1-Hexene (C6H12)

Version 8.5 Revision Date 2023-01-25

According to Regulation (EC) No. 1907/2006, Regulation (EC) No. 2020/878

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

1.1 Product identifier

Product information

Product Name : 1-Hexene (C6H12)
Material : 10576539

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
1-Hexene	592-41-6 209-753-1	Qatar Chemical Company LTD (Q-Chem) 01-2119475505-34-0002
1-Hexene	592-41-6 209-753-1	Qatar Chemical Company LTD (Q-Chem) 01-2119475505-34-0003

1.2

Relevant identified uses of the substance or mixture and uses advised against

Relevant Identified Uses Supported : Manufacture
Use as an intermediate
Formulation
Lubricants - Industrial
Lubricants - Professional
Lubricants - Consumer
Metal working fluids / rolling oils - Industrial
Metal working fluids / rolling oils – Professional
Use as a fuel - industrial
Use as a fuel – professional
Functional Fluids - Industrial
Functional Fluids - Professional
Use in polymer production – industrial

1.3

Details of the supplier of the safety data sheet

Company : Qatar Chemical Company LTD (QChem)
Amwal Tower, Omar Al Mukhtar St,
Al-Dafna (Zone 61)
PO Box 24646
Doha, Qatar

SDS Requests: (+974) 4484-7110
Technical Information: (+974) 4476-7145
Responsible Party: Product Safety Group
Email: MSDSInquiry@qchem.com.qa

Local : Muntajat B.V. (MBV OR)
19th Floor, Tower E, WTC The Hague
Prinses Margrietplantsoen 78-A, 2595 BR
The Hague, the Netherlands.
Tel: +31702055630
Email: info.netherlands@muntajatbv.com

1.4

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

2.1

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Flammable liquids, Category 2	H225: Highly flammable liquid and vapor.
Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters airways.

2.2

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.

Precautionary Statements :

Prevention:

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.

Response:

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Hazardous ingredients which must be listed on the label:

- 592-41-6 1-Hexene
- 760-21-4 2-Ethyl-1-Butene

2.3

Other hazards

Results of PBT and vPvB assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 - 3.2
Substance or Mixture

Synonyms : alpha-Hexene
Hexene-1
Hex-1-ene
Hexylene
NAO 6
Butyl Ethylene
C6H12

Molecular formula : C6H12

Hazardous ingredients

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]	Specific Conc. Limits, M-factors and ATEs
1-Hexene	**592-41-6** **209-753-1**	Flam. Liq. 2; H225 Asp. Tox. 1; H304	99 - 100	
2-Ethyl-1-Butene	760-21-4 212-078-5	Flam. Liq. 2; H225 STOT SE 3; H336 Asp. Tox. 1; H304	0 - 1	

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

SECTION 4: First aid measures

4.1
Description of 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 : If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.

In case of skin contact : 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.

4.2 Most important symptoms and effects, both acute and delayed
Notes to physician

Symptoms : No data available.

Risks : No data available.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment	:	No data available.

SECTION 5: Firefighting measures

Flash point	:	-26°C (-15°F) Method: closed cup
Autoignition temperature	:	272°C (522°F)

5.1

Extinguishing media

Suitable extinguishing media	:	Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.
Unsuitable extinguishing media	:	High volume water jet.

5.2

Special hazards arising from the substance or mixture

Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.

5.3

Advice for firefighters

Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting 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 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

6.1

Personal precautions, protective equipment and emergency procedures

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.

6.2

Environmental precautions

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.

6.3

Methods and materials for containment and cleaning up

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).

6.4

Reference to other sections

Reference to other sections : For personal protection see section 8. For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1

Precautions for safe handling
Handling

Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. 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 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.

7.2

Conditions for safe storage, including any incompatibilities

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.

SECTION 8: Exposure controls/personal protection

8.1

Control parameters
Ingredients with workplace control parameters

PT

Componentes	Bases	Valor	Parâmetros de controlo	Nota
1-Hexene	PT OEL	VLE-MP	50 ppm,	

NL

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
n-Hexane	NL WG	TGG-8 uur	72 mg/m3	
	NL WG	TGG-15 min	144 mg/m3	

MT

Components	Basis	Value	Control parameters	Note
n-hexane	MT OEL	TWA	20 ppm, 72 mg/m3	

IE

Components	Basis	Value	Control parameters	Note
1-Hexene	IE OEL	OELV - 8 hrs (TWA)	50 ppm,	

ES

Componentes	Base	Valor	Parámetros de control	Nota
1-Hexene	ES VLA	VLA-ED	50 ppm,	

EE

Komponendid, osad	Alused	Väärtus	Kontrolliparameetrid	Märkused
n-Hexane	EE OEL	Piirnorm	20 ppm, 72 mg/m3	

CZ

Složky	Základ	Hodnota	Kontrolní parametry	Poznámka
n-Hexane	CZ OEL	PEL	70 mg/m3	I, D,
	CZ OEL	NPK-P	200 mg/m3	I, D,

D Při expozici se významně uplatňuje pronikání faktoru kůží
I dráždí sliznice (oči, dýchací cesty), respektive kůži

CY

Συστατικά	Βάση	Τιμή	Παράμετροι ελέγχου	Σημείωση
n-Hexane	CY OEL	TWA	20 ppm, 72 mg/m3	

BG

Съставки	Основа	Стойност	Параметри на контрол	Бележка
n-Hexane	BG OEL	TWA	20 ppm, 72 mg/m3	

BE

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
1-Hexene	BE OEL	TGG 8 hr	50 ppm, 175 mg/m3	

