Raw Natural Gas Liquids (Raw NGL)

Version 1.3 Revision Date 2022-11-29

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product information

Product Name : Raw Natural Gas Liquids (Raw NGL)
Material : 1012520, 1012523, 1012525, 1012524, 1012522, 1012521

Company : Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Austria: VIZ +43 1 406 43 43 (24 hours/day, 7 days/week)
Belgium: 070 245 245 (24 hours/day, 7 days/week)
Bulgaria: +359 2 9154 233
Croatia: +3851 2348 342 (24 hours/day, 7 days/week)
Cyprus: 1401
Czech Republic: Toxicological Information Center +420 224 919 293, +420 224 915 402
Denmark: Danish Poison Center (Giftlinjen): +45 8212 1212
Estonia: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Finland: 0800 147 111 09 471 977 (24 hours/day)
France: ORFILA number (INRS): + 33 (0) 1 45 42 59 59 (24 hours/day, 7 days/week)
Germany: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Greece: (0030) 2107793777 (24 hours/day, 7 days/week)
Hungary: +36-80-201-199 (24 hours/day, 7 days/week)
Iceland: 543 2222 (24 hours/day, 7 days/week)
Ireland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Italy: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Latvia: State Fire and Rescue Service, phone number: 112; Toxicology and Sepsis Clinic Poisoning and Drug Information Center, Hipokrāta 2, Riga, Latvia, LV-1038, phone number +371 67042473. (24 hours.)
Liechtenstein: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Lithuania: +370 (85) 2362052

Luxembourg: (+352) 8002 5500 (24 hours/day, 7 days/week)
Malta: +356 2395 2000
The Netherlands: NVIC: +31 (0)88 755 8000
Norway: 22 59 13 00 (24 hours/day, 7 days/week)
Poland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Portugal: CIAV phone number: +351 800 250 250
Romania: +40213183606
Slovakia: +421 2 5477 4166
Slovenia: Phone number: 112
Spain: National Emergency Telephone Number of Spanish Poison Centre: +34 91 562 04 20 (24 hours/day, 7 days/week)
Sweden: 112 – ask for Poisons Information

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

SECTION 2: Hazards identification

Classification of the substance or mixture
This product has been classified in accordance with the hazard communication standard 29 CFR 1910.1200; the SDS and labels contain all the information as required by the standard.

Classification

: Flammable gases, Category 1
Gases under pressure, Liquefied gas
Acute toxicity, Category 3, Inhalation
Skin irritation, Category 2
Germ cell mutagenicity, Category 1B
Carcinogenicity, Category 1A
Reproductive toxicity, Category 2
Specific target organ toxicity - single exposure, Category 3, Central nervous system
Specific target organ toxicity - repeated exposure, Category 1, Blood
Specific target organ toxicity - repeated exposure, Category 2, Inhalation, Nervous system
Aspiration hazard, Category 1

Labeling

Symbol(s) :

Signal Word : Danger

Hazard Statements : H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.
H304: May be fatal if swallowed and enters airways.
H315: Causes skin irritation.
H331: Toxic if inhaled.
H336: May cause drowsiness or dizziness.
H340: May cause genetic defects.
H350: May cause cancer.
H361: Suspected of damaging fertility or the unborn child.

H372: Causes damage to organs (Blood) through prolonged or repeated exposure.
H373: May cause damage to organs (Nervous system) through prolonged or repeated exposure if inhaled.
May displace oxygen and cause rapid suffocation.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P331 Do NOT induce vomiting.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Carcinogenicity:

IARC	Group 1: Carcinogenic to humans	
	Benzene	71-43-2
	Group 2B: Possibly carcinogenic to humans	
	Natural gas (petroleum), raw liq. mix	64741-48-6
NTP	Known to be human carcinogen	
	Benzene	71-43-2

