

AlphaPlus® 1-Butene

Version 2.5

Revision Date 2016-05-26

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

Product Name : AlphaPlus® 1-Butene
Material : 1036988, 1015419, 1037080, 1037081

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
1-Butene	106-98-9 203-449-2 601-012-00-4	Chevron Phillips Chemical Company LP 01-2119456615-34-0003

Relevant Identified Uses : Manufacture
Supported Manufacture and use as an intermediate

Company : Chevron Phillips Chemical Company LP
Normal Alpha Olefins (NAO)
10001 Six Pines Drive
The Woodlands, TX 77380

Local : Chevron Phillips Chemicals International N.V.
Airport Plaza (Stockholm Building)
Leonardo Da Vincilaan 19
1831 Diegem
Belgium

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

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: +800 CHEMCALL (+800 2436 2255) China:+86-21-22157316

EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

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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 : SDS@CPChem.com
 Website : www.CPChem.com

SECTION 2: Hazards identification
Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Flammable gases, Category 1 H220:
Extremely flammable gas.
 Gases under pressure, Compressed gas H280:
Contains gas under pressure; may explode if heated.

Label elements**Labeling (REGULATION (EC) No 1272/2008)**

Hazard pictograms :



Signal Word : Danger

Hazard Statements : H220 Extremely flammable gas.
 H280 Contains gas under pressure; may explode if heated.

Precautionary Statements : **Prevention:**
 P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Response:
 P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 P381 Eliminate all ignition sources if safe to do so.
Storage:
 P410 + P403 Protect from sunlight. Store in a well-ventilated place.

SECTION 3: Composition/information on ingredients

Synonyms : Ethylethylene
 1-Butylene
 Alpha-butene
 Butene-1 (C4)
 Alpha-Butylene
 C4H8

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Molecular formula : C₄H₈**Mixtures****Hazardous ingredients**

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]
1-Butene	106-98-9 203-449-2 601-012-00-4	Flam. Gas 1; H220 Press. Gas Compr. Gas; H280	95 - 99
n-Butane	106-97-8 203-448-7 601-004-00-0	Flam. Gas 1; H220 Press. Gas Liquefied gas; H280 Press. Gas Compr. Gas; H280	0 - 1

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

SECTION 4: First aid measures

- General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Do not leave the victim unattended.
- If inhaled : If unconscious place in recovery position and seek medical advice. If symptoms persist, call a physician.
- 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. Keep respiratory tract clear. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: Firefighting measures

- Flash point : -80 °C (-112 °F)
- Autoignition temperature : 383,89 °C (723,00 °F)
- Suitable extinguishing media : Alcohol-resistant foam. Carbon dioxide (CO₂). Dry chemical.
- Unsuitable extinguishing media : High volume water jet.
- Special protective equipment for fire-fighters : Wear self-contained breathing apparatus for firefighting if necessary.
- Further information : For safety reasons in case of fire, cans should be stored

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- 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. 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.
- Hazardous decomposition products : Carbon oxides.

SECTION 6: Accidental release measures

- Personal precautions : 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.

SECTION 7: Handling and storage**Handling**

- Advice on safe handling : 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. Container may be opened only under exhaust ventilation hood. 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 an open flame or any other 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 areas and containers : Prevent unauthorized access. No smoking. Keep container tightly closed in a dry and well-ventilated place. 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**

SI

Sestavine	Osnova	Vrednost	Parametri nadzora	Pripomba
n-Butane	SI OEL	MV	1.000 ppm, 2.400 mg/m3	

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PT

Componentes	Bases	Valor	Parâmetros de controle	Nota
1-Butene	PT OEL	VLE-MP	1.000 ppm,	afeção do SNC,
n-Butane	PT OEL	VLE_CD	1.000 ppm,	afeção do SNC,

afeção do SNC afeção do sistema nervoso central

PL

Składniki	Podstawa	Wartość	Parametry dotyczące kontroli	Uwaga
n-Butane	PL NDS	NDS	1.900 mg/m3	
	PL NDS	NDSch	3.000 mg/m3	

