa	Not regulated

Review classification requirements before shipping materials at elevated temperatures

15	Regulatory Information
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Symbol(s)	Not applicable.
Indication of Danger	Not applicable.
Precautionary Labels	Not applicable.
Other Label Information	None.

-- Global Chemical Inventories --

USA	All components of this material are on the US TSCA Inventory or are exempt.
EU	All components comply with the EU 7th Amendment and are approved for EU sales. Lubrizol must maintain records of all imports of this product into the EU. Third party importers are asked to report every import to The Lubrizol PSCD Manager (Europe), Hazelwood, Derby DE56 1QN, UK.
Japan	This product may be imported to Japan only by Lubrizol Japan.
Australia	All components are in compliance with chemical notification requirements in Australia.
New Zealand	All components are in compliance with chemical notification requirements in New Zealand.
Canada	All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.
Switzerland	All components are in compliance with the Environmentally Hazardous Substance Ordinance in Switzerland. Lubrizol must maintain records of all imports of this product into Switzerland. Third party importers are asked to report every import to The Lubrizol PSCD Manager (Europe), Hazelwood, Derby DE56 1QN, UK.
Korea	All components are in compliance in Korea.
Philippines	All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).
China	All components of this product are listed on the Inventory of Existing Chemical Substances in China.

-- Product Registrations --

Finnish Registration Number	Not Registered
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OS240946

Swedish Registration Number	Not Registered
Norwegian Registration Number	Not Registered
Danish Registration Number	Not Registered
Swiss Registration Number	Not Registered
Italian Registration Number	Not Registered
Korean Registration Number	Not Registered
U.S. Dept of Agriculture NSF Nonfood Compounds Registration	This product has not been filed with the USDA to support H2 approvals. This product has not been filed with the NSF to support H1 or H2 approvals.

– Other / International –

FDA Approval Not applicable.

16	Other Information
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HMIS Codes	Health	Fire	Reactivity
	0	1	0

Relevant R Phrases R38 -- Irritating to skin.
 R41 -- Risk of serious damage to eye.
 R51/53 -- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Revision Indicators	Section	Changed
	8 Respiratory protection.	19 June 2009
	9 Odor threshold.	15 February 2009
	9 Percent volatile.	15 February 2009
	9 Viscosity.	15 February 2009
	11 Dermal toxicity.	19 June 2009
	11 Eye irritation.	19 June 2009
	11 Inhalation toxicity.	19 June 2009
	11 Oral toxicity.	19 June 2009
	11 Respiratory irritation.	19 June 2009
	11 Skin irritation.	19 June 2009
	15 New Zealand	9 October 2009

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.

OS241936



Safety Data Sheet
 OS241936

Prepared according to Annex II of EC Regulation 1907/2006.

1	Substance/Product Identification
---	----------------------------------

Product Trade Name OS241936
Company Lubrizol Ltd.
 PO Box 88
 Belper
 Derbyshire
 DE56 1QN
 United Kingdom
 Telephone: +44 (0) 1332 842211
 Fax: +44 (0) 1332 842191
E-mail contact EUBI2@lubrizol.com

This material is to be used for research purposes only under the supervision of a technically qualified individual. The toxicological properties may have not been completely characterized. To determine your responsibilities under the EC Seventh amendment Directive 92/32/EEC, please see the Regulatory Information Section. If this material has been supplied to you under the terms of a secrecy or non-analysis agreement, the information included in this MSDS is hereby identified as "Confidential Information."

CAS Number Not applicable for mixtures.
Synonyms None.
Preparation/Revision Date 09 October 2009
Generic Chemical Name Mixture.
Product Type Experimental.
Emergency Phone Number FOR TRANSPORT EMERGENCY call CHEMTRAC: (+1) 703-827-4447 (outside the U.S.) 1-800-424-9300 (in the U.S.)
MSDS No. 29050570-2502920-4117910-102100

2	Hazards Identification
---	------------------------

Symbol(s) Not applicable.
Product Classification Not applicable.

3	Composition/Information on Ingredients
---	--

Hazardous Ingredients

Comp.	Percentage (by wt.)	Symbol(s)	Risk Phrase(s)	EU Number
Zinc alkylidithiophosphate	From 0 to 10.0 percent	N,Xi	R11;R41;R51/53	272-028-3

4	First Aid Measures
---	--------------------

Ingestion DO NOT INDUCE VOMITING. Get immediate medical attention.
Eyes Flush with water at least 30 minutes. Get medical attention if eye irritation develops or persists.
Skin Wash with soap and water. Get medical attention if irritation develops. Launder.