SECTION 3: Composition/information on ingredients

Synonyms : Raw NGL
Natural Gas Liquids - Y Grade
De-methanized NGL

Molecular formula : UVCB

Component	CAS-No.	Weight %
Natural gas (petroleum), raw liq. mix	64741-48-6	100
Ethane	74-84-0	20 - 80
Propane	74-98-6	20 - 80
n-Pentane	109-66-0	0 - 25
Isopentane	78-78-4	0 - 25
n-Butane	106-97-8	0 - 20
Isobutane	75-28-5	0 - 20
n-hexane	110-54-3	0 - 30
Hydrogen Sulfide	7783-06-4	0 - 0.1
Benzene	71-43-2	0 - 5
Carbon Dioxide	124-38-9	0 - 2

SECTION 4: First aid measures

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

If inhaled : Consult a physician after significant exposure. If unconscious, place in recovery position and seek medical advice.

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 : Flush eyes with water as a precaution. 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. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point : -135°C (-211°F)

Suitable extinguishing media : Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.

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 : Wear self-contained breathing apparatus for firefighting if

equipment for fire-fighters		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 a naked flame or any incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

SECTION 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).

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

Storage

Requirements for storage	:	No smoking. Keep container tightly closed in a dry and well-

areas and containers	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.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

US

Components	Basis	Value	Control parameters	Note
Natural gas (petroleum), raw liq. mix	OSHA Z-1	TWA	500 ppm, 2,000 mg/m3	
	OSHA Z-1-A	TWA	400 ppm, 1,600 mg/m3	
n-hexane	ACGIH	TWA	50 ppm,	Skin,
	OSHA Z-1	TWA	500 ppm, 1,800 mg/m3	
	OSHA Z-1-A	TWA	50 ppm, 180 mg/m3	
Benzene	ACGIH	TWA	0.5 ppm,	A1, Skin,
	ACGIH	STEL	2.5 ppm,	A1, Skin,
	OSHA Z-1-A	TWA	1 ppm,	
	OSHA Z-1-A	CEIL	5 ppm,	
	OSHA Z-2	Peak	50 ppm,	
	OSHA 29 CFR 1910.1028(c)	TWA	1 ppm,	
	OSHA 29 CFR 1910.1028(c)	STEL	5 ppm,	
	OSHA CARC	PEL	1 ppm,	
	OSHA CARC	STEL	5 ppm,	
Hydrogen Sulfide	ACGIH	TWA	1 ppm,	
	ACGIH	STEL	5 ppm,	
	OSHA Z-2	CEIL	20 ppm,	
	OSHA Z-2	Peak	50 ppm,	
	OSHA Z-1-A	TWA	10 ppm, 14 mg/m3	
	OSHA Z-1-A	STEL	15 ppm, 21 mg/m3	

A1 Confirmed human carcinogen
Skin Danger of cutaneous absorption

Immediately Dangerous to Life or Health Concentrations (IDLH)

Substance name	CAS-No.	Control parameters	Update
Propane	74-98-6	Immediately Dangerous to Life or Health Concentration Value 2100 parts per million	1995-03-01
n-hexane	110-54-3	Immediately Dangerous to Life or Health Concentration Value 1100 parts per million	1995-03-01
n-Pentane	109-66-0	Immediately Dangerous to Life or Health Concentration Value 1500 parts per million	1995-03-01
n-Butane	106-97-8	Immediately Dangerous to Life or Health Concentration Value 1600 parts per million	2017-02-03
Benzene	71-43-2	Immediately Dangerous to Life or Health Concentration Value 500 parts per million	1995-03-01
Carbon Dioxide	124-38-9	Immediately Dangerous to Life or Health Concentration Value 40000 parts per million	1995-03-01
Hydrogen Sulfide	7783-06-4	Immediately Dangerous to Life or Health Concentration Value 100 parts per million	1995-03-01