Biological exposure indices

SK

Názov látky	Č. CAS	Kontrolné parametre	Doba odberu vzorky	Aktualizácia
n-Hexane	110-54-3	2,5-hexándión a 4,5-dihydroxy-2-hexanón: 5 mg/l (moč)	Koniec vystavenia alebo pracovnej zmeny	2011-11-23
		2,5-hexándión a 4,5-dihydroxy-2-hexanón: 20 µmol.l-1 (moč)	Koniec vystavenia alebo pracovnej zmeny	2011-11-23
		2,5-hexándión a 4,5-dihydroxy-2-hexanón: 3 mg/g kreatinínu (moč)	Koniec vystavenia alebo pracovnej zmeny	2011-11-23
		2,5-hexándión a 4,5-dihydroxy-2-hexanón: 1.4 µmol/mmol kreatinínu (moč)	Koniec vystavenia alebo pracovnej zmeny	2011-11-23
		2,5-hexándión a 4,5-dihydroxy-2-hexanón: 5 mg/l (moč)	Koniec vystavenia alebo pracovnej zmeny	2011-11-23
		2,5-hexándión a 4,5-dihydroxy-2-hexanón: 20 µmol.l-1 (moč)	Koniec vystavenia alebo pracovnej zmeny	2011-11-23
		2,5-hexándión a 4,5-dihydroxy-2-hexanón: 3 mg/g kreatinínu (moč)	Koniec vystavenia alebo pracovnej zmeny	2011-11-23
		2,5-hexándión a 4,5-dihydroxy-2-hexanón: 1.4 µmol/mmol kreatinínu (moč)	Koniec vystavenia alebo pracovnej zmeny	2011-11-23

SI

Ime snovi	Št. CAS	Parametri nadzora	Čas vzorčenja	Sprememba
n-Hexane	110-54-3	2,5-heksandion in 4,5-dihidroksi-2-heksanon: 5 mg/l po hidrolizi (Urin)	Ob koncu delovne izmene	2018-12-04
		2,5-heksandion in 4,5-dihidroksi-2-heksanon: 5 mg/l po hidrolizi (Urin)	Ob koncu delovne izmene	2018-12-04

RO

Numele substanţei	Nr. CAS	Parametri de control	Timp de prelevare a probei	Adus la zi
n-Hexane	110-54-3	2,5 hexandionă: 5 mg/g creatinină (Urină)	Sfârşit schimb	2002-11-25
		2,5 hexandionă: 5 mg/g creatinină (Urină)	Sfârşit schimb	2002-11-25

PT

Nome da substância	No. CAS	Parâmetros de controlo	Tempo de amostra	Atualizada em
n-Hexane	110-54-3	2,5-Hexanodiona: 0,4 mg/l Sem hidrólise (Urina)	No final do turno e no final da semana de trabalho	2014-11-14
		2,5-Hexanodiona: 0,4 mg/l Sem hidrólise (Urina)	No final do turno e no final da semana de trabalho	2014-11-14

IT

Denominazione della sostanza	N. CAS	Parametri di controllo	Tempo di campionamento	Aggiornamento

HU

Az anyag megnevezése	CAS szám	Ellenőrzési paraméterek	Mintavétel időpontja	Aktualizálás
n-Hexane	110-54-3	2,5-hexán-dion: 2 mg/l Hidrolízis után (húgyhólyag)	A műszak végén	2020-02-06
		2,5-hexán-dion: 18 µmol/l Hidrolízis után (húgyhólyag)	A műszak végén	2020-02-06
		2,5-hexán-dion: 2 mg/l Hidrolízis után (húgyhólyag)	A műszak végén	2020-02-06
		2,5-hexán-dion: 18 µmol/l Hidrolízis után (húgyhólyag)	A műszak végén	2020-02-06

HR

Naziv tvari	CAS-br.	Nadzorni parametri	Vrijeme uzorkovanja	Ažurirati
n-Hexane	110-54-3	n-heksan: 1.74 µmol/l (Krv)	za vrijeme izloženosti	2018-10-12
		n-heksan: 150 µg/l (Krv)	za vrijeme izloženosti	2018-10-12
		n-heksan: 1.66 µmol/l (krajnje izdahnuti zrak)	za vrijeme izloženosti	2018-10-12
		n-heksan: 40 dijelova na milijun (krajnje izdahnuti zrak)	za vrijeme izloženosti	2018-10-12
		2-heksanol: 0.22 mmol/mol kreatinina Računato na prosječnu vrijednost kreatinina od 1,2 g/L urina. Za sve rezultate koji se izražavaju na kreatinin, koncentracije kreatinina < 0,5 g/L i > 3,0 g/L ne mogu se uzeti u obzir. (Urin) interferencija istodobne izloženosti metil etil-ketonu ()	na kraju radne smjene	2018-10-12