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Inhalation contaminated clothing before reuse.
 Remove exposed person to fresh air if adverse effects are observed.
Additional Information Note to physician: Treat symptomatically.

5	Fire Fighting Measures
----------	-------------------------------

Flash Point > 165 °C, 329 °F PMCC (Minimum)
Extinguishing Media CO₂, dry chemical, or foam. Water can be used to cool and protect exposed material.
Firefighting Procedures Recommend wearing self-contained breathing apparatus. Water may cause splattering.
Unusual Fire & Explosion Hazards None known.

6	Accidental Release Measures
----------	------------------------------------

Spill Procedures Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations. Ventilate area if spilled in confined space or other poorly ventilated areas. Prevent entry into sewers and waterways. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.

7	Handling and Storage
----------	-----------------------------

Pumping Temperature Not determined.
Maximum Handling Temperature Not determined.
Handling Procedures Keep containers closed when not in use. Wash thoroughly after handling. Empty container contains product residue which may exhibit hazards of product.
Maximum Storage Temperature Not determined.
Storage Procedures Odorous and toxic fumes may form from the decomposition of this product if stored at temperatures in excess of 113 deg F (45 deg C) for extended periods of time or if heat sources in excess of 250 deg F (121 deg C) are used.
Loading Temperature Not determined.

8	Exposure Controls/Personal Protection
----------	--

Exposure Limits

EU
 Not applicable.

UK
 Not applicable.

Ireland
 Not applicable.

India
 Not applicable.

Cyprus
 Not applicable.

Other Exposure Limits Contains mineral oil. Under conditions which may generate mists, observe the OSHA PEL of

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	5 mg per cubic meter, ACGIH STEL of 10 mg per cubic meter.
Engineering Controls	Use with adequate ventilation.
Hand Protection	Nitrile, Neoprene.
Eye Protection	Safety Glasses.
Respiratory Protection	Use respirator with a combination organic vapor and high efficiency filter cartridge if recommended exposure limit is exceeded. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.
Clothing Recommendation	Long sleeve shirt is recommended. Launder contaminated clothing before reuse.

9	Physical and Chemical Properties
---	---

Flash Point	> 165 °C, 329 °F PMCC (Minimum)
Upper Flammable Limit	Not determined.
Lower Flammable Limit	Not determined.
Autoignition Point	Not determined.
Explosion Data	Material does not have explosive properties.
Vapour Pressure	Not determined.
pH	Not determined.
Specific Gravity	0.89 (15.6 °C)
Bulk Density	Not determined.
Water Solubility	Insoluble.
Percent Solid	Not determined.
Percent Volatile	Not determined.
Volatile Organic Compound	Not determined.
Vapour Density	Not determined.
Evaporation Rate	Not determined.
Odour	Mild
Appearance	Light colored liquid.
Viscosity	Not determined.
Odour Threshold	Not determined.
Boiling Point	Not determined.
Pour Point Temperature	Not determined.
Melting/ Freezing Point	Not determined.

The above data are typical values and do not constitute a specification.

10	Stability and Reactivity
----	---------------------------------

Stability	Material is normally stable at room temperature and pressure. See the Handling and Storage Section for further details.
Decomposition Temperature	Not determined.
Incompatibility	Oxidizing agents.
Polymerization	Will not occur.
Thermal Decomposition	Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion. Hydrogen sulfide and alkyl mercaptans and sulfides may also be released.

11	Toxicological Information
----	----------------------------------

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– ACUTE EXPOSURE –

Eye Irritation	Not expected to cause eye irritation Based on data from components or similar materials.
Skin Irritation	Not expected to be a primary skin irritant. Based on data from components or similar materials. Prolonged or repeated skin contact as from clothing wet with material may cause dermatitis. Symptoms may include redness, edema, drying, and cracking of the skin.
Respiratory Irritation	If material is misted or if vapors are generated from heating, exposure may cause irritation of mucous membranes and the upper respiratory tract. Based on data from components or similar materials.
Dermal Toxicity	The LD50 in rabbits is > 2000 mg/Kg. Based on data from components or similar materials.
Inhalation Toxicity	No data available to indicate product or components may be a toxic inhalation hazard.
Oral Toxicity	The LD50 in rats is > 5000 mg/Kg. Based on data from components or similar materials.
Dermal Sensitization	No data available to indicate product or components may be a skin sensitizer.
Inhalation Sensitization	No data available to indicate product or components may be respiratory sensitizers.