Biological exposure indices

US

Substance name	CAS-No.	Control parameters	Sampling time	Update

n-hexane	110-54-3	2,5-Hexanedione: 0.5 mg/l Without hydrolysis (Urine)	End of shift	2020-02-01
Benzene	71-43-2	S-Phenylmercapturic acid: 25 µg/g creatinine Background (Urine)	End of shift (As soon as possible after exposure ceases)	2010-03-01
		t,t-Muconic acid: 500 µg/g creatinine Background (Urine)	End of shift (As soon as possible after exposure ceases)	2010-03-01

Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection : If ventilation or other engineering controls are not adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure, a supplied-air NIOSH approved respirator may be appropriate. If exposure to harmful levels of airborne material may occur, a NIOSH approved respirator that provides protection may be appropriate, such as:. Air-Purifying Respirator for Organic Vapors. A positive pressure, air-supplying respirator may be appropriate if there is potential for uncontrolled release, aerosolization, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection : The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection : Eye wash bottle with pure water. Tightly fitting safety goggles.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.

Hygiene measures : When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Form : compressed liquefied gas

Physical state	:	Gaseous
Color	:	Colorless
Odor	:	gasoline-like, Rotten eggs, sulfurous

Safety data

Flash point	:	-135°C (-211°F)
Lower explosion limit	:	3 %(V)
Upper explosion limit	:	12.4 %(V)
Molecular formula	:	UVCB
pH	:	Not applicable
Vapor pressure	:	200.00 PSI at 37.8°C (100.0°F)
Density	:	0.5 - 0.7 g/cm3 at 20°C (68°F)
Water solubility	:	negligible

SECTION 10: Stability and reactivity

Chemical stability : This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions

Hazardous reactions : Further information: No decomposition if stored and applied as directed.

Hazardous reactions: Vapors may form explosive mixture with air.

Conditions to avoid : Heat, flames and sparks.

Other data : No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Raw Natural Gas Liquids (Raw NGL)
Acute oral toxicity : LD50 Oral: > 5,000 mg/kg
Species: Rat
Method: Acute toxicity estimate

Raw Natural Gas Liquids (Raw NGL)
Acute inhalation toxicity : Hazardous quantities of hydrogen sulfide (H2S) may be present. Whenever a potential for exceeding 0.5 ppm (one-

half the ACGIH TLV) exists, detection and monitoring of hydrogen sulfide should occur. Since the sense of smell cannot be relied upon to detect the presence of H2S, the concentration should be measured by the use of fixed or portable devices.

LC50: 2.99 mg/l
Exposure time: 4 h
Test atmosphere: vapor
Method: Acute toxicity estimate

Raw Natural Gas Liquids (Raw NGL)
Acute dermal toxicity : LD50 Dermal: > 2,000 mg/kg
Species: Rabbit
Method: Acute toxicity estimate

Raw Natural Gas Liquids (Raw NGL)
Skin irritation : May cause skin irritation in susceptible persons.

Raw Natural Gas Liquids (Raw NGL)
Eye irritation : Vapors may cause irritation to the eyes, respiratory system and the skin.

Raw Natural Gas Liquids (Raw NGL)
Sensitization : No data available.

Repeated dose toxicity

Ethane : Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 0, 1600, 5000, 16000 ppm
Exposure time: 6 weeks
Number of exposures: 6 hours/day, 7 days/week
NOEL: 16000 ppm
Test substance: yes
Method: OECD Guideline 422

Propane Species: Monkey
Application Route: Inhalation
Dose: 0, 750 ppm
Exposure time: 90 day
Number of exposures: daily
NOEL: > 750 ppm

n-Pentane Species: Rat, Male and female
Sex: Male and female
Application Route: inhalation (gas)
Dose: 0, 5000, 10,000, 20,000 mg/m3
Exposure time: 13 wk
Number of exposures: 6 h/d, 5 d/wk
NOEL: 20,000 mg/m3
Method: OECD Test Guideline 413

Isopentane Species: Rat, male and female
Sex: male and female
Application Route: Inhalation
Dose: 668, 2220, 6646 ppm

