

SIP

SIPDRILL

Drilling Base Fluid

Qualities: This Product is acceptable for use under the conditions of OSPAR Decision 2000/2 "List of Notified Chemicals"

Characteristic	Units	Method	Min	Max	Typical
Appearance		Visual	C & B		C & B
Saybolt Colour		ASTM D156	+25 min		+30
Density at 15°C	g/ml	ASTM D1298			0.815
Flash Point - PMCC	°C	ASTM D93	100		102
Pour Point	°C	ASTM D97			below - 21
Sulphur Content	ppm				< 5
Viscosity at 40°C	cSt	ASTM D445	2.3	2.7	2.35
Distillation - IBP	°C	ASTM D86			220
Distillation - FBP	°C	ASTM D86			310
Aromatics by UV	%wt		0.5		0.1

Typical values quoted above are informative and do not constitute a specification

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D001

SIPDRILL

INVERT BASE FLUIDS

Low toxicity
Water-white
Low odour

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SIP is a leading supplier of speciality base oils and fluids throughout Europe, Africa and the Middle East.

SIP oils and fluids are used in a wide variety of applications, including metal working fluids, transmission oils, drilling fluids and in pharmaceutical and cosmetic preparations

SIP maintains over 20,000 MT storage capacity within Europe and can deliver products by ship, road tanker, barge, iso container, flexibag and drums. Independent inspectors certify that all products meet quality guarantees.

SIP has **ISO 9001:2008** accreditation.

SIPDRILL BASE FLUIDS

The SIPDRILL Series are cost effective low viscosity, drilling base fluids, with viscosities from 1.7 to 3.9 cSt @ 40°C.

The SIPDRILL range offers the drilling fluid formulator many beneficial properties which includes having only trace aromatics, high flash points, very low marine toxicity and world class occupational hygiene characteristics.

Features of the SIPDRILL Series.

- **Health, Safety and Toxicity.** SIPDRILL fluids exhibit very low levels of toxicity & have excellent occupational hygiene characteristics. They contain only trace levels of polycyclic aromatics and are registered with the Offshore Chemical Notification Scheme (OCNS).
- **Colourless.** The purity of the SIPDRILL range is demonstrated by their "water white" +30 Saybolt colour.
- **Volatility and Flash Point.** Relatively low volatility and high flash points compared with solvent refined oils of equivalent viscosity.
- **Superior Oxidation Characteristics.** SIPDRILL fluids provide exceptionally good thermal and oxidation stability

Typical Qualities of the SIPDRILL invert drilling base fluids

Product:			SIPDRILL 1LV	SIPDRILL 1	SIPDRILL 2/0	SIPDRILL 2/0 S	SIPDRILL 2/0 AG	SIPDRILL 4DP	SIPDRILL 4/0
ASTM Method									
Viscosity at 40°C,	cSt	D445	1.73	2.35	1.75	2.3	1.89	2.7	3.6
Density at 15°C	kg/l	D1298	0.810	0.815	0.760	0.780	0.762	0.813	0.875
Flash point, PMCC,	°C	D93	76	102	95	90	83	104	123
Pour point,	°C	D97	<-30	-21	-9	-15	-3	<-45	<-48
Aniline point,	°C	D611	72	79.6	87	87	-	83.6	91
Aromatics by UV,	%wt	D2008 (mod)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1*
Sulphur	ppm	D3120	<5	<5	<5	<5	<5	<5	<5
Colour	Saybolt	D 156	+30	+30	+30	+30	+30	+30	+30
Odour	Mild								
Appearance	Clear & bright								

* Aromatic Content measured by IP391 HPLC method.

All products are acceptable for use under the conditions of OSPAR Decision 2000/2 - "List of Notified Chemicals".

Detailed product specifications are available on request from **SIP**.