– CHRONIC EXPOSURE –

Chronic Toxicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Carcinogenicity	This experimental material contains mineral oils which are considered to be severely refined and not considered to be carcinogenic under IARC. All of the oils in this product have been demonstrated to contain less than 3% extractables by the IP346 test.
Mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Reproductive Toxicity	No data available to indicate either product or components present at greater than 0.1% that may cause reproductive toxicity.
Teratogenicity	No data available to indicate product or any components contained at greater than 0.1% may cause birth defects.
Other	No other health hazards known.

12	Ecological Information
----	-------------------------------

– ENVIRONMENTAL TOXICITY –

Freshwater Fish Toxicity	The acute LC50 is 100 - 1000 mg/L based on component data.
Freshwater Invertebrates Toxicity	Not determined.
Algae Toxicity	Not determined.
Saltwater Fish Toxicity	Not determined.
Saltwater Invertebrates Toxicity	Not determined.
Bacteria Toxicity	The acute EC50 is 100 - 1000 ppm based on component data.
Miscellaneous Toxicity	Not determined.

– ENVIRONMENTAL FATE –

Biodegradation	At least 25% of the components in this product show moderate biodegradation based on OECD 301-type test data. At least 25% of the components in this product show moderate biodegradation based on OECD 302-type test data.
Bioaccumulation	Less than 1.0% of the components potentially bioconcentrate, based on octanol/water coefficients.
Soil Mobility	Not determined.
WGK	WGK = 2 according to the Water Hazardous Directive, VwVw8, dated May 17, 1999.

13	Disposal Considerations
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OS241936

Waste Disposal This material, if discarded, should not be considered a European hazardous waste.

14	Transport Information
-----------	------------------------------

ICAO/IATA II	Not regulated
IMDG	Not regulated
IMDG EMS Fire	Not applicable.
IMDG EMS Spill	Not applicable.
IMDG MFAG	Not applicable.
MARPOL Annex II	Not determined.
USCG Compatibility	Not determined.
ADR/RID	Not regulated
ADR/RID Hazard ID No.	Not applicable.
South Africa	Not regulated

Review classification requirements before shipping materials at elevated temperatures

15	Regulatory Information
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Symbol(s)	Not applicable.
Indication of Danger	Not applicable.
Precautionary Labels	Not applicable.
Other Label Information	None.

-- Global Chemical Inventories --

USA	May require notification in the U.S. Commercial shipments from Lubrizol's U.S. location must be exported to non U.S. customers only. Research and development quantities must bear special labels and shipping papers. Sample recipients must comply with the requirements for an R&D exemption under TSCA.
EU	May require notification under EC Seventh Amendment Directive 92/32/EEC.
Japan	May require notification in Japan.
Australia	May require notification before sale under Australian regulations.
New Zealand	All components are in compliance with chemical notification requirements in New Zealand.
Canada	May require notification before sale under Canadian regulations.
Switzerland	May require notification before sale in Switzerland.
Korea	May require notification before sale in Korea.
Philippines	May require notification before sale under Philippines Republic Act 6969.
China	This product may require notification in China.

-- Product Registrations --

Finnish Registration Number	Not Registered
Swedish Registration Number	Not Registered
Norwegian Registration Number	Not Registered
Danish Registration	

OS241936

Number Not Registered
 Swiss Registration Number Not Registered
 Italian Registration Number Not Registered
 Korean Registration Number Not Registered
 U.S. Dept of Agriculture This product has not been filed with the USDA to support H2 approvals.
 NSF Nonfood Compounds Registration This product has not been filed with the NSF to support H1 or H2 approvals.

– Other / International –

FDA Approval Not applicable.

16	Other Information
----	-------------------

HMIS Codes	Health	Fire	Reactivity
	0	1	0

Relevant R Phrases R38 – Irritating to skin.
 R41 – Risk of serious damage to eye.
 R51/53 -- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Revision Indicators	Section	Changed
	8 Respiratory protection.	3 April 2009
	11 Dermal toxicity.	3 April 2009
	11 Eye irritation.	3 April 2009
	11 Inhalation toxicity.	3 April 2009
	11 Oral toxicity.	3 April 2009
	11 Respiratory irritation.	3 April 2009
	11 Skin irritation.	3 April 2009

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.