		2-heksanol: 0.2 mg/g kreatinina Računato na prosječnu vrijednost kreatinina od 1,2 g/L urina. Za sve rezultate koji se izražavaju na kreatinin, koncentracije kreatinina < 0,5 g/L i > 3,0 g/L ne mogu se uzeti u obzir. (Urin) interferencija istodobne izloženosti metil etil-ketonu ()	na kraju radne smjene	2018-10-12
		2,5-heksandion: 5.25 mmol/mol kreatinina Računato na prosječnu vrijednost kreatinina od 1,2 g/L urina. Za sve rezultate koji se izražavaju na kreatinin, koncentracije kreatinina < 0,5 g/L i > 3,0 g/L ne mogu se uzeti u obzir. (Urin) interferencija istodobne izloženosti metil etil-ketonu ()	na kraju radne smjene	2018-10-12
		2,5-heksandion: 5.3 mg/g kreatinina Računato na prosječnu vrijednost kreatinina od 1,2 g/L urina. Za sve rezultate koji se izražavaju na kreatinin, koncentracije kreatinina < 0,5 g/L i > 3,0 g/L ne mogu se uzeti u obzir. (Urin) interferencija istodobne izloženosti metil etil-ketonu ()	na kraju radne smjene	2018-10-12
		n-heksan: 1.74 µmol/l (Krv)	za vrijeme izloženosti	2018-10-12
		n-heksan: 150 µg/l (Krv)	za vrijeme izloženosti	2018-10-12
		n-heksan: 1.66 µmol/l (krajnje izdahnuti zrak)	za vrijeme izloženosti	2018-10-12
		n-heksan: 40 dijelova na milijun (krajnje izdahnuti zrak)	za vrijeme izloženosti	2018-10-12
		2-heksanol: 0.22 mmol/mol kreatinina Računato na prosječnu vrijednost kreatinina od 1,2 g/L urina. Za sve rezultate koji se izražavaju na kreatinin, koncentracije kreatinina < 0,5 g/L i > 3,0 g/L ne mogu se uzeti u obzir. (Urin) interferencija istodobne izloženosti metil etil-ketonu ()	na kraju radne smjene	2018-10-12
		2-heksanol: 0.2 mg/g kreatinina Računato na prosječnu vrijednost kreatinina od 1,2 g/L urina. Za sve rezultate koji se izražavaju na kreatinin, koncentracije kreatinina < 0,5 g/L i > 3,0 g/L ne mogu se uzeti u obzir. (Urin) interferencija istodobne izloženosti metil etil-ketonu ()	na kraju radne smjene	2018-10-12
		2,5-heksandion: 5.25 mmol/mol kreatinina Računato na prosječnu vrijednost kreatinina od 1,2 g/L urina. Za sve rezultate koji se izražavaju na kreatinin, koncentracije kreatinina < 0,5 g/L i > 3,0 g/L ne mogu se uzeti u obzir. (Urin) interferencija istodobne izloženosti metil etil-ketonu ()	na kraju radne smjene	2018-10-12
		2,5-heksandion: 5.3 mg/g kreatinina Računato na prosječnu vrijednost kreatinina od 1,2 g/L urina. Za sve rezultate koji se izražavaju na kreatinin, koncentracije kreatinina < 0,5 g/L i > 3,0 g/L ne mogu se uzeti u obzir. (Urin) interferencija istodobne izloženosti metil etil-ketonu ()	na kraju radne smjene	2018-10-12

ES

Nombre de la sustancia	No. CAS	Parámetros de control	Hora de muestreo	Puesto al día

n-Hexane	110-54-3	2,5-hexanodiona: 0,2 mg/l 2,5-hexanodiona libre, es decir, sin conjugar. Esta sustancia es metabolito del n-hexano y de la metil-n-butilcetona. (Orina) Después de cuatro o cinco días consecutivos de trabajo con exposición, lo antes posible después del final de la última jornada, dado que los indicadores biológicos se eliminan con vidas medias superiores a las cinco horas. Estos indicadores se acumulan en el organismo durante la semana de trabajo, por lo tanto el momento de muestreo es crítico con relación a exposiciones anteriores. () Sin hidrólisis ()	Final de la semana laboral	2014-01-01
		2,5-hexanodiona: 0,2 mg/l 2,5-hexanodiona libre, es decir, sin conjugar. Esta sustancia es metabolito del n-hexano y de la metil-n-butilcetona. (Orina) Después de cuatro o cinco días consecutivos de trabajo con exposición, lo antes posible después del final de la última jornada, dado que los indicadores biológicos se eliminan con vidas medias superiores a las cinco horas. Estos indicadores se acumulan en el organismo durante la semana de trabajo, por lo tanto el momento de muestreo es crítico con relación a exposiciones anteriores. () Sin hidrólisis ()	Final de la semana laboral	2014-01-01

DE

Stoffname	CAS-Nr.	Zu überwachende Parameter	Probennahmezeitpunkt	Stand
n-Hexane	110-54-3	2,5-Hexandion plus 4,5-Dihydroxy-2-hexanon: 5 mg/l Nach Hydrolyse (Urin)	Expositionsende, bzw. Schichtende	2013-09-19
		2,5-Hexandion plus 4,5-Dihydroxy-2-hexanon: 5 mg/l Nach Hydrolyse (Urin)	Expositionsende, bzw. Schichtende	2013-09-19

CH

Stoffname	CAS-Nr.	Zu überwachende Parameter	Probennahmezeitpunkt	Stand
n-Hexane	110-54-3	2,5-Hexandion plus 4,5-Dihydroxy-2-hexanon: 5 mg/l Nicht spezifischer Parameter; Die mit N gekennzeichneten biologischen Parameter sind nicht für den aufgeführten Arbeitsstoff spezifisch, sondern können auch nach Expositionen gegenüber bestimmten anderen Arbeitsstoffen im biologischen Material gemessen werden. In der Praxis hat sich die Bestimmung dieser Stoffe jedoch bewährt. Bei speziellen Problemen empfiehlt sich zusätzlich die Bestimmung eines spezifischen Parameters. (Urin)	Expositionsende, bzw. Schichtende	2005-01-01

