n-Heptane Primary Reference Fuel (PRF)

Version 3.0 Revision Date 2011-09-23

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product information

Trade name : n-Heptane Primary Reference Fuel (PRF)
Material : 1084146, 1021846, 1021847, 1021848, 1021849, 1021850, 1031134

EC-No.Registration number

Chemical Name	CAS-No. Index-No.	Legal Entity Registration number
n-Heptane	142-82-5 601-008-00-2	Chevron Phillips Chemicals International NV 01-2119457603-38-0002

Relevant Identified Uses Supported : Use as a fuel - industrial

Company : Specialty Chemicals
10001 Six Pines Drive
The Woodlands, TX 77380

Local : Chevron Phillips Chemicals International N.V.
Brusselsesteenweg 355
B-3090 Overijse
Belgium

MSDS Requests: (800) 852-5530
Technical Information: (832) 813-4862
Responsible Party: Product Safety Group
Email:msds@cpchem.com

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
North America: CHEMTREC 800.424.9300 or 703.527.3887
Asia: +800 CHEMCALL (+800 2436 2255) China: 0532.8388.9090
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Chemcare Asia: Tel: +65 6848 9048 - Mob: +65 8382 9188 - Fax: +65 6848
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Responsible Department : Product Safety and Toxicology Group
E-mail address : MSDS@CPChem.com
Website : www.CPChem.com

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters airways.
Flammable liquids, Category 2	H225: Highly flammable liquid and vapor.
Skin irritation, Category 2	H315: Causes skin irritation.
Specific target organ systemic toxicity - single exposure, Category 3	H336: May cause drowsiness or dizziness.
Acute aquatic toxicity, Category 1	H400: Very toxic to aquatic life.
Chronic aquatic toxicity, Category 1	H410: Very toxic to aquatic life with long lasting effects.

Classification (67/548/EEC, 1999/45/EC)

Highly flammable	R11: Highly flammable.
Harmful	R65: Harmful: may cause lung damage if swallowed.
Irritant	R38: Irritating to skin. R67: Vapors may cause drowsiness and dizziness.
Dangerous for the environment	R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Label elements

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal Word : Danger

Hazard Statements :

H225	Highly flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements :

Prevention:

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P243	Take precautionary measures against static discharge.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing.

	Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P331	Do NOT induce vomiting.
Storage:	
P403 + P235	Store in a well-ventilated place. Keep cool.

Hazardous ingredients which must be listed on the label:
- 142-82-5 n-Heptane

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Normal Heptane
Dipropilmetano

Molecular formula : C7H16

Mixtures

Hazardous ingredients

Chemical Name	CAS-No. EINECS-No.	Classification (67/548/EEC)	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]
n-Heptane	142-82-5 205-563-8	F; R11 Xn; R65 Xi; R38 R67 N; R50-R53	Asp. Tox. 1; H304 Flam. Liq. 2; H225 Skin Irrit. 2; H315 STOT SE 3; H336 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	100

EC-No.Registration number

Chemical Name	CAS-No. EINECS-No.	Registration number
n-Heptane	142-82-5 205-563-8	Chevron Phillips Chemicals International NV 01-2119457603-38-0002

For the full text of the R-phrases mentioned in this Section, see Section 16.
For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Symptoms of poisoning may only appear several hours later. Do not leave the victim unattended.

If inhaled	:	Move to fresh air. If unconscious place in recovery position and seek medical advice. If symptoms persist, call a physician.
In case of skin contact	:	If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.
In case of eye contact	:	Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
If swallowed	:	Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. Take victim immediately to hospital.

5. FIRE-FIGHTING MEASURES

Flash point	:	-4 °C (25 °F) Method: Tag closed cup
Autoignition temperature	:	203,85 °C (398,93 °F)
Suitable extinguishing media	:	Dry chemical. Carbon dioxide (CO2). Alcohol-resistant foam.
Unsuitable extinguishing media	:	High volume water jet.
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for fire-fighters	:	Wear self contained breathing apparatus for fire fighting if necessary.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.
Fire and explosion protection	:	Do not spray on an open flame or any other incandescent material. Use only explosion-proof equipment. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	:	Carbon oxides.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to

form explosive concentrations. Vapors can accumulate in low areas.