	Exposure time: 13 wk Number of exposures: 6 h/d, 5 d/wk NOEL: > 2220 ppm Lowest observable effect level: > = 6646 ppm Method: OECD Guideline 413 Target Organs: Kidney Information given is based on data obtained from similar substances.
n-Butane	Species: Rat, Male and female Sex: Male and female Application Route: Inhalation Dose: 0, 1017, 4489 ppm Exposure time: 90 day Number of exposures: 6 hr/d, 5 d/wk NOEL: 4489 ppm
n-hexane	Species: Rat, male Sex: male Application Route: Inhalation Dose: 3,000 ppm Exposure time: 16 wks Number of exposures: 12 h/d Lowest observable effect level: 3,000 ppm Target Organs: Peripheral nervous system Species: Mouse, female Sex: female Application Route: Inhalation Dose: 500, 1,000, 4,000, 10,000 ppm Exposure time: 13 wks Number of exposures: 6h or 22h (1,000 ppm)/ 5d/wk Lowest observable effect level: 500 ppm Target Organs: Nose Species: Mouse, male Sex: male Application Route: Inhalation Dose: 500, 1,000, 4000, 10,000 ppm Exposure time: 13 wks Number of exposures: 6h or 22h (1,000 ppm)/d, 5d/wk NOEL: 500 ppm Lowest observable effect level: 1,000 ppm Target Organs: Nose Species: Rat, male Sex: male Application Route: oral gavage Dose: 568, 1,135, 3,973 mg/kg bw/day Exposure time: 90 or 120 days Number of exposures: Daily or 5d/wk (120-d study) NOEL: 568 mg/kg bw/day Lowest observable effect level: 1135 mg/kg bw/day
Benzene	Species: Rat, female Sex: female Application Route: oral gavage Dose: 0, 25, 50, 100 mg/kg Exposure time: 103 wk Number of exposures: 5 d/wk

NOEL: < 25 mg/kg
Lowest observable effect level: 25 mg/kg

Species: Rat, male
Sex: male
Application Route: oral gavage
Dose: 0, 50, 100, 200 mg/kg
Exposure time: 103 wk
Number of exposures: 5 d/wk
NOEL: < 50 mg/kg
Lowest observable effect level: 50 mg/kg

Species: Mouse
Application Route: oral gavage
Dose: 0, 25, 50,100 mg/kg
Exposure time: 103 wk
NOEL: < 25 mg/kg

Genotoxicity in vitro

Propane	:	Test Type: Ames test Result: negative
n-Pentane		Test Type: Ames test Metabolic activation: with and without metabolic activation Result: negative Test Type: Chromosome aberration test in vitro Metabolic activation: with and without metabolic activation Result: Ambiguous
Isopentane		Test Type: Ames test Concentration: 1, 2, 5, 8, 10% Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 471 Result: negative

Test Type: Ames test
Concentration: 1, 2, 5, 8, 10, 25, 50%
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Remarks: Information given is based on data obtained from similar substances.

Test Type: Chromosome aberration test in vitro
Metabolic activation: with and without metabolic activation
Method: Mutagenicity (in vitro mammalian cytogenetic test)
Result: negative
Remarks: Information given is based on data obtained from similar substances.

Test Type: In vitro mammalian cell gene mutation test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Remarks: Information given is based on data obtained from similar substances.

n-Butane
Test Type: Ames test
Result: negative

Isobutane
Test Type: Ames test
Result: negative

n-hexane
Test Type: Ames test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: Mouse lymphoma assay
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Test Type: Mouse lymphoma assay
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: Positive results were obtained in some in vitro tests.

