

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

1.1. Product identifier

Substance name : Fusel oil
IUPAC name : Fusel Oil
EC-No. : 232-395-2
CAS-No. : 8013-75-0
REACH registration No : 01-2119970173-39-xxxx
Formula : C5H12O

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

1.2.1. Relevant identified uses

Main use category : Industrial use, Professional use
Use of the substance/mixture : Fuel additives
Fuels
Solvents
Fusel oils are included in some spirits as desired flavor components, eg brandy, whiskey, fruit brandy, red wine et al.

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Sasma
Willem Dreeslaan 301
2729 NE Zoetermeer - Netherlands
T +31 79 363 30 64
sales@sasmabv.com - www.sasmabv.com

1.4. Emergency telephone number

Emergency number : Worldwide: For Hazardous Materials (or Dangerous Goods) Incident, Spill, Leak, Exposure, or Accident – Call NCEC Day or Night(24/7) +441865407333 - SASMA29003-NCEC

Country	Organisation/Company	Address	Emergency number	Comment
United Kingdom	Guy's & St Thomas' Poisons Unit Medical Toxicology Unit, Guy's & St Thomas' Hospital Trust	Avonley Road SE14 5ER London	+44 20 7188 7188	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flammable liquids, Category 3 H226
Acute toxicity (oral), Category 4 H302
Skin corrosion/irritation, Category 2 H315
Serious eye damage/eye irritation, Category 1 H318
Specific target organ toxicity — Single exposure, Category 3, Narcosis H336
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation H335
Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects

Flammable liquid and vapour. May cause drowsiness or dizziness. Harmful if swallowed. May cause respiratory irritation. Causes skin irritation. Causes serious eye damage.

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according to Regulation (EU) 2015/830

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS02

GHS05

GHS07

Signal word (CLP) :

Danger

Hazard statements (CLP) :

- H226 - Flammable liquid and vapour.
 - H302 - Harmful if swallowed.
 - H315 - Causes skin irritation.
 - H318 - Causes serious eye damage.
 - H335 - May cause respiratory irritation.
 - H336 - May cause drowsiness or dizziness.
- Precautionary statements (CLP) :
- P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 - P240 - Ground and bond container and receiving equipment.
 - P261 - Avoid breathing dust, fume, gas, mist, spray.
 - P280 - Wear eye protection, protective clothing, protective gloves.
 - P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 - P305+P351+P338+P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor, a POISON CENTER.
 - P312 - Call doctor, a POISON CENTER if you feel unwell.

2.3. Other hazards

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Fusel oil	(CAS-No.) 8013-75-0 (EC-No.) 232-395-2 (REACH-no) 01-2119970173-39-xxxx	≤ 100	Flam. Liq. 3, H226 Acute Tox. 4 (Oral), H302 Skin Irrit. 2, H315 Eye Dam. 1, H318 STOT SE 3, H336 STOT SE 3, H335

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general :

- Call a poison center or a doctor if you feel unwell. Victim conscious with laboured breathing: half-seated. If medical advice is needed, have product container or label at hand. Keep watching the victim. Check the vital functions. Never give anything by mouth to an unconscious person. Prevent cooling by covering the victim (no warming up).

First-aid measures after inhalation :

- Remove person to fresh air and keep comfortable for breathing. Call a poison center or a doctor if you feel unwell. Give oxygen or artificial respiration if necessary.

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First-aid measures after skin contact	: Rinse skin with water/shower. Take off immediately all contaminated clothing. If skin irritation occurs: Get medical advice/attention.
First-aid measures after eye contact	: If eye irritation persists: Get medical advice/attention. Rinse immediately with plenty of water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
First-aid measures after ingestion	: Rinse mouth. Do not induce vomiting. Immediately consult a doctor/medical service. Do NOT induce vomiting.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects	: May cause drowsiness or dizziness.
Symptoms/effects after inhalation	: May cause respiratory irritation.
Symptoms/effects after skin contact	: Irritation.
Symptoms/effects after eye contact	: Serious damage to eyes.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Water spray. Dry powder. Foam. Carbon dioxide.
Unsuitable extinguishing media	: Solid water jet ineffective as extinguishing medium. Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Fire hazard	: Flammable liquid and vapour.
Hazardous decomposition products in case of fire	: Toxic fumes may be released. Upon combustion: CO and CO ₂ are formed.