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Sipdrill Base fluids

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Drilling Base Fluids Comparison Table

	Sipdrill 1	Sipdrill 2/0	Sipdrill 2/0 (S)	Sipdrill 4/0 DP	Sipdrill 4/0
Viscosity cSt					
@ 25°C	3.20	2.87	3.3	3.54	5.70
@ 40°C	2.35	1.76	2.0	2.60	3.60
Flash Point COC °C	101	94	90	101	132
Aromatics Total, %	<0.5	<0.1	N/D	N/D	N/D
Aniline Point C	80	88	84	91	92
Pour Point °C	-20	-8	-15	<-60	<-57
Specific Gravity @15°C	0.815	0.765	0.79	0.800	0.8275
Distillation, °C ASTM D86	240-270	210-230	210 – 310	236-307	249-317
Product Type	Hydrotreated gasoil	Linear Alkane	GTL Linear/Iso alkane	GTL produced synthetic isomerate	Synthetic iso- alkane

Marine Toxicity & Occupational Hygiene Data Comparison

	SIP 1	SIP 2/0	SIP 2/0(S)	SIP 4/0 DP	SIPDRILL 4/0
Biodeg % OECD 306 28 dys	83.1	74	84	83.8	94.9
Skin irritation OECD 404	1.25	1.20	0.8	0.2	0.8
Aromatics %	0.5	<0.1	0.001	<0.001	<0.1
Vapours 50°C	24.4	87		29	13
100°C	69.6	186		169	193
BCF	na	5.54	Na	na	6.55
Corophium v	539	2316	1827	1320	1812
Mysid Shrimp	>1,000,000	>1,000,000	>1,000,000	NA	>1,000,000



Other Sipdrill Options

- **Sipdrill 1LV**

- Low cost
- Low viscosity
- Dearomatised base oil
- Available ex tank Europe

- **Sipdrill 2/0 (S)**

- Mix of Iso and Linear alkanes (part FT part mole seive)
- Lower Pour point
- Low viscosity
- Good biodegradation
- Good toxicity