NO

Komponenter	Grunnlag	Verdi	Kontrollparametere	Nota
n-Butane	FOR-2011-12-06-1358	TWA	250 ppm, 600 mg/m3	

MK

Съставки	Основа	Стойност	Параметри на контрол	Бележка
n-Butane	MK OEL	MV	1.000 ppm, 2.400 mg/m3	

LV

Sastāvdaļas	Bāze	Vērtība	Pārvaldības parametri	Piezīme
n-Butane	LV OEL	AER 8 st	300 mg/m3	

IS

Komponenter	Grunnlag	Verdi	Kontrollparametere	Nota
n-Butane	IS OEL	TWA	500 ppm, 1.200 mg/m3	

IE

Ingredients	Basis	Value	Control parameters	Note
n-Butane	IE OEL	OELV - 8 hrs (TWA)	1.000 ppm,	

HU

Komponensek	Bázis	Érték	Ellenőrzési paraméterek	Megjegyzés
n-Butane	HU OEL	AK-érték	2.350 mg/m3	
	HU OEL	CK-érték	9.400 mg/m3	

HR

Sastojci	Temelj	Vrijednost	Nadzorni parametri	Bilješka
n-Butane	HR OEL	GVI	600 ppm, 1.450 mg/m3	F+,
	HR OEL	STEL	750 ppm, 1.810 mg/m3	F+,
	HR OEL	GVI	10 ppm, 22 mg/m3	1, 2, T, F+,

- 1 Karc. kat. 1: tvari za koje je dokazano da su karcinogene za ljude
 2 Muta. kat. 2: tvari koje su vjerojatno mutagene za ljude
 F+ Vrlo lako zapaljivo
 T Otrovno

GR

Συστατικά	Βάση	Τιμή	Παράμετροι ελέγχου	Σημείωση
n-Butane	GR OEL	TWA	1.000 ppm, 2.350 mg/m3	

GB

Ingredients	Basis	Value	Control parameters	Note
n-Butane	GB EH40	TWA	600 ppm, 1.450 mg/m3	Carc,
	GB EH40	STEL	750 ppm, 1.810 mg/m3	Carc,

Carc Capable of causing cancer and/or heritable genetic damage. The identified substances include those which: - are assigned the risk phrases 'R45: May cause cancer'; 'R46: may cause heritable genetic damage'; 'R49: May cause cancer by inhalation' or - a substance or process listed in Schedule 1 of COSHH.

FR

Composants	Base	Valeur	Paramètres de contrôle	Note
n-Butane	FR VLE	VME	800 ppm, 1.900 mg/m3	normal,

normal Valeurs limites indicatives

FI

Aineosat	Peruste	Arvo	Valvontaa koskevat muuttujat	Huomautus
n-Butane	FI OEL	HTP-arvot 8h	800 ppm, 1.900 mg/m3	Liite 4,
	FI OEL	HTP-arvot 15 min	1.000 ppm, 2.400 mg/m3	Liite 4,

Liite 4 Happea syrjäyttämällä tukehduttavat kaasut

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ES

Componentes	Base	Valor	Parámetros de control	Nota
1-Butene	ES VLA	VLA-ED	1.000 ppm,	gas
n-Butane	ES VLA	VLA-ED	1.000 ppm,	gas

EE

Komponendid, osad	Alused	Väärtus	Kontrolliparameetrid	Märkused
n-Butane	EE OEL	Piimorm	800 ppm, 1.500 mg/m3	

DK

Komponenter	Basis	Værdi	Kontrolparametre	Note
n-Butane	DK OEL	GV	500 ppm, 1.200 mg/m3	

DE

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
n-Butane	DE TRGS 900	AGW	1.000 ppm, 2.400 mg/m3	DFG,

DFG Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission)