		2,5-Hexandion plus 4,5-Dihydroxy-2-hexanon: 5 mg/l Nicht spezifischer Parameter; Die mit N gekennzeichneten biologischen Parameter sind nicht für den aufgeführten Arbeitsstoff spezifisch, sondern können auch nach Expositionen gegenüber bestimmten anderen Arbeitsstoffen im biologischen Material gemessen werden. In der Praxis hat sich die Bestimmung dieser Stoffe jedoch bewährt. Bei speziellen Problemen empfiehlt sich zusätzlich die Bestimmung eines spezifischen Parameters. (Urin)	Expositionsende, bzw. Schichtende	2005-01-01

PNEC : Fresh water
Value: 0,111 mg/l

PNEC : Sea water
Value: 0,111 mg/l

PNEC : Fresh water sediment
Value: 19,25 mg/kg

PNEC : Sea sediment
Value: 19,25 mg/kg

PNEC : Soil
Value: 4,01 mg/kg

8.2

Exposure controls
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

9.1

Information on basic physical and chemical properties

Appearance

Form	:	liquid
Physical state	:	liquid
Color	:	Clear, colorless
Odor	:	No information available.
Odor Threshold	:	No data available

Safety data

Flash point	:	-26°C (-15°F) Method: closed cup
Lower explosion limit	:	2 %(V)
Upper explosion limit	:	7 %(V)
Flammability (solid, gas)	:	
Oxidizing properties	:	no
Autoignition temperature	:	272°C (522°F)
Thermal decomposition	:	No data available
Molecular formula	:	C6H12
Molecular weight	:	84,18 g/mol
pH	:	Not applicable
Pour point	:	No data available
Melting point/freezing point		-140°C (-220°F)

Boiling point/boiling range	:	63,5°C (146,3°F)
Vapor pressure	:	176,00 MMHG at 24°C (75°F) 106,30 kPa at 65°C (149°F)
Relative density	:	0,68 at 15 °C (59 °F)
Density	:	645 kg/m3 at 50°C (122°F) 678 kg/m3 at 15°C (59°F) 674 g/cm3 at 20°C (68°F)
Water solubility	:	47 MG/L at 20°C (68°F) slightly soluble
Partition coefficient: n-octanol/water	:	log Pow: 3,87
Viscosity, kinematic	:	0,34 cSt at 40°C (104°F)
Relative vapor density	:	2,9 (Air = 1.0)
Evaporation rate	:	No data available
Percent volatile	:	> 99 %

9.2

Other information

Conductivity	:	4,1 pSm Method: ASTM D4308

SECTION 10: Stability and reactivity

10.1

Reactivity : Stable at normal ambient temperature and pressure.

10.2

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

10.3

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.

10.4
Conditions to avoid : Heat, flames and sparks.

10.5
Materials to avoid : May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Thermal decomposition : No data available

10.6

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

SECTION 11: Toxicological information

11.1
Information on toxicological effects

1-Hexene (C6H12)
Acute oral toxicity : LD50: > 5.600 mg/kg
Species: Rat
Sex: male and female
Method: Acute toxicity estimate

1-Hexene (C6H12)
Acute inhalation toxicity : No data available

1-Hexene (C6H12)
Acute dermal toxicity : LD50 Dermal: > 3.500 mg/kg
Species: Rabbit
Method: Acute toxicity estimate

1-Hexene (C6H12)
Skin irritation : No skin irritation. Repeated or prolonged contact with the mixture may cause removal of natural fat from the skin resulting in desiccation of the skin.

1-Hexene (C6H12)
Eye irritation : No eye irritation.

1-Hexene (C6H12)
Sensitization : Did not cause sensitization on laboratory animals. Information refers to the main ingredient.

Repeated dose toxicity

1-Hexene : Species: Rat, male
Sex: male
Application Route: oral gavage

Dose: 0, 10, 101, 1010, 3365 mg/kg
Exposure time: 28 day
Number of exposures: daily
NOEL: 101 mg/kg
Lowest observable effect level: 1.010 mg/kg
Test substance: yes
Method: OECD Test Guideline 407

Species: Rat, female
Sex: female
Application Route: oral gavage
Dose: 0, 10, 101, 1010, 3365 mg/kg
Exposure time: 28 day
Number of exposures: daily
NOEL: 1.010 mg/kg
Lowest observable effect level: 3.365 mg/kg
Test substance: yes
Method: OECD Test Guideline 407

Species: Rat
Application Route: Inhalation
Dose: 0, 300, 1000, 3000 ppm
Exposure time: 90 day
Number of exposures: 6 h/d, 5 d/wk, 13 wk
NOEL: 3000 ppm
Test substance: yes

Genotoxicity in vitro

1-Hexene : Test Type: Ames test
Metabolic activation: with and without metabolic activation
Method: Mutagenicity (Escherichia coli - reverse mutation assay)
Result: negative

Test Type: Unscheduled DNA synthesis assay
Result: negative

Test Type: Mouse lymphoma assay
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Guideline 473
Result: negative

Genotoxicity in vivo

1-Hexene : Test Type: Mouse micronucleus assay
Species: Mouse
Method: Mutagenicity (micronucleus test)
Result: negative

Reproductive toxicity

1-Hexene : Species: Rat
Sex: males
Application Route: oral gavage
Dose: 0, 100, 500, 1000 mg/kg

Number of exposures: daily
Test period: 44 d
Test substance: yes
Method: OECD Guideline 421
NOAEL Parent: 1.000 mg/kg
NOAEL F1: 1.000 mg/kg

Species: Rat
Sex: females
Application Route: oral gavage
Dose: 0, 100, 500, 1000 mg/kg
Number of exposures: daily
Test period: 41-51 d
Test substance: yes
Method: OECD Guideline 421
NOAEL Parent: 1.000 mg/kg
NOAEL F1: 1.000 mg/kg

1-Hexene (C6H12)
Aspiration toxicity : May be fatal if swallowed and enters airways.