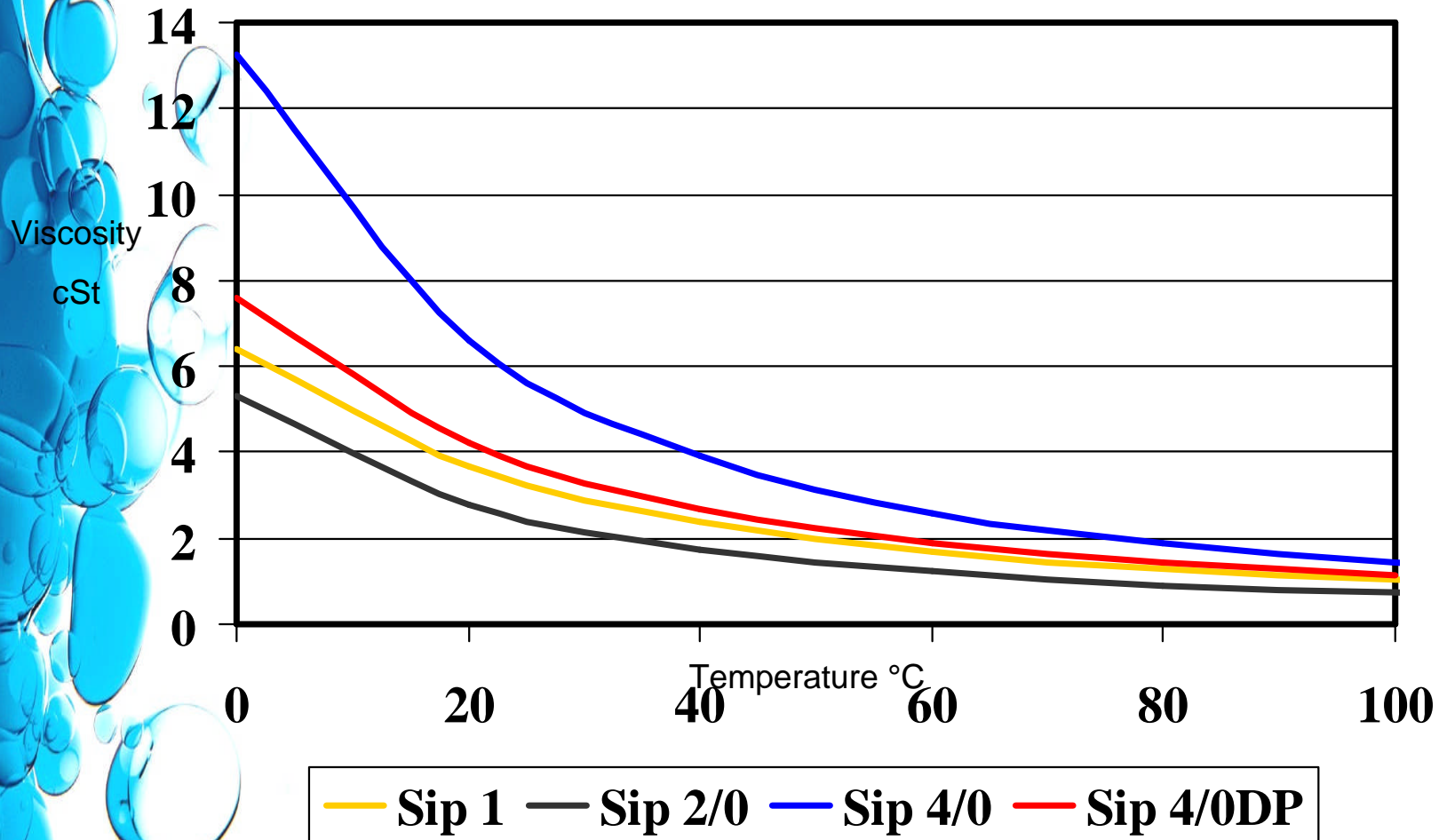
GTL Products

The starting point for Sipdrill 4DP is a methane feedstock.

This gas is converted into liquid hydrocarbon and olefinic gases. The olefinic gases act as a feedstock to the Conversion of Olefins (COD) unit which oligomerises the olefins to form distillate fractions. The COD distillate is hydrotreated to saturate the olefins into paraffins and isoparaffins. These units contain no polyaromatics but may contain small amounts of mono aromatics. These monoaromatics are removed by further hydrogenation to remove any trace of aromatics

Sipdrill 4DP is fractionated from the resultant distillate to the required viscosity and flash point