Environmental precautions : Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

Methods for cleaning up : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling

Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations.
Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary, but may not by themselves be sufficient. Review all operations, which have the potential to generating and accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106 "Flammable and Combustible Liquids"; National Fire Protection Association (NFPA 77), "Recommended Practice on Static Electricity"; and/or the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising Out of Static, Lightning, and stray Currents".

Advice on protection against fire and explosion : Do not spray on an open flame or any other incandescent material. Use only explosion-proof equipment. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Keep away from open flames, hot surfaces and sources of ignition.

Storage

Requirements for storage areas and containers : No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

IT

Componenti	Base	Valore	Parametri di controllo	Nota
n-Heptane	IT OEL	TWA	500 ppm, 2.085 mg/m3	

LT

Komponentai	Pagrindas, bazė	Vertė	Kontrolės parametrai	Pastaba
n-Heptane	LT OEL	IPRD	500 ppm, 2.085 mg/m3	
	LT OEL	TPRD	750 ppm, 3.128 mg/m3	

LU

Composants	Base	Valeur	Paramètres de contrôle	Note
n-Heptane	LU OEL	TWA	500 ppm, 2.085 mg/m3	

LV

Sastāvdaļas	Bāze	Vērtība	Pārvaldības parametri	Piezīme
n-Heptane	LV OEL	AER 8 st	85 ppm, 350 mg/m3	
	LV OEL	AER īslaicīgā	500 ppm, 2.085 mg/m3	

NL

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
n-Heptane	NL MAC	TGG-8 uur	1.200 mg/m3	
	NL MAC	TGG-15 min	1.600 mg/m3	

PL

Składniki	Podstawa	Wartość	Parametry dotyczące kontroli	Uwaga
n-Heptane	PL NDS	NDS	1.200 mg/m3	
	PL NDS	NDSch	2.000 mg/m3	

PT

Componentes	Bases	Valor	Parâmetros de controlo	Nota
n-Heptane	PT OEL	VLE-MP	400 ppm,	(1),
	PT OEL	VLE_CD	500 ppm,	(1),

(1) Abrangido por legislação nacional específica ou por legislação comunitária não transposta

SE

Beståndsdelar	Grundval	Värde	Kontrollparametrar	Anmärkning
n-Heptane	SE AFS	NGV	200 ppm, 800 mg/m3	
	SE AFS	KTV	300 ppm, 1.200 mg/m3	

SI

Komponente	Osnova	Vrednost	Parametri nadzora	Pripomba
n-Heptane	SI OEL	MV	500 ppm, 2.085 mg/m3	EU,

EU European Union - mejna vednost določena na ravni Evropske unije

SK

Súčasti	Podstata	Hodnota	Kontrolné parametre	Poznámka
n-Heptane	SK OEL	NPEL	500 ppm, 2.085 mg/m3	

AT

Inhaltsstoffe	Basis	Wert	Zu überwachende Parameter	Bemerkung
n-Heptane	AT OEL	TMW	500 ppm, 2.000 mg/m3	
	AT OEL	KZW	2.000 ppm, 8.000 mg/m3	

BE

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
n-Heptane	BE OEL	TGG 8 hr	400 ppm, 1.664 mg/m3	
	BE OEL	TGG 15 min	500 ppm, 2.085 mg/m3	

CZ

Složky	Základ	Hodnota	Kontrolní parametry	Poznámka
n-Heptane	CZ OEL	PEL	1.000 mg/m3	
	CZ OEL	NPK-P	2.000 mg/m3	

DK

Komponenter	Basis	Værdi	Kontrolparametre	Note
n-Heptane	DK OEL	GV	200 ppm, 820 mg/m3	E,

E At stoffet har en EF-grænseværdi

EE

Komponendid, osad	Alused	Väärtus	Kontrolliparameetrid	Märkused
n-Heptane	EE OEL	Piirnorm	500 ppm, 2.085 mg/m3	

ES

Componentes	Base	Valor	Parámetros de control	Nota
n-Heptane	ES VLA	VLA-ED	500 ppm, 2.085 mg/m3	VLI,

VLI Agente químico que tiene establecido un valor límite indicativo por la UE.