Benzene
Test Type: Ames test
Result: negative

Test Type: Cytogenetic assay
Result: positive

Test Type: Mouse lymphoma assay
Result: positive

Test Type: Sister Chromatid Exchange Assay
Result: negative

Genotoxicity in vivo

n-Pentane : Test Type: Micronucleus test
Species: Rat

	Cell type: Bone marrow Result: negative
Isopentane	Test Type: In vivo micronucleus test Species: Rat Cell type: Bone marrow Route of Application: inhalation (vapor) Exposure time: 13 wk Dose: 5000, 10,000, 20,000 mg/m3 Method: Directive 67/548/EEC, Annex V, B.12. Remarks: Information given is based on data obtained from similar substances.
n-hexane	Test Type: Dominant lethal assay Species: Mouse Dose: 100 and 400 ppm Result: negative Test Type: Cytogenetic assay Species: Rat Dose: 900, 3000, 9000 ppm Result: negative
Benzene	Test Type: Mouse micronucleus assay Result: positive

Carcinogenicity

n-hexane	:	Species: Rat Dose: 0.043, 900, 3,000, 9,016 ppm Exposure time: 2 yrs Number of exposures: 6 h/d, 5 d/wk Remarks: No evidence of carcinogenicity, Information given is based on data obtained from similar substances. Species: Mouse Sex: male and female Dose: 0.039, 900, 3,000, 9,018 ppm Exposure time: 2 yrs Number of exposures: 6 h/d, 5 d/wk Remarks: No evidence of carcinogenicity, Information given is based on data obtained from similar substances.
Benzene		Species: Rat Sex: female Dose: 0, 25, 50, 250 mg/kg Exposure time: 103 wks Number of exposures: daily, 5 days/week Test substance: yes Remarks: zymbal gland carcinomas, squamous cell papillomas

Species: Rat
Sex: male
Dose: 0, 50, 100, 200 mg/kg
Exposure time: 103 wks
Number of exposures: daily, 5 days/week
Test substance: yes
Remarks: zymbal gland carcinomas, squamous cell papillomas

Species: Mouse
Sex: male and female
Dose: 25, 50, 100 mg/kg
Exposure time: 103 wks
Number of exposures: daily, 5 days/week
Test substance: yes
Remarks: Clear evidence of multiple organ carcinogenicity.

Reproductive toxicity

Ethane : Species: Rat
Sex: male and female
Application Route: Inhalation
Dose: 0, 1600, 5000, 16000 ppm
Exposure time: 6 weeks
Number of exposures: 6 hours/day, 7 days/week
Test period: 6 weeks
Test substance: yes
Method: OECD Guideline 422
NOAEL Parent: 16000 ppm
NOAEL F1: 16000 ppm
no abnormalities observed

Propane Species: Rat
Sex: male and female
Application Route: Inhalation
Dose: 0, 1200, 4000, 12000 ppm
Exposure time: 6 weeks
Number of exposures: 6 hours/day, 7 days/week
Test period: 6 weeks
Test substance: yes
Method: OECD Guideline 422
NOAEL Parent: 12000 ppm
NOAEL F1: 12000 ppm

n-Pentane Species: Rat
Sex: male
Application Route: Inhalation
Dose: 0, 5, 10, 20 mg/l
Exposure time: 13 wk
Test period: 6hrs/day, 5 days/wk
NOAEL Parent: 20 mg/l
no abnormalities observed

	Species: Rat Sex: female Application Route: Inhalation Dose: 0, 5, 10, 20 mg/l Exposure time: 13 wk Test period: 6hrs/day, 5days/wk NOAEL Parent: 20 mg/l no abnormalities observed
Isopentane	Species: Rat Sex: male and female Application Route: inhalation (vapor) Dose: 0, 500, 2000, 7000 ppm Number of exposures: 6 h/d 5 d/wk Method: OECD Test Guideline 416 NOAEL Parent: 7000 ppm NOAEL F1: 2000 ppm NOAEL F2: 2000 ppm Information given is based on data obtained from similar substances. Reduced fetal weight.
n-hexane	Species: Rat Sex: male Application Route: Inhalation Dose: 5,000 ppm Number of exposures: 16 hr/d, 6 d/wk Test period: 6 wks permanent testicular damage characterized by loss of germ-cell line