Viscosity versus Temperature Drilling Base Fluids





What is a linear paraffin/alkane

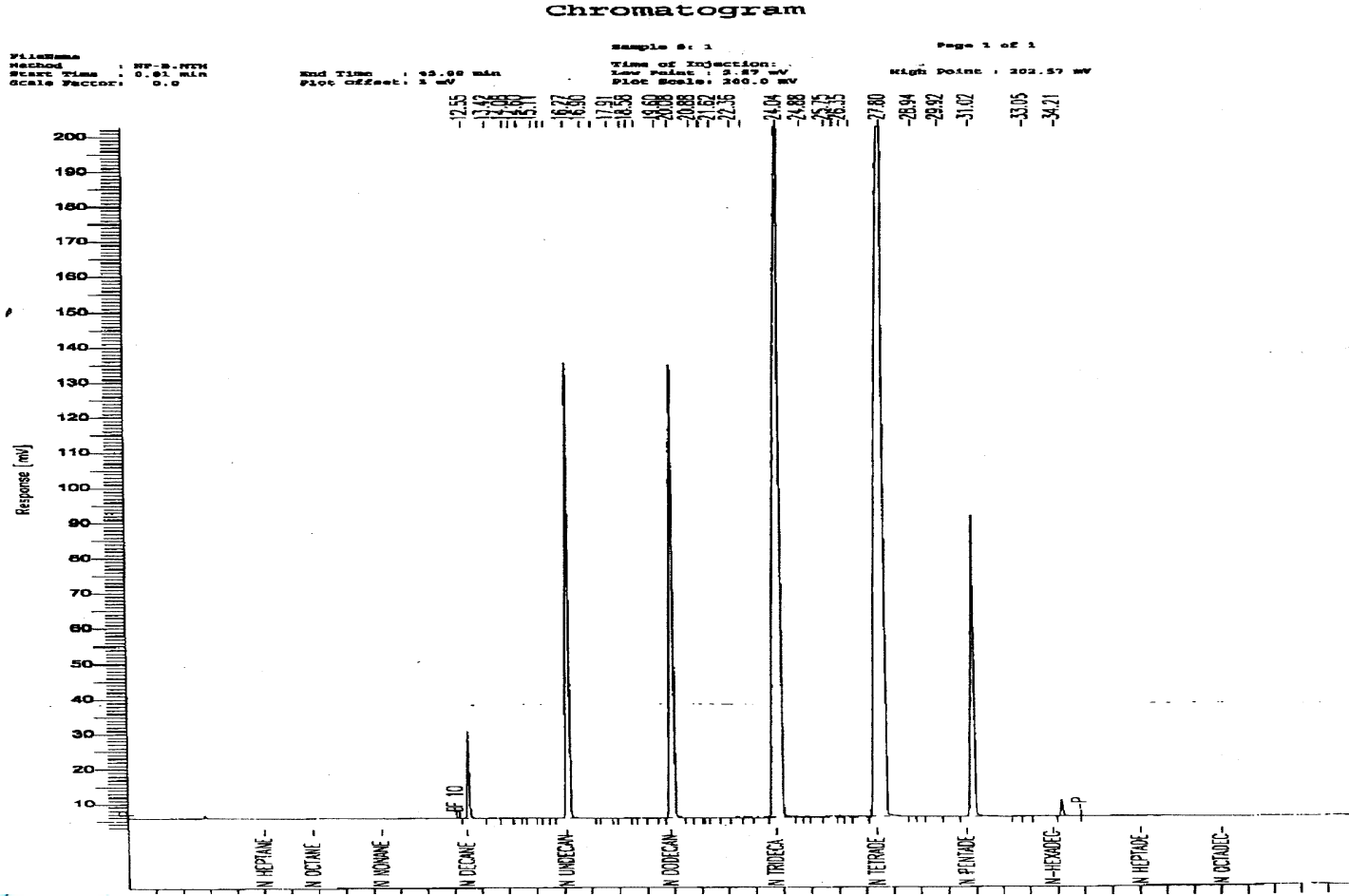
- There are 3 types of paraffin
 - Iso-or branched paraffin
 - Cyclic paraffin or naphthenes
 - Linear paraffin or straight chained alkane
- Long chained paraffin is solid at room temperature and is known as common wax (typically C25 and above)
- Linear alkane used in drilling is chemically the same as paraffin wax except it is shorter chained (C11-C14) and exceptionally pure (99.9%) purity.
- Chemically the only difference between a linear alkane and a linear alkene (LAO/iAO) is a double bond on the first or middle carbon to carbon bond.



What is a “paraffinic base oil” ?

- A paraffinic base oil is completely different from a linear alkane because it would normally only contain 2 to 5 % linear alkanes. The majority is made up of iso paraffins, naphthenic paraffins and possibly aromatics. In most base oil production units the linear paraffins or wax are extracted to improve pour points.
- **A simple GC trace can quickly distinguish a linear alkane from a paraffinic base oil.**

GC Trace - Linear Alkane





Characteristics of Linear alkane

- Odourless and Colourless
- Certified for incidental food & human contact
- Biodegradable (OECD)
- Very low marine toxicity
- Distinctive GC trace - easy to see over oil or gas shows
- Very low intrinsic viscosity
- Very low fluid retention on cuttings
- Non irritating to skin – easy to handle
- High purity (>99.9%)
- High aniline point – good elastomer compatibility

Sipdrill 2 - Toxicity & Occupational hygiene

Typical data

- Density	0.7602
- Colour	+30
- Initial B Pt	211
- Final B Pt	235
- Viscosity cSt	1.765
- Aniline Pt	88
- Aromatics	<0.1%

Toxicity/Biodegradation

- Arcartia tonsa >10,000
- Skeletonema costatum >10,000
- Corophium volutator 2316 Mg kg⁻¹
- Mysidopsis bahia >1000 gm.l
- Aerobic biodegradation(OECD 306) 74%

Occupational Hygiene

- Skin irritation	1.20 (non irritant)
- Bioconcentration factor	5.54 (does not bioconcentrate)
- FDA	b(deemed not harmful with incidental human contact)
- Sulphur & benzene	non-detectable
- Cas number	64771-728