FI

Aineosat	Peruste	Arvo	Valvontaa koskevat muuttujat	Nota
n-Heptane	FI OEL	HTP-arvot 8h	300 ppm, 1.200 mg/m3	
	FI OEL	HTP-arvot 15 min	500 ppm, 2.100 mg/m3	

FR

Composants	Base	Valeur	Paramètres de contrôle	Note
n-Heptane	FR VLE	VME	400 ppm, 1.668 mg/m3	zwart/vet,
	FR VLE	VLCT (VLE)	500 ppm, 2.085 mg/m3	zwart/vet,

zwart/vet Valeurs limites réglementaires contraingnantes

GB

Ingredients	Basis	Value	Control parameters	Note
n-Heptane	GB EH40	TWA	500 ppm,	2,

2 Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used

GR

Συστατικά	Βάση	Τιμή	Παράμετροι ελέγχου	Σημείωση
n-Heptane	GR OEL	TWA	500 ppm, 2.000 mg/m3	
	GR OEL	STEL	500 ppm, 2.000 mg/m3	

HU

Komponensek	Bázis	Érték	Ellenőrzési paraméterek	Megjegyzés
n-Heptane	HU OEL	AK-érték	2.000 mg/m3	*, EU3,
	HU OEL	CK-érték	8.000 mg/m3	*, EU3,

* Európai 'indikatív' határértékek (96/94/EK, 2000/39/EK), amelyeknél nincs csúcskoncentráció megadva. Ezekben az esetekben jelen melléklet 1.3. pontja szerint kell eljárni

EU3 2000/39/EK irányelvben közölt érték

IE

Ingredients	Basis	Value	Control parameters	Note
n-Heptane	IE OEL	OELV - 8 hrs (TWA)	400 ppm, 1.600 mg/m3	IOELV,

IOELV Indicative Occupational Exposure Limit Value

DNEL : End Use: Workers
Routes of exposure: Skin contact
Potential health effects: Chronic effects, Systemic effects
Value: 300 mg/kg

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Systemic effects
Value: 2085 mg/m3

PNEC : Fresh water
Value: 0,03 mg/l

PNEC : Marine water
Value: 0,03 mg/l

PNEC : Fresh water sediment
Value: 4,4 mg/kg

PNEC : Marine sediment

Value: 4,4 mg/kg

PNEC : Soil
Value: 1,8 mg/kg

Personal protective equipment

Respiratory protection	:	In the case of vapor formation use a respirator with an approved filter.
Hand protection	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves.
Eye protection	:	Eye wash bottle with pure water. Tightly fitting safety goggles.
Skin and body protection	:	Impervious clothing. Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

For additional details, see the Exposure Scenario in the Annex portion

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance

Form	:	Liquid
Physical state	:	Liquid
Color	:	Clear
Odor	:	Sweet

Safety data

Flash point	:	-4 °C (25 °F) Method: Tag closed cup
Lower explosion limit	:	1 %(V)
Upper explosion limit	:	7 %(V)
Oxidizing properties	:	no
Autoignition temperature	:	203,85 °C (398,93 °F)
Molecular formula	:	C7H16
Molecular Weight	:	100,23 g/mol
pH	:	Not applicable
Pour point	:	No data available
Boiling point/boiling range	:	98 °C (208 °F)

Vapor pressure	:	1,60 PSI at 38 °C (100 °F)
Relative density	:	0,69, 16 °C(61 °F)
Water solubility	:	Negligible
Partition coefficient: n-octanol/water	:	No data available
Relative vapor density	:	3,4 (Air = 1.0)
Evaporation rate	:	3,46
Percent volatile	:	> 99 %

Other information

Conductivity	:	< 1 pSm at 20 °C

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions

Conditions to avoid	:	Not applicable.
Materials to avoid	:	May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Other data	:	This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. No decomposition if stored and applied as directed.