Developmental Toxicity

n-Pentane	:	Species: Rat Application Route: Inhalation Dose: 0, 1000, 3000, 10000 ppm Number of exposures: 6 h/d Test period: GD 6-15 NOAEL Teratogenicity: 10,000 ppm
Isopentane		Species: Rat Application Route: oral gavage Dose: 0, 100, 500, 1000 mg/kg/d Exposure time: GD 6-15 Number of exposures: daily Method: OECD Guideline 414 NOAEL Teratogenicity: 1,000 mg/kg NOAEL Maternal: 1,000 mg/kg Information given is based on data obtained from similar substances.

	Species: Rat Application Route: Inhalation Dose: 0, 500, 2000, 7000 ppm Exposure time: GD 6-15 Number of exposures: 5 d/wk Method: OECD Guideline 414 NOAEL Teratogenicity: 7000 ppm NOAEL Maternal: 500 - 2000 ppm Information given is based on data obtained from similar substances. Species: Rabbit Application Route: Inhalation Dose: 0, 500, 2000, 7000 ppm Exposure time: GD 6-18 Method: OECD Guideline 414 NOAEL Teratogenicity: 7000 ppm NOAEL Maternal: 7000 ppm Information given is based on data obtained from similar substances.
n-hexane	Species: Rat Application Route: Inhalation Dose: 200, 1,000, 5,000 ppm Number of exposures: 20 hr/d, daily Test period: GD 6-20 NOAEL Teratogenicity: 200 ppm NOAEL Maternal: 200 ppm Species: Mouse Application Route: Inhalation Dose: 200, 1,000, 5,000 ppm Number of exposures: 20 hr/d, daily Test period: GD 6-17 NOAEL Maternal: 1,000 ppm

Raw Natural Gas Liquids (Raw NGL)

Aspiration toxicity : May be fatal if swallowed and enters airways.

CMR effects

Natural gas (petroleum), raw liq. mix	: Carcinogenicity: Possible human carcinogen Mutagenicity: In vivo tests showed mutagenic effects Teratogenicity: Not available Reproductive toxicity: Not available
Ethane	Carcinogenicity: Weight of evidence does not support classification as a carcinogen Mutagenicity: In vitro tests did not show mutagenic effects Teratogenicity: No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments. Reproductive toxicity: Weight of evidence does not support classification for reproductive toxicity
Propane	Carcinogenicity: Weight of evidence does not support classification as a carcinogen Mutagenicity: In vitro tests did not show mutagenic effects Teratogenicity: No evidence of adverse effects on sexual

	function and fertility, or on development, based on animal experiments. Reproductive toxicity: Weight of evidence does not support classification for reproductive toxicity
Isopentane	Carcinogenicity: Not available Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects., In vivo tests did not show mutagenic effects Teratogenicity: Animal testing did not show any effects on fetal development. Reproductive toxicity: Animal testing did not show any effects on fertility.
n-Butane	Carcinogenicity: Weight of evidence does not support classification as a carcinogen Mutagenicity: Weight of evidence does not support classification as a germ cell mutagen. Teratogenicity: Not available Reproductive toxicity: Weight of evidence does not support classification for reproductive toxicity
n-hexane	Carcinogenicity: Not classifiable as a human carcinogen. Mutagenicity: Did not show mutagenic effects in animal experiments. Teratogenicity: Animal testing did not show any effects on fetal development. Reproductive toxicity: Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.
Benzene	Carcinogenicity: Human carcinogen. Mutagenicity: In vivo tests showed mutagenic effects Teratogenicity: Did not show teratogenic effects in animal experiments. Reproductive toxicity: Animal testing did not show any effects on fertility.

Raw Natural Gas Liquids (Raw NGL)

Further information : Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Concentrations substantially above the TLV value may cause narcotic effects. Solvents may degrease the skin.