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Material Safety Data Sheet

SIPDRILL

Section 1: Identification

Trade Names: SIPDRILL 1
Other Names: Drilling Base Fluid
Chemical Synonyms: Petroleum Hydrocarbon, Paraffinic / Naphthenic Solvent
Supplier: SIP Ltd., Westminster Tower, 3 Albert Embankment London SE1 7SP, United Kingdom
Tele: ++44 (0)20-7717-0100 Fax: ++44 (0)20-7717-0105 eMAIL: info@sip.com
In case of emergency please contact: ++44 (0)20-7717-0100
Application: Used in Drilling Fluid Applications

Section 2: Composition

<u>Components</u>	<u>CAS Number</u>	<u>Einecs Number</u>	<u>Vol %</u>
Light Hydrotreated Distillate (Petroleum)	64742-47-8	265-149-8	100

Section 3: Hazard Identification

Human Hazard

This material is classified as Harmful (Xn) under EC legislation since it may present an aspiration hazard due to the low viscosity (< 7 cSt).

Risk Phrase: R65 - Harmful: may cause lung damage

R66 Repeated exposure may cause skin dryness and cracking

Safety Phrase: S23 Do not breathe mist / vapours / spray.

S62 - If swallowed do not induce vomiting, seek medical advice immediately and show this information.



Environmental Hazard This substance presents no major hazard to the environment

Section 4: First-aid Measures

Skin: Wash skin thoroughly with soap and water after contact. Change contaminated clothing and dry-clean and launder before re-use.
Eyes: Wash eyes thoroughly with copious quantities of water, ensuring eyelids are held open. Obtain medical advice if any pain or redness develops or persists.
Ingestion: If contamination of the mouth occurs, wash it out thoroughly with water. Obtain medical advice if large amounts are swallowed - do not induce vomiting.
Inhalation: If inhalation of mists, fumes or vapour causes irritation to the nose or throat, or coughing, remove to fresh air. Obtain medical advice if symptoms persist.

Section 5: Fire-Fighting Measures

As with all mineral oil based products, this material is combustible. Contain the spill and blanket with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Extinguish using dry powder, foam, water fog or (for small fires) carbon dioxide. Note that use of BCF/halon extinguishers is now considered environmentally unacceptable. Fires in confined spaces should be dealt with by trained personnel wearing breathing apparatus.

Section 6: Accidental Release Measures

Large spillages must be notified to the appropriate authorities. As this material is combustible remove any sources of ignition. Do not wash or allow spilled material to enter drainage systems. Contain and recover spillage by pumping or by using sand, sawdust or other suitable absorbents. Dispose of recovered material and contaminated absorbents in an approved manner. Spilled material may make surfaces slippery and thus be hazardous.

Section 7: Handling and Storage

7.1 Handling: Protective clothing, including impervious gloves, should be worn if skin contact is anticipated. Wear a face visor or goggles if eye contact can accidentally occur. Protective clothing should be regularly inspected and maintained; overalls should be dry-cleaned and laundered. Discard oil-saturated leather articles.

7.2 Storage: Store at ambient temperature in a well-ventilated area, away from sources of ignition. Clean up any spilled material immediately. Take all necessary precautions against accidental spillage into soil or

Section 8: Exposure Controls

8.1 Exposure Limits: Oil Mists must be kept below 5 mg/m³

8.2 Exposure Controls:

8.2.1 Occupational Exposure Controls

- Whilst this material is not hazardous it is recommended the following good practises are adopted.

8.2.1.1 Respiratory Protection - Avoid inhalation of mists, fumes or vapour generated during use.

8.2.1.2 Hand Protection - Use impervious gloves, wash hands thoroughly after use, and always wash hands before eating, drinking or using the toilet.

8.2.1.3 Eye Protection - Avoid contact with eyes. Use suitable eye protection

8.2.1.4 Skin Protection - Avoid contact with skin and observe good personal hygiene. Change heavily contaminated clothing. Use single-use disposable cloths and discard when soiled.