CMR effects

1-Hexene : 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: Animal testing did not show any effects on fertility.

11.2 Information on other hazards

1-Hexene (C6H12)
Further information : Solvents may degrease the skin.
Endocrine disrupting properties : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 12: Ecological information

12.1 Toxicity

Ecotoxicity effects
Toxicity to fish

1-Hexene : LC50: 5,6 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
semi-static test Test substance: yes
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

1-Hexene	:	EC50: 4,4 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) static test Test substance: no Method: OECD Test Guideline 202 Information given is based on data obtained from similar substances.

Toxicity to algae

1-Hexene	:	NOEC: 1,8 mg/l Exposure time: 96 h Species: Pseudokirchneriella subcapitata (green algae) Growth inhibition Method: OECD Test Guideline 201 Information given is based on data obtained from similar substances. EC50: > 5,5 mg/l Exposure time: 96 h Species: Pseudokirchneriella subcapitata (green algae) Growth inhibition Method: OECD Test Guideline 201 Information given is based on data obtained from similar substances.

12.2
Persistence and degradability

Biodegradability	:	This material is expected to be readily biodegradable.

12.3
Bioaccumulative potential
Elimination information (persistence and degradability)

Bioaccumulation	:	This material is not expected to bioaccumulate.

12.4
Mobility in soil

Mobility	:	No data available

12.5
Results of PBT and vPvB assessment

Results of PBT assessment	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6
Endocrine disrupting properties

Endocrine disrupting properties	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7

Other adverse effects

Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Toxic to aquatic life.

12.8

Additional Information

Ecotoxicology Assessment

Short-term (acute) aquatic hazard	:	Toxic to aquatic life.
Long-term (chronic) aquatic hazard	:	No data available

SECTION 13: Disposal considerations

13.1

Waste treatment methods

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

14.1 - 14.7

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)

UN2370, 1-HEXENE, 3, II

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)

UN2370, 1-HEXENE, 3, II, (-26 °C c.c.)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN2370, 1-HEXENE, 3, II

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN2370, 1-HEXENE, 3, II, (D/E)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
33,UN2370,1-HEXENE, 3, II

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN2370, 1-HEXENE, 3, II, ENVIRONMENTALLY HAZARDOUS, (1-HEXENE)
For Tank Vessels and/or Barges:
UN2370, 1-HEXENE, 3, (N3), II, ENVIRONMENTALLY HAZARDOUS, (1-Hexene)

Other information	**:**	**Hexene (all isomers), S.T.3., Cat. Y**

Maritime transport in bulk according to IMO instruments

SECTION 15: Regulatory information

15.1

Safety, health and environmental regulations/legislation specific for the substance or mixture
National legislation

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Water hazard class (Germany) : WGK 2 obviously hazardous to water

15.2

Chemical Safety Assessment

Components	:	hex-1-ene	A Chemical Safety Assessment has been carried out for this substance.	209-753-1

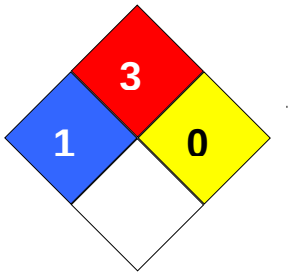
Notification status

Europe REACH	:	This product is in full compliance according to REACH regulation 1907/2006/EC.
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 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	:	All substances in this product were registered, notified to be registered, or exempted from registration by QChem through an Only Representative according to K-REACH regulations. Importation of this product is permitted if the Korean Importer of Record was included on QChem's notifications or if the Importer of Record themselves notified the substances.
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory
Taiwan TCSI	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

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



Further information

Legacy SDS Number : QCHEM009

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%
AIIC	Australian Inventory of Industrial Chemicals	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

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.
H336	May cause drowsiness or dizziness.

Annex: Exposure Scenarios

Table of Contents

Number	Title
ES 1	Manufacture; Industrial uses (SU3).
ES 2	Use as an intermediate; Industrial uses (SU3).
ES 3	Formulation; Industrial uses (SU3).
ES 4	Lubricants - Industrial; Industrial uses (SU3).
ES 5	Lubricants - Professional; Professional uses (SU22).
ES 6	Lubricants - Consumer; Consumer uses (SU21).
ES 7	Metal working fluids / rolling oils - Industrial; Industrial uses (SU3).
ES 8	Metal working fluids / rolling oils – Professional; Professional uses (SU22).
ES 9	Use as a fuel - industrial; Industrial uses (SU3).
ES 10	Use as a fuel – professional; Professional uses (SU22).
ES 11	Functional Fluids - Industrial; Industrial uses (SU3).
ES 12	Functional Fluids - Professional; Professional uses (SU22).
ES 13	Use in polymer production – industrial; Industrial uses (SU3).

ES 1: Manufacture; Industrial uses (SU3).

1.1. Title section

Exposure Scenario name	:	Manufacture
Structured Short Title	:	Manufacture; Industrial uses (SU3).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Manufacture**	ERC1, ERC4
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Manufacture of the substance (ERC1) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	166.834 kg/day
Release type	:	Continuous release
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by soil. Air - minimum efficiency of 90 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils.

		Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	40
Local marine water dilution factor	:	100

1.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Manufacture of the substance (ERC1) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Protection Target	Exposure estimate	RCR
Freshwater	0,0201 mg/l (EUSES)	0,181
Sea water	0,0080 mg/l (EUSES)	0,072
Freshwater sediment	0,809 mg/kg wet weight (EUSES)	0,193
Sea sediment	0,323 mg/kg wet weight (EUSES)	0,077
Soil	3,54 mg/kg wet weight (EUSES)	0,999
Air	0,232 mg/m³	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

1.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use as laboratory reagent (PROC15)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 2: Use as an intermediate; Industrial uses (SU3).