SECTION 12: Ecological information

Ecotoxicity effects

Toxicity to fish

n-Pentane	: LC50: 4.3 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout) semi-static test
Isopentane	LC50: 4.26 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout) semi-static test Method: OECD Test Guideline 203

	Information given is based on data obtained from similar substances.
n-hexane	LL50: 12.51 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout) Method: QSAR modeled data
Benzene	LC50: 5.3 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout) flow-through test Test substance: yes Method: OECD Test Guideline 203
Carbon Dioxide	35 mg/l Exposure time: 96 h Species: Salmo gairdneri (Rainbow trout)

Toxicity to daphnia and other aquatic invertebrates

n-Pentane	:	EC50: 2.7 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) static test
Isopentane		EC50: 2.3 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) static test Method: OECD Test Guideline 202
n-hexane		EL50: 21.85 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) Method: QSAR modeled data
Hydrogen Sulfide		EC50: 0.12 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) static test Analytical monitoring: yes Test substance: yes Method: OECD Test Guideline 202
Benzene		EC50: 10 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) static test Test substance: yes Method: OECD Test Guideline 202

Toxicity to algae

n-Pentane	:	EbC50: 10.7 mg/l Exposure time: 72 h Species: Pseudokirchneriella subcapitata (green algae) static test
Isopentane		EC50: 7.51 mg/l Exposure time: 72 h Species: Scenedesmus capricornutum (fresh water algae) Growth inhibition Method: OECD Test Guideline 201 Information given is based on data obtained from similar

substances.

n-hexane	EL50: 9.29 mg/l Exposure time: 72 h Species: Pseudokirchneriella subcapitata (green algae) Method: QSAR modeled data
Hydrogen Sulfide	EC50: 1.87 mg/l Exposure time: 24 h Species: Selenastrum capricornutum (algae) static test Test substance: yes
Benzene	ErC50: 100 mg/l Exposure time: 72 h Species: Pseudokirchneriella subcapitata (green algae) Test substance: yes Method: OECD Test Guideline 201

Biodegradability : This material is not expected to be readily biodegradable.

Elimination information (persistence and degradability)

Bioaccumulation

Ethane	:	This material is not expected to bioaccumulate.
Propane	:	This material is not expected to bioaccumulate.
n-Pentane	:	Bioconcentration factor (BCF): 171 Method: QSAR modeled data This material is not expected to bioaccumulate.
Isopentane	:	Accumulation in aquatic organisms is unlikely.
n-Butane	:	This material is not expected to bioaccumulate.
n-hexane	:	Bioconcentration factor (BCF): 501 Does not significantly accumulate in organisms.
Hydrogen Sulfide	:	This material is not expected to bioaccumulate.
Benzene	:	Bioconcentration factor (BCF): 13

Mobility	:	No data available
Results of PBT assessment	:	This substance is not considered to be persistent, bioaccumulating and toxic (PBT).
Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Toxic to aquatic life with long lasting effects.

Ecotoxicology Assessment

Short-term (acute) aquatic hazard	:	Toxic to aquatic life.
Long-term (chronic) aquatic	:	Toxic to aquatic life with long lasting effects.

hazard

Toxicity Data on Soil	:	No data available
Other organisms relevant to the environment	:	No data available
Impact on Sewage Treatment	:	No data available

SECTION 13: Disposal considerations

The information in this SDS 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.