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity

n-Heptane	:	LD50: > 5.000 mg/kg Species: rat Method: OECD Test Guideline 401 Information given is based on data obtained from similar substances.

Acute inhalation toxicity

n-Heptane	:	LC50: > 29,29 mg/l Exposure time: 4 HR Species: rat Sex: male and female Method: OECD Test Guideline 403

Acute dermal toxicity

n-Heptane : LD50: > 2.000 mg/kg
Species: rabbit
Sex: male and female
Method: OECD Test Guideline 402
Information given is based on data obtained from similar substances.

n-Heptane Primary Reference Fuel (PRF)
Skin irritation : Irritating to skin.

May cause skin irritation in susceptible persons.

n-Heptane Primary Reference Fuel (PRF)
Eye irritation : Vapors may cause irritation to the eyes, respiratory system and the skin.

Sensitization

n-Heptane : Did not cause sensitization on laboratory animals.
Information given is based on data obtained from similar substances.

Repeated dose toxicity

n-Heptane : Species: rat, male
Sex: male
Application Route: Inhalation
Dose: 12.47 mg/l
Exposure time: 16 wk
Number of exposures: 12 h/d, 7 d/wk
NOEL: 12,47 mg/l
No adverse effect has been observed in chronic toxicity tests.

Reproductive toxicity

n-Heptane : Species: rat
Application Route: Inhalation
Dose: 0, 900, 3000, 9000 ppm
Number of exposures: 6 hr/d, 5 d/wk
Test period: 13 wk
Method: OECD Test Guideline 416
NOAEL Parent: 9000 ppm
NOAEL F1: 3000 ppm
NOAEL F2: 3000 ppm

Teratogenicity

n-Heptane : Species: rat
Application Route: Inhalation
Dose: 0, 900, 3000, 9000 ppm
Exposure time: GD6-15
Number of exposures: 6 hrs/d
NOAEL Teratogenicity: 9000 ppm
NOAEL Maternal: 3000 ppm

n-Heptane Primary Reference Fuel (PRF)
Aspiration toxicity : May be fatal if swallowed and enters airways.
Substances known to cause human aspiration toxicity hazards

or to be regarded as if they cause human aspiration toxicity hazard.

CMR effects

n-Heptane : Carcinogenicity: Not available
Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: No toxicity to reproduction

n-Heptane Primary Reference Fuel (PRF)
Further information : Concentrations substantially above the TLV value may cause narcotic effects. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Solvents may degrease the skin.

12. ECOLOGICAL INFORMATION

Toxicity to fish

n-Heptane : LL50: 1,284 mg/l
Exposure time: 96 HR
Species: Oncorhynchus mykiss (rainbow trout)
Method: QSAR

Toxicity to daphnia and other aquatic invertebrates.

n-Heptane : EC50: 1,5 mg/l
Exposure time: 48 HR
Species: Daphnia magna (Water flea)
static test Toxic to aquatic organisms.

LC50: 0,1 mg/l
Exposure time: 96 HR
Species: Mysidopsis bahia (mysid shrimp)
semi-static test Very toxic to aquatic organisms.

Toxicity to algae

n-Heptane : EL50: 4,338 mg/l
Exposure time: 72 HR
Species: Pseudokirchneriella subcapitata
Method: QSAR

Biodegradability

n-Heptane : Result: Readily biodegradable.
70 %
Testing period: 10 D

Further information on ecology

Results of PBT assessment

n-Heptane	:	Non-classified PBT substance, Non-classified vPvB substance
Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

The information in this MSDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

For additional details, see the Exposure Scenario in the Annex portion

14. TRANSPORT INFORMATION

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the MSDS and the bill of lading.