Section 9: Physical and Chemical Properties

Typical Physical Properties

Test	Typical Value	Test	Typical Value
Appearance	Colourless Liquid	Density at 15°C	0.81 kg/l
Flash Point - COC	>100°C	Viscosity at 40°C	2.4 cSt
Odour	Kerosine type Odour	Polycyclic Aromatics	< 0.1%
pH Value	Not Applicable	Boiling Point Range	220 - 270°C
Auto Ignition Point	>100°C	Explosive Limits	LEL = approx. 1% UEI approx. 6%
Oxidative Properties	Not Applicable	Vapour Pressure	< 1 mmHg at 20°C
Solubility in Water	Insoluble	Solubility in Fat	Not Established
Partition Coefficient	Log Kow > 3 (n-Octanol/water)	Vapour Density	> 3 @101.3kPa (air=1)
Evaporation Rate	< 0.1 (n-Bu Acetate=1)	Pour Point	below - 30°C
Surface Tension	30mN/M @ 25°C		

Section 10: Stability and Reactivity

Thermal stability - Stable at ambient temperatures.

Reactivity - Avoid contact with strong oxidising agents.

Hazardous decomposition products - Thermal decomposition can produce a variety of compounds, the precise nature of which will depend on the decomposition conditions.

Incomplete combustion will generate smoke and hazardous gases, including carbon monoxide.

Section 11: Toxicological Information

This material is characterised as non-toxic because it shows the following characteristics:

Acute Toxicity (oral)	LD50 > 2000mg/kg (Rat)
Acute Toxicity (dermal)	LD50 > 2000mg/kg (Rabbit)
Acute Toxicity (inhalation)	LC50 > 5000mg/m ³ /4hr (Rat)
Irritation / Corrosion (eye)	Repeated or prolonged contact spray, mist or vapours may cause eye irritation but no permanent damage
Irritation / Corrosion (skin)	Non Irritant (OECD 404 - Index value 1.25)
Irritation / Corrosion (Respiratory Tract)	This material has a low vapour pressure and does not cause an inhalation exposure at ambient conditions. Contact with sprays, mists or vapours may cause irritation to the breathing passages. Aspiration of spray, mist or vapour may cause chemical pneumonitis.
Sensitisation (skin)	Non sensitising (guinea pig)
Sensitisation (Respiratory Tract)	This material is not a respiratory tract sensitiser
Repeated Dose Toxicity	Prolonged contact to skin or eyes can cause irritation and possible dermatitis

Mutagenicity	Negative to Modified Ames Test.
Carcinogenicity	Does not contain any IARC Group 1, 2(a) or 2(b) Listed Chemicals. Polycyclic Aromatic Hydrocarbons by IP346 < 1%
Reproductive Toxicity	Based on animal data studies this material does not pose a reproductive risk

Section 12: Ecological Information

Environmental Fate - This material, because of its density, will float on water. Since it consist of relatively low molecular weight paraffinic substances, small spillages into oil or water will be dispersed by evaporation and biodegradation.

Aquatic toxicity (fish)	LC50 >1000mg/l - 96hr Test - Juvenile Turbot (OECD 203)
Aquatic toxicity (algae)	Not determined
Aquatic toxicity (invertebrate)	LC50 = 540 mg/kg - 10 day Test - Amphipod Corophium Volutator (Parcom protocol)
Mobility	This material will float on water. For other Physio-chemical properties see Section 9
Biodegradation	Readily Biodegradable (OECD 306 = 83% in 28 days)
Bioaccumulation potential	Bioaccumulation is unlikely due to the very low water solubility of this product. Bioavailability to aquatic organisms is minimal.
Other Ecological information	Although not toxic to vertebrates and invertebrates spilled material may affect organisms (especially small invertebrates) by physical smothering leading or by deoxygenation of the water below the oil film. WGK = 1(Germany)

Section 13: Disposal Considerations

Waste or surplus oil, or oil-contaminated materials, may be disposed of by incineration, land-fill or other suitable means approved by the Local Authority.

Section 14: Transport Information

This material is not classified as dangerous for transportation under current EC and International legislation.