SECTION 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 SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (ETHANE, PROPANE), 2.1, MARINE POLLUTANT, (N-HEXANE), RQ (N-HEXANE, BENZENE)
NON- ODORIZED

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (ETHANE, PROPANE), 2.1, (-135 °C c.c.), MARINE POLLUTANT, (N-PENTANE, N-HEXANE)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (ETHANE, PROPANE), 2.1

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (ETHANE, PROPANE), 2.1, (B/D), ENVIRONMENTALLY HAZARDOUS, (N-PENTANE, N-HEXANE)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))

23,UN1965,HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (ETHANE, PROPANE), 2.1, ENVIRONMENTALLY HAZARDOUS, (N-PENTANE, N-HEXANE)

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)

UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (ETHANE, PROPANE), 2.1, ENVIRONMENTALLY HAZARDOUS, (N-PENTANE, N-HEXANE)

Maritime transport in bulk according to IMO instruments

SECTION 15: Regulatory information

National legislation

SARA 311/312 Hazards : Flammable (gases, aerosols, liquids, or solids)
Gases under pressure
Acute toxicity (any route of exposure)
Germ cell mutagenicity
Carcinogenicity
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)
Aspiration hazard
Skin corrosion or irritation

EPCRA - EMERGENCY PLANNING COMMUNITY RIGHT - TO – KNOW

CERCLA Reportable Quantity : 200 lbs

Benzene

SARA 302 Reportable Quantity : Calculated RQ exceeds reasonably attainable upper limit.

Hydrogen Sulfide

SARA 302 Threshold Planning Quantity : The following components are subject to reporting levels established by SARA Title III, Section 302:

Hydrogen Sulfide 7783-06-4 500 lbs

SARA 304 Reportable Quantity : Calculated RQ exceeds reasonably attainable upper limit.

Hydrogen Sulfide 7783-06-4 100 lbs

SARA 313 Components : The following components are subject to reporting levels established by SARA Title III, Section 313:

: n-hexane - 110-54-3
Benzene - 71-43-2

Clean Air Act

Ozone-Depletion Potential : This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 112 (40 CFR 61):
: n-hexane - 110-54-3
Benzene - 71-43-2

The following chemical(s) are listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F):
: Ethane - 74-84-0
Propane - 74-98-6
Isopentane - 78-78-4
n-Pentane - 109-66-0
n-Butane - 106-97-8
Isobutane - 75-28-5
Methane - 74-82-8

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):
: Isopentane - 78-78-4
n-Pentane - 109-66-0
Benzene - 71-43-2

US State Regulations

Pennsylvania Right To Know
: Natural gas (petroleum), raw liq. mix - 64741-48-6
Ethane - 74-84-0
Propane - 74-98-6
n-hexane - 110-54-3
Isopentane - 78-78-4
n-Pentane - 109-66-0
n-Butane - 106-97-8
Isobutane - 75-28-5
Benzene - 71-43-2
Carbon Dioxide - 124-38-9
Methane - 74-82-8
Hydrogen Sulfide - 7783-06-4

California Prop. 65 Components	:	WARNING: This product can expose you to chemicals including [listed below], which is [are] known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov/food.

Benzene	71-43-2

WARNING: This product can expose you to chemicals including [listed below], which is [are] known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

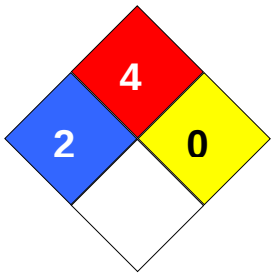
n-hexane	110-54-3
Benzene	71-43-2

Notification status

Europe REACH	:	Not in compliance with the inventory
Switzerland CH INV	:	On the inventory, or in compliance with the inventory
United States of America (USA) TSCA	:	On or in compliance with the active portion of the TSCA inventory
Canada DSL	:	All components of this product are on the Canadian DSL
Other AIIC	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	Not in compliance with the inventory
Japan ENCS	:	Not in compliance with the inventory
Korea KECI	:	Not in compliance with the inventory
Philippines PICCS	:	Not in compliance with the inventory
Taiwan TCSI	:	Not in compliance with the inventory
Korea KECI	:	Not in compliance with the inventory
China IECSC	:	Not in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 2
Fire Hazard: 4
Reactivity Hazard: 0



Further information

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

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

The information provided in this 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	Philippines 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 Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%	ATE	Acute toxicity estimate