US DOT (United States Department of Transportation)
UN1206, HEPTANES, 3, II

IMO / IMDG (International Maritime Dangerous Goods)
UN1206, HEPTANES, 3, II, MARINE POLLUTANT, (N-HEPTANE), (-4 °C)

IATA (International Air Transport Association)
UN1206, HEPTANES, 3, II

ADR (Agreement on Dangerous Goods by Road (Europe))
UN1206, HEPTANES, 3, II, (D/E)

RID (Regulations concerning the International Transport of Dangerous Goods (Europe))
UN1206, HEPTANES, 3, II

ADN (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)
UN1206, HEPTANES, 3, II

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

15. REGULATORY INFORMATION

National legislation

Chemical Safety Assessment

Ingredients	:	heptane	A Chemical Safety Assessment has been carried out for this substance.	205-563-8

Major Accident Hazard Legislation : 96/82/EC Update: 2003
Highly flammable
7b
Quantity 1: 5.000 t
Quantity 2: 50.000 t

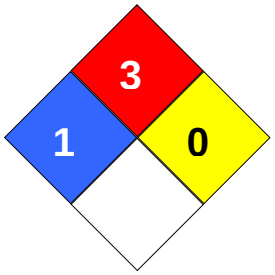
: 96/82/EC Update: 2003
Dangerous for the environment
9a
Quantity 1: 100 t
Quantity 2: 200 t

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
United States of America US.TSCA	:	On the inventory, or in compliance with the inventory
Canada DSL	:	On the inventory, or in compliance with the inventory
Australia AICS	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	On the inventory, or in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	On the inventory, or in compliance with the inventory
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory

16. OTHER INFORMATION

NFPA Classification : Health Hazard: 1
Fire Hazard: 3
Reactivity Hazard: 0



Further information

Legacy MSDS Number : 26960

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this MSDS pertains only to the product as shipped.

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philipines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical	TWA	Time Weighted Average

	Substances in China		
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Compositon, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Full text of R-phrases referred to under sections 2 and 3

R11	Highly flammable.
R38	Irritating to skin.
R50	Very toxic to aquatic organisms.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R53	May cause long-term adverse effects in the aquatic environment.
R65	Harmful: may cause lung damage if swallowed.
R67	Vapors may cause drowsiness and dizziness.

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Annex

1. Short title of Exposure Scenario: **Use as a fuel - industrial**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU 3:** Industrial Manufacturing (all)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC16:** Using material as fuel sources, limited exposure to unburned product to be expected
Environmental release category	:	**ERC7:** Industrial use of substances in closed systems
Further information	:	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

ERC7: Industrial use of substances in closed systems

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers percentage substance in the product up to 100 % (unless stated differently)
(Msafe)	:	4.300 tonnes/day

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Continuous use/release		
Number of emission days per year	:	20
Emission or Release Factor: Air	:	5 %
Emission or Release Factor: Water	:	0,001 %
Emission or Release Factor: Soil	:	0 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: 95 %)
Water	:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 0 %)
Remarks	:	Risk from environmental exposure is driven by freshwater sediment.

Water	:	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): (Effectiveness: 0 %)
Remarks	:	No wastewater treatment required.
Remarks	:	Common practices vary across sites thus conservative process release estimates used.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent	:	2.000 m3/d
Effectiveness (of a measure)	:	96,2 %
Percentage removed from waste water	:	96,2 %

Conditions and measures related to external treatment of waste for disposal

Remarks	:	Combustion emissions considered in regional exposure assessment. Combustion emissions limited by required exhaust emission controls.

Conditions and measures related to external recovery of waste

Recovery Methods	:	This substance is consumed during use and no waste of the substance is generated.