2.1. Title section

Exposure Scenario name	:	Use as an intermediate
Structured Short Title	:	Use as an intermediate; Industrial uses (SU3).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Use as an intermediate**	ERC6a
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Use of intermediate (ERC6a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	166.837 kg/day
Release type	:	Continuous release
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by soil. Air - minimum efficiency of 80 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.

STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure

Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

2.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use as laboratory reagent (PROC15)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Do not ingest. If swallowed then seek immediate medical assistance.
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
No other specific measures identified.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Use of intermediate (ERC6a)

Protection Target	Exposure estimate	RCR

Freshwater	0,0081 mg/l (EUSES)	0,073
Sea water	0,805 µg/l (EUSES)	0,007
Freshwater sediment	0,325 mg/kg wet weight (EUSES)	0,078
Sea sediment	0,0324 mg/kg wet weight (EUSES)	0,008
Soil	0,354 mg/kg wet weight (EUSES)	0,099
Air	0,0232 mg/m³	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

2.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use as laboratory reagent (PROC15)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 3: Formulation; Industrial uses (SU3).

3.1. Title section

Exposure Scenario name	:	Formulation
Structured Short Title	:	Formulation; Industrial uses (SU3).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Formulation**	ERC2
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Formulation into mixture (ERC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	248.014 kg/day
Release type	:	Continuous release
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by soil. Air - minimum efficiency of 0 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from

		wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

3.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Mixing or blending in batch processes (PROC5) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Tabletting, compression, extrusion, pelettisation, granulation (PROC14) / Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Formulation into mixture (ERC2)

Protection Target	Exposure estimate	RCR
Freshwater	0,0268 mg/l (EUSES)	0,241
Sea water	0,0227 mg/l (EUSES)	0,024
Freshwater sediment	1,08 mg/kg wet weight (EUSES)	0,258
Sea sediment	0,108 mg/kg wet weight (EUSES)	0,026
Soil	1,19 mg/kg wet weight (EUSES)	0,336
Air	0,579 mg/m³	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

3.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Mixing or blending in batch processes (PROC5) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Tabletting, compression, extrusion, pelettisation, granulation (PROC14) / Use as laboratory reagent (PROC15)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 4: Lubricants - Industrial; Industrial uses (SU3).

4.1. Title section

Exposure Scenario name	:	Lubricants - Industrial
Structured Short Title	:	Lubricants - Industrial; Industrial uses (SU3).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Lubricants - Industrial**	ERC4, ERC7
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15, PROC17, PROC18

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of functional fluid at industrial site (ERC7)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	805.271 kg/day
Release type	:	Continuous release
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater sediment. Air - minimum efficiency of 70 % Water - minimum efficiency of 96,8 %		

Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

4.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Industrial spraying (PROC7) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Roller application or brushing (PROC10) / Treatment of articles by dipping and pouring (PROC13) / Use as laboratory reagent (PROC15) / Lubrication at high energy conditions in metal working operations (PROC17) / General greasing/lubrication at high kinetic energy conditions (PROC18)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of functional fluid at industrial site (ERC7)

Protection Target	Exposure estimate	RCR
Freshwater	0,071 µg/l (EUSES)	0,001
Sea water	0,0063 µg/l (EUSES)	0,000
Freshwater sediment	0,0029 mg/kg wet weight (EUSES)	0,001
Sea sediment	0,254 µg/kg wet weight (EUSES)	0,000
Soil	0,001 mg/kg wet weight (EUSES)	0,000
Air	0,447 µg/m3	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

4.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Industrial spraying (PROC7) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Roller application or brushing (PROC10) / Treatment of articles by dipping and pouring (PROC13) / Use as laboratory reagent (PROC15) / Lubrication at high energy conditions in metal working operations (PROC17) / General greasing/lubrication at high kinetic energy conditions (PROC18)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 5: Lubricants - Professional; Professional uses (SU22).

5.1. Title section

Exposure Scenario name	:	Lubricants - Professional
Structured Short Title	:	Lubricants - Professional; Professional uses (SU22).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Lubricants - Professional**	ERC8a, ERC8d, ERC9a, ERC9b
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	873 kg/day
Release type	:	Wide dispersive use
Emission days	:	300
Technical and organisational conditions and measures		

Risk from environmental exposure is driven by freshwater sediment.
Air - minimum efficiency of 0 %
Water - minimum efficiency of 96,8 %

Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

5.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Roller application or brushing (PROC10) / Non-industrial spraying (PROC11) / Treatment of articles by dipping and pouring (PROC13) / Lubrication at high energy conditions in metal working operations (PROC17) / General greasing/lubrication at high kinetic energy conditions (PROC18) / Use of functional fluids in small devices (PROC20)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent /

minimise exposures and to report any skin problems that may develop.
No other specific measures identified.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Protection Target	Exposure estimate	RCR
Freshwater	0,131 µg/l (EUSES)	0,001
Sea water	0,0123 µg/l (EUSES)	0,000
Freshwater sediment	0,0053 mg/kg wet weight (EUSES)	0,001
Sea sediment	0,496 µg/kg wet weight (EUSES)	0,000
Soil	0,0038 mg/kg wet weight (EUSES)	0,001
Air	0,179 µg/m3	

Additional information on exposure estimation

Common practices vary across sites thus conservative process release estimates used.