CH

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
n-Butane	CH SUVA	MAK-Wert	800 ppm, 1.900 mg/m3	
	CH SUVA	MAK-Wert	800 ppm, 1.900 mg/m3	
	CH SUVA	KZGW	3.200 ppm, 7.200 mg/m3	

BG

Съставки	Основа	Стойност	Параметри на контрол	Бележка
n-Butane	BG OEL	TWA	1.900 mg/m3	

BE

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
1-Butene	BE OEL	TGG 8 hr	250 ppm, 583 mg/m3	
n-Butane	BE OEL	TGG 8 hr	1.000 ppm,	
	BE OEL	TGG 8 hr	1.000 ppm,	gas

AT

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
n-Butane	AT OEL	TMW	800 ppm, 1.900 mg/m3	
	AT OEL	KZW	1.600 ppm, 3.800 mg/m3	

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Local effects
Value: 1530 mg/m3

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Systemic effects
Value: 769 mg/m3

Engineering measures

Adequate ventilation to control airborne 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 : Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to

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maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, 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 : Wash hands before breaks and at the end of workday.

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

SECTION 9: Physical and chemical properties**Information on basic physical and chemical properties****Appearance**

Form : Compressed gas
Physical state : Gaseous
Color : Colorless

Safety data

Flash point : -80 °C (-112 °F)

Lower explosion limit : 1,6 %(V)

Upper explosion limit : 9,3 %(V)

Oxidizing properties : no

Autoignition temperature : 383,89 °C (723,00 °F)

Molecular formula : C₄H₈

Molecular weight : 56,12 g/mol

pH : Not applicable

Freezing point : -185 °C (-301 °F)

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Pour point	No data available
Boiling point/boiling range	: -6,26 °C (20,73 °F)
Vapor pressure	: 1.895,00 MMHG at 20 °C (68 °F)
Relative density	: 0,6 at 15,6 °C (60,1 °F)
Density	: 600,3 g/l
Water solubility	: Soluble in hydrocarbon solvents; insoluble in water.
Partition coefficient: n-octanol/water	: No data available
Viscosity, kinematic	: No data available
Relative vapor density	: 1,93 (Air = 1.0)
Evaporation rate	: No data available
Percent volatile	: > 99 %

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.
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Possibility of hazardous reactions

Conditions to avoid	: Heat, sparks, fire, and oxidizing agents.
Materials to avoid	: May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous decomposition products	: Carbon oxides
Other data	: No decomposition if stored and applied as directed.

SECTION 11: Toxicological information**Acute oral toxicity**

1-Butene	: Not applicable
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Acute inhalation toxicity

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n-Butane : LC50: 658 mg/l
Exposure time: 4 h
Species: Rat
Test atmosphere: vapor

Acute dermal toxicity

1-Butene :
No data available

Skin irritation

1-Butene : No skin irritation
Rapid evaporation of the liquid may cause frostbite.

Eye irritation

1-Butene : No eye irritation

Sensitization

1-Butene : No data available.

Repeated dose toxicity

1-Butene : Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 0, 500, 2000, 8000 ppm
Exposure time: 28 d
Number of exposures: 6 hr/d, 7 d/wk
NOEL: 8000 ppm
Method: OECD Guideline 422
No adverse effect has been observed in chronic toxicity tests.

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

Carcinogenicity

1-Butene : Species: Rat
Sex: male
Dose: 0, 500, 2000, 8000 ppm
Exposure time: 2 years
Number of exposures: 6 hr/d, 5 d/wk
Remarks: increased incidence of thyroid tumors, Information given is based on data obtained from similar substances.

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Species: Rat
Sex: female
Dose: 0, 500, 2000, 8000 ppm
Exposure time: 2 years
Number of exposures: 6 hr/d, 5 d/wk
Remarks: no increase incidence of tumors, Information given is based on data obtained from similar substances.