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers percentage substance in the product up to 100 % (unless stated differently)
Physical Form (at time of use)	:	Liquid substance
Vapor pressure	:	8,9 kPa

Amount used

Remarks	:	No limit

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks	:	Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures

Handle substance within a closed system., Store substance within a closed system.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers percentage substance in the product up to 100 % (unless stated differently)
Physical Form (at time of use)	:	Liquid substance
Vapor pressure	:	8,9 kPa

Amount used

Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Handle substance within a closed system., Store substance within a closed system., Transfer via enclosed lines.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Product characteristics
Concentration of the Substance in Mixture/Article : Covers percentage substance in the product up to 100 % (unless stated differently)
Physical Form (at time of use) : Liquid substance
Vapor pressure : 8,9 kPa

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Handle substance within a closed system.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Concentration of the Substance in Mixture/Article : Covers percentage substance in the product up to 100 % (unless stated differently)
Physical Form (at time of use) : Liquid substance
Vapor pressure : 8,9 kPa

Amount used
Remarks : No limit

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Drain down and flush system prior to equipment opening or maintenance.

Organizational measures to prevent /limit releases, dispersion and exposure
Apply vessel entry procedures including use of forced supplied air.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable coveralls to prevent exposure to the skin., Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Concentration of the Substance in Mixture/Article : Covers percentage substance in the product up to 100 % (unless stated differently)
Physical Form (at time of use) : Liquid substance
Vapor pressure : 8,9 kPa

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Handle substance within a closed system.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC16: Using material as fuel sources, limited exposure to unburned product to be expected

Product characteristics
Concentration of the Substance in Mixture/Article : Covers percentage substance in the product up to 100 % (unless stated differently)
Physical Form (at time of use) : Liquid substance
Vapor pressure : 8,9 kPa

Amount used
Remarks : No limit

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures

Handle substance within a closed system.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
ERC7	Hydrocarbon Block Method with Petrorisk		Freshwater		0,0043 µg/L	0,000046
			Marine water		0,0004 µg/L	0,000005
			Freshwater sediment		0,13 µg/kg	0,000052
			Marine sediment		0,013 µg/kg	0,000005
			Soil		0,0006 µg/kg	< 0,000001
			Air		0,0086 µg/m3	

ERC7: Industrial use of substances in closed systems

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
PROC1, CS15, CS37, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,04 mg/m3	0
			Worker – dermal, long-term – systemic	0,34 mg/kg	0,001
			Worker – long-term – systemic Combined routes		0,001
PROC2, CS15, CS37	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	40,90 mg/m3	0,020
			Worker – dermal, long-term – systemic	1,37 mg/kg	0,005
			Worker – long-term – systemic Combined routes		0,024
PROC3, CS15, CS37	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	102,25 mg/m3	0,049
			Worker – dermal, long-term – systemic	0,34 mg/kg	0,001
			Worker – long-term – systemic Combined routes		0,050
PROC8a, CS39	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	204,50 mg/m3	0,098
			Worker – dermal, long-term – systemic	2,742 mg/kg/d	0,009
			Worker – long-term – systemic Combined routes		0,107

PROC8a, CS103	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	20,45 mg/m3	0,010
			Worker – long-term – systemic Combined routes	2,742 mg/kg	0,009
			Worker – dermal, long-term – systemic		0,019
PROC8b, CS8, CS14	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	204,50 mg/m3	0,098
			Worker – dermal, long-term – systemic	1,372 mg/kg	0,005
			Worker – long-term – systemic Combined routes		0,103
PROC16, CS15, CS107	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	20,45 mg/m3	0,010
			Worker – dermal, long-term – systemic	0,34 mg/kg	0,001
			Worker – long-term – systemic Combined routes		0,011

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)
CS37: Use in contained batch processes
CS67: Storage

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)
CS37: Use in contained batch processes

PROC3: Use in closed batch process (synthesis or formulation)
CS15: General exposures (closed systems)
CS37: Use in contained batch processes

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS39: Equipment cleaning and maintenance

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS103: Vessel and container cleaning

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS8: Drum/batch transfers
CS14: Bulk transfers

PROC16: Using material as fuel sources, limited exposure to unburned product to be expected
CS15: General exposures (closed systems)
CS107: (closed systems)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Risk Management Measures are based on qualitative risk characterisation.