5.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Roller application or brushing (PROC10) / Non-industrial spraying (PROC11) / Treatment of articles by dipping and pouring (PROC13) / Lubrication at high energy conditions in metal working operations (PROC17) / General greasing/lubrication at high kinetic energy conditions (PROC18) / Use of functional fluids in small devices (PROC20)

Additional information on exposure estimation

A quantitative risk assessment is not required for human health.

5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 6: Lubricants - Consumer; Consumer uses (SU21).

6.1. Title section

Exposure Scenario name	:	Lubricants - Consumer
Structured Short Title	:	Lubricants - Consumer; Consumer uses (SU21).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Lubricants - Consumer**	ERC8a, ERC8d, ERC9a, ERC9b
Consumer		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PC1, PC24, PC31

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	804 kg/day
Release type	:	Wide dispersive use
Emission days	:	365
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

6.2.2. Control of consumer exposure: Adhesives, sealants (PC1) / Lubricants, greases, release products (PC24) / Polishes and wax blends (PC31)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Conditions and measures related to personal protection, hygiene and health evaluation		
Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. No other specific measures identified.		
Other conditions affecting consumers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Protection Target	Exposure estimate	RCR
Freshwater	0,116 µg/l (EUSES)	0,001
Sea water	0,0108 µg/l (EUSES)	0,000
Freshwater sediment	0,0047 mg/kg wet weight (EUSES)	0,001
Sea sediment	0,435 µg/kg wet weight (EUSES)	0,000
Soil	0,0031 mg/kg wet weight (EUSES)	0,000
Air	0,147 µg/m3	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

6.3.2. Consumer exposure: Adhesives, sealants (PC1) / Lubricants, greases, release products (PC24) / Polishes and wax blends (PC31)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 7: Metal working fluids / rolling oils - Industrial; Industrial uses (SU3).

7.1. Title section

Exposure Scenario name	:	Metal working fluids / rolling oils - Industrial
Structured Short Title	:	Metal working fluids / rolling oils - Industrial; Industrial uses (SU3).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Metal working fluids / rolling oils - Industrial**	ERC4
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	102.713 tonnes/day
Release type	:	Continuous release
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater sediment. Air - minimum efficiency of 70 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		

STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure

Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

7.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Roller application or brushing (PROC10) / Non-industrial spraying (PROC11) / Treatment of articles by dipping and pouring (PROC13) / Lubrication at high energy conditions in metal working operations (PROC17)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Do not ingest. If swallowed then seek immediate medical assistance.
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
No other specific measures identified.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Protection Target	Exposure estimate	RCR
Freshwater	0,0843 µg/l (EUSES)	0,000
Sea water	0,0076 µg/l (EUSES)	0,000
Freshwater sediment	0,0034 mg/kg wet weight (EUSES)	0,000
Sea sediment	0,308 µg/kg wet weight (EUSES)	0,000
Soil	0,0018 mg/kg wet weight (EUSES)	0,000
Air	0,0013 mg/m³	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

7.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Roller application or brushing (PROC10) / Non-industrial spraying (PROC11) / Treatment of articles by dipping and pouring (PROC13) / Lubrication at high energy conditions in metal working operations (PROC17)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 8: Metal working fluids / rolling oils – Professional; Professional uses (SU22).

8.1. Title section

Exposure Scenario name	:	Metal working fluids / rolling oils – Professional
Structured Short Title	:	Metal working fluids / rolling oils – Professional; Professional uses (SU22).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Metal working fluids / rolling oils – Professional**	ERC8a, ERC8d, ERC9a, ERC9b
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	1.006 kg/day
Release type	:	Wide dispersive use
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater sediment.		

Air - minimum efficiency of 0 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

8.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Roller application or brushing (PROC10) / Non-industrial spraying (PROC11) / Treatment of articles by dipping and pouring (PROC13) / Lubrication at high energy conditions in metal working operations (PROC17)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. No other specific measures identified.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

8.3. Exposure estimation and reference to its source

8.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Protection Target	Exposure estimate	RCR
Freshwater	0,0843 µg/l (EUSES)	0,000
Sea water	0,0076 µg/l (EUSES)	0,000
Freshwater sediment	0,0034 mg/kg wet weight (EUSES)	0,000
Sea sediment	0,308 µg/kg wet weight (EUSES)	0,000
Soil	0,0018 mg/kg wet weight (EUSES)	0,000
Air	0,0013 mg/m³	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

8.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Roller application or brushing (PROC10) / Non-industrial spraying (PROC11) / Treatment of articles by dipping and pouring (PROC13) / Lubrication at high energy conditions in metal working operations (PROC17)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 9: Use as a fuel - industrial; Industrial uses (SU3).

9.1. Title section

Exposure Scenario name	:	Use as a fuel - industrial
Structured Short Title	:	Use as a fuel - industrial; Industrial uses (SU3).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Use as a fuel - industrial**	ERC7
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: Use of functional fluid at industrial site (ERC7)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	1.484.848 kg kg/day
Release type	:	Continuous release
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater sediment. Air - minimum efficiency of 95 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.

STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure

Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

9.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use of fuels (PROC16)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Do not ingest. If swallowed then seek immediate medical assistance.
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
No other specific measures identified.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.3. Exposure estimation and reference to its source

9.3.1. Environmental release and exposure: Use of functional fluid at industrial site (ERC7)

Protection Target	Exposure estimate	RCR

Freshwater	0,0582 µg/l (EUSES)	0,001
Sea water	0,005 µg/l (EUSES)	0,000
Freshwater sediment	0,0023 mg/kg wet weight (EUSES)	0,001
Sea sediment	0,203 µg/kg wet weight (EUSES)	0,000
Soil	0,0006 mg/kg wet weight (EUSES)	0,000
Air	0,565 µg/m3	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

9.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use of fuels (PROC16)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 10: Use as a fuel – professional; Professional uses (SU22).