UN number	Not applicable
Packaging Class	Not applicable
ADR/RID class (road/rail)	Not applicable
IMDG class (sea)	Not applicable
IATA/ICAO class (air)	Not applicable
Marine Pollution Category	Marpol 73/78 Annex I
Other Transport Information	Not classified as dangerous in respect to transport regulations

Section 15: Regulatory Information

15.1 Classification

15.1.1 CHIPS 3 Approved List Name - Distillate (petroleum), hydrotreated light.

15.1.2 CHIPS 3 Approved List Index No. - 649-422-00-2

15.1.3 Internationally Recognised Name - Kerosine - unspecified

15.2 EC Label

15.3 Eines No. 265-149-8

15.4 Other Regulatory Information

This material is not classified as dangerous for supply under current EC legislation.

This material is not classified under current Canadian WHMIS legislation.

This material is certified to meet the US Food and Drugs Administration (FDA) requirements for its intended use.

WGK Water Classification: WGK 1 (self assessment)

This Material is known to be listed on the following Chemical Inventories:

European (EINECS) 265-149-8

USA (TSCA)

Canadian (DSL)

Australian (AICS)

Japanese (ENCS) / (MITI)

Korean (ECL)

Phillipines (PICCS)

Section 16: Other Information

16.1 Labelling

16.1.1 Danger Classification - Possible Aspiration Hazard

16.1.2 Distillate (Petroleum) Hydrotreated, Light

Viscosity < 7cSt at 40°C, Surface Tension < 33mN/m@25°C (Requires R65 Risk Phrase)

DMSO extract by IP346 < 3%/m. (Does not require R45 Risk Phrase)

Acute Toxicity > 100mg/l *

Biodegradation - Readily Biodegradable *

(*identifies that product is not harmful to the environment)

16.1.3 R - Phrases

R65 Xn - Harmful : may cause lung damage if swallowed (Aspiration Hazard)

R66 Repeated exposure may cause skin dryness and cracking

16.1.4 S - Phrases

S23 Do not breathe mist / vapours / spray

S62 If swallowed do not induce vomiting: seek medical advice immediately and show this container or label.

16.2 Recommended Use

(See applications - Section 1)

16.3 References

- Threshold limit values and biological exposure indices, ACGIH, Cincinnati, Ohio, 1991.
- Occupational exposure limits 1992, Report No. EH40/92, HSE, London, 1992.
- First aid measures, medical toxicology data and professional advice to clinicians on petroleum products, Report No. 2/83, CONCAWE, Brussels, 1983.
- Petroleum process stream terms included in the Chemical Substances Inventory under the Toxic Substances Control Act (TSCA), API, 1983.
- Assessment and comparison of the composition of food-grade white oils and waxes manufactured from petroleum by catalytic hydrogenation versus conventional treatment, Report No. 84/60, CONCAWE, Brussels 1984.
- Report on Modified Ames Tests of petroleum basestocks, Calgary, 1986
- White oils and waxes - summary of 90-day studies, Report No. 93/56, CONCAWE, Brussels, 1993.
- The classification and labelling of petroleum substances according to the EU dangerous substances directive, Report No. 95/59, CONCAWE, Brussels, 1995.
- The classification and labelling of petroleum substances according to the EU dangerous substances directive, Recommendations (August 2001) - Report No. 01/53, CONCAWE, Brussels, October 2001
- EC Commission Directive 2001/58/EC relating to Directives 91/155/EEC, 1999/45/EC & 67/548/EEC.
- Chemical (Hazard Information and Packaging for Supply) Regulations 2002 (CHIPS 3)

16.4 Reason for Revision:

To comply with the requirements of CHIPS 3 and Commission Directive 2001/58/EC (amending Directives 91/155/EEC & 199/45/EC

REVISION

THIS REVISION REPLACES THE PREVIOUS ISSUE No. 2002/1

D001

Compilation:

This data sheet and the health, safety and environmental information it contains is considered to be accurate as of the date of compilation specified above. Any information contained herein has been reviewed. However, no warranty or representation, express or implied, is made as to the accuracy or completeness of the data and information contained in this data sheet.

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