Species: Mouse
Sex: male
Dose: 0, 500, 2000, 8000 ppm
Exposure time: 2 years
Number of exposures: 6 hr/d, 5 d/wk
Remarks: no increase incidence of tumors, Information given is based on data obtained from similar substances.

Species: Mouse
Sex: female
Dose: 0, 500, 2000, 8000 ppm
Exposure time: 2 years
Number of exposures: 6 hr/d, 5 d/wk
Remarks: no increase incidence of tumors, Information given is based on data obtained from similar substances.

Reproductive toxicity

1-Butene : Species: Rat
Sex: male and female
Application Route: Inhalation
Dose: 0, 500, 2000, 8000 ppm
Method: OECD Guideline 422
NOAEL Parent: 8000 ppm
NOAEL F1: 8000 ppm

CMR effects

1-Butene : Carcinogenicity: Not classifiable as a human carcinogen.
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: Animal testing did not show any effects on fertility.

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Further information**

: No data available.

SECTION 12: Ecological information

Elimination information (persistence and degradability)

Biodegradability : This material is expected to be readily biodegradable.

Ecotoxicology Assessment

Results of PBT assessment : This substance/mixture contains no components considered

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to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

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 : Do not dispose of waste into sewer. 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

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)

UN1012, BUTYLENE, 2.1
NON- ODORIZED

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)

UN1012, BUTYLENE, 2.1, (-80 °C)
NON- ODORIZED

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)

UN1012, BUTYLENE, 2.1
NON- ODORIZED

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))

UN1012, 1-BUTYLENE, 2.1, (B/D)
NON- ODORIZED

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF

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DANGEROUS GOODS (EUROPE))UN1012, 1-BUTYLENE, 2.1
NON- ODORIZED**ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE
OF DANGEROUS GOODS BY INLAND WATERWAYS)**UN1012, 1-BUTYLENE, 2.1
NON- ODORIZED

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

SECTION 15: Regulatory information**National legislation****Chemical Safety Assessment**

Ingredients : but-1-ene A Chemical Safety Assessment 203-449-2
has been carried out for this
substance.

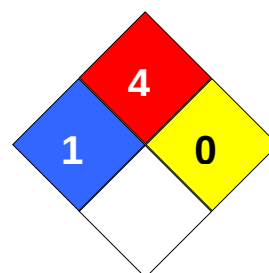
Major Accident Hazard : 96/82/EC Update: 2003
Legislation Extremely flammable
8
Quantity 1: 10 t
Quantity 2: 50 t

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
United States of America 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

SECTION 16: Other information

NFPA Classification : Health Hazard: 1
Fire Hazard: 4
Reactivity Hazard: 0



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Further information

Legacy SDS Number : PE0015

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%		

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

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H220

Extremely flammable gas.

H280

Contains gas under pressure; may explode if heated.

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Annex**1. Short title of Exposure Scenario: Manufacture**

Main User Groups	:	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	SU8, SU9: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
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) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises 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 PROC15: Use as laboratory reagent
Environmental release category	:	ERC1, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles
Further information	:	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC1, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles

Technical conditions and measures / Organizational measures

Remarks : Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large

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containers at dedicated facilities, Use as laboratory reagent**Amount used**

Remarks : Not applicable

3. Exposure estimation and reference to its source

Remarks: Not applicable

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

Not applicable

1. Short title of Exposure Scenario: Manufacture and use as an intermediate

Main User Groups	:	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	SU8, SU9: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
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) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises 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 PROC15: Use as laboratory reagent
Environmental release category	:	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)
Further information	:	Use as an isolated intermediate under strictly controlled conditions

2.1 Contributing scenario controlling environmental exposure for:ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)**Technical conditions and measures / Organizational measures**

AlphaPlus® 1-Butene

Version 2.5

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Remarks : Not applicable

2.2 Contributing scenario controlling worker exposure for: , PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Use as laboratory reagent

Amount used

Remarks : Not applicable

3. Exposure estimation and reference to its source

Remarks: Not applicable

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

Not applicable