10.1. Title section

Exposure Scenario name	:	Use as a fuel – professional
Structured Short Title	:	Use as a fuel – professional; Professional uses (SU22).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Use as a fuel – professional**	ERC9a, ERC9b
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	3.899 kg/day
Release type	:	Wide dispersive use
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater sediment. Air - minimum efficiency of 0 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils.

		Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

10.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use of fuels (PROC16)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure: Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Protection Target	Exposure estimate	RCR
Freshwater	0,0452 µg/l (EUSES)	0,000
Sea water	0,0037 µg/l (EUSES)	0,000
Freshwater sediment	0,0018 mg/kg wet weight (EUSES)	0,000
Sea sediment	0,15 µg/kg wet weight (EUSES)	0,000
Soil	0,0092 µg/kg dry weight (EUSES)	0,000
Air	0,0045 µg/m3	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

10.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use of fuels (PROC16)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 11: Functional Fluids - Industrial; Industrial uses (SU3).

11.1. Title section

Exposure Scenario name	:	Functional Fluids - Industrial
Structured Short Title	:	Functional Fluids - Industrial; Industrial uses (SU3).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Functional Fluids - Industrial**	ERC7
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

11.2. Conditions of use affecting exposure

11.2.1. Control of environmental exposure: Use of functional fluid at industrial site (ERC7)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	1.027.127 kg kg/day
Release type	:	Continuous release
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater sediment. Air - minimum efficiency of 0 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.

STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure

Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

11.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Do not ingest. If swallowed then seek immediate medical assistance.
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
No other specific measures identified.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

11.3. Exposure estimation and reference to its source

11.3.1. Environmental release and exposure: Use of functional fluid at industrial site (ERC7)

Protection Target	Exposure estimate	RCR
Freshwater	0,0843 µg/l (EUSES)	0,001
Sea water	0,0076 µg/l (EUSES)	0,000
Freshwater sediment	0,0034 mg/kg wet weight (EUSES)	0,001
Sea sediment	0,308 µg/kg wet weight (EUSES)	0,000
Soil	0,0018 mg/kg wet weight (EUSES)	0,001
Air	0,0023 mg/m³	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

11.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 12: Functional Fluids - Professional; Professional uses (SU22).

12.1. Title section

Exposure Scenario name	:	Functional Fluids - Professional
Structured Short Title	:	Functional Fluids - Professional; Professional uses (SU22).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Functional Fluids - Professional**	ERC9a, ERC9b
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC8a, PROC9, PROC20

12.2. Conditions of use affecting exposure

12.2.1. Control of environmental exposure: Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	1.604 kg/day
Release type	:	Wide dispersive use
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater sediment. Air - minimum efficiency of 0 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils.

		Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

12.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Use of functional fluids in small devices (PROC20)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

12.3. Exposure estimation and reference to its source

12.3.1. Environmental release and exposure: Widespread use of functional fluid (indoor) (ERC9a) / Widespread use of functional fluid (outdoor) (ERC9b)

Protection Target	Exposure estimate	RCR
Freshwater	0,110 µg/l (EUSES)	0,001
Sea water	0,0102 µg/l (EUSES)	0,000
Freshwater sediment	0,0044 mg/kg wet weight (EUSES)	0,001
Sea sediment	0,413 µg/kg wet weight (EUSES)	0,000
Soil	0,0029 mg/kg wet weight (EUSES)	0,001
Air	0,0226 µg/m3	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

12.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Use of functional fluids in small devices (PROC20)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

12.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).

ES 13: Use in polymer production – industrial; Industrial uses (SU3).

13.1. Title section

Exposure Scenario name	:	Use in polymer production – industrial
Structured Short Title	:	Use in polymer production – industrial; Industrial uses (SU3).
Substance	:	hex-1-ene EC-No.: 209-753-1

Environment		
CS 1	**Use in polymer production – industrial**	ERC4, ERC6c
Worker		
CS 2	**General measures applicable to all activities, General measures (skin irritants)**	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC14, PROC15

13.2. Conditions of use affecting exposure

13.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6c)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	171.467 kg/day
Release type	:	Continuous release
Emission days	:	300
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by soil. Air - minimum efficiency of 80 % Water - minimum efficiency of 96,8 %		
Conditions and measures related to sewage treatment plant		

STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

13.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Mixing or blending in batch processes (PROC5) / Calendering operations (PROC6) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Tabletting, compression, extrusion, pelettisation, granulation (PROC14) / Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Do not ingest. If swallowed then seek immediate medical assistance.
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

13.3. Exposure estimation and reference to its source

13.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6c)

Protection Target	Exposure estimate	RCR
Freshwater	0,0391 mg/l (EUSES)	0,352
Sea water	0,0039 mg/l (EUSES)	0,035
Freshwater sediment	1,58 mg/kg wet weight (EUSES)	0,376
Sea sediment	0,157 mg/kg wet weight (EUSES)	0,038
Soil	1,72 mg/kg wet weight (EUSES)	0,486
Air	0,0452 mg/m³	

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

13.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Chemical production where opportunity for exposure arises (PROC4) / Mixing or blending in batch processes (PROC5) / Calendering operations (PROC6) / Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Tabletting, compression, extrusion, pelettisation, granulation (PROC14) / Use as laboratory reagent (PROC15)

Additional information on exposure estimation
A quantitative risk assessment is not required for human health.

13.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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).