5.3. Advice for firefighters

Precautionary measures fire	: Eliminate all ignition sources if safe to do so. This product is not to be used under conditions of poor ventilation. Keep container tightly closed and away from heat, sparks and flame. Keep cool. Protect from sunlight.
Firefighting instructions	: Eliminate all ignition sources if safe to do so. Use water spray or fog for cooling exposed containers. Take account of environmentally hazardous firefighting water. Contain the extinguishing fluids by bunding.
Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	: If leakage cannot be stopped, evacuate the area. Ensure adequate ventilation. Avoid breathing vapors / spray and contact with skin and eyes. Not spilled material touch or walk in. Eliminate all sources of ignition. Keep away from heat, sparks and open fire. Wear protective clothing as described in Section 8 of this Safety Data Sheet.
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6.1.1. For non-emergency personnel

Protective equipment	: Wear recommended personal protective equipment.
Emergency procedures	: Ventilate spillage area. No open flames, no sparks, and no smoking. Avoid breathing vapours, gas, mist, fume, spray. Avoid contact with skin and eyes.

6.1.2. For emergency responders

Protective equipment	: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
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6.2. Environmental precautions

Avoid release to the environment. Do not allow to enter drains or water courses. Notify authorities if product enters sewers or public waters.

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6.3. Methods and material for containment and cleaning up

- For containment : Heating: dilute combustible gas/vapour with water curtain. Cover spill with non combustible material, e.g.: sand, earth, vermiculite. Do not touch or walk on the spilled product. Try to reduce evaporation. Provide adequate ventilation.
- Methods for cleaning up : Take up liquid spill into absorbent material. Notify authorities if product enters sewers or public waters.
- Other information : Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Additional hazards when processed : In use, may form flammable vapour-air mixture. Handle empty containers with care because residual vapours are flammable. Flammable vapours may accumulate in the container. Do not spray on an open flame or other ignition source. Protect from direct sunlight. Do not pierce or burn, even after use. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Flammable vapours may accumulate in the container. Use explosion-proof equipment. Wear personal protective equipment. Use only outdoors or in a well-ventilated area. Avoid breathing vapours, gas, mist, fume, spray. Avoid contact with skin and eyes.
- Hygiene measures : Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Ground/bond container and receiving equipment.
- Storage conditions : Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store locked up.
- Incompatible products : Oxidizing agent.
- Incompatible materials : Sources of ignition. Direct sunlight. Heat sources.
- Heat and ignition sources : KEEP SUBSTANCE AWAY FROM: ignition sources. heat sources.
- Information on mixed storage : KEEP SUBSTANCE AWAY FROM: oxidizing agents. ignition sources.
- Storage area : Keep out of direct sunlight. Store away from heat. Fireproof storeroom. Store in a well-ventilated place. Store in a cool area.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Fusel oil (8013-75-0)	
PNEC (Water)	
PNEC aqua (freshwater)	0.053 mg/l
PNEC aqua (marine water)	0.005 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	0.219 mg/kg dwt
PNEC sediment (marine water)	0.022 mg/kg dwt
PNEC (Soil)	
PNEC soil	0.013 mg/kg dwt

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PNEC (STP)

PNEC sewage treatment plant	100 mg/l
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8.2. Exposure controls

Appropriate engineering controls:

Ensure good ventilation of the work station.

Materials for protective clothing:

Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Hand protection:

Protective gloves

Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Reusable gloves	Butyl rubber	6 (> 480 minutes)	0.7		EN ISO 374

Eye protection:

Safety glasses

Skin and body protection:

Wear fire/flare resistant/retardant clothing. Chemical resistant safety shoes

Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory equipment

Device	Filter type	Condition	Standard
Gas mask	ABEK		EN 14387

Personal protective equipment symbol(s):



Environmental exposure controls:

Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear liquid.
Colour	: Colourless to light yellow.
Odour	: Irritating. Disagreeable.
Odour threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: < -20 °C
Freezing point	: No data available
Boiling point	: 60 – 143
Flash point	: 26 °C
Auto-ignition temperature	: 300 °C

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Decomposition temperature	: No data available
Flammability (solid, gas)	: Not applicable
Vapour pressure	: No data available
Relative vapour density at 20 °C	: No data available
Relative density	: No data available
Density	: 0.84 g/cm ³ @ 15 °C
Solubility	: Material nearly insoluble in water.
Partition coefficient n-octanol/water (Log Pow)	: -1.26 – -0.14
Viscosity, kinematic	: No data available
Viscosity, dynamic	: 3.64 – 3.88 mPa·s @ 20 °C
Explosive properties	: the study does not need to be conducted because there are no chemical groups present in the molecule which are associated with explosive properties.
Oxidising properties	: The substance is incapable of reacting exothermically with combustible materials on the basis of the chemical structure (the substance contains oxygen atoms but these are not chemically bonded to nitrogen or oxygen).
Explosive limits	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Flammable liquid and vapour.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Oxidizing agent.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Harmful if swallowed.
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

Fusel oil (8013-75-0)

LD50 oral rat	4172 mg/kg
LD50 dermal rabbit	3216 mg/kg
LC50 Inhalation - Rat (Vapours)	12.8 – 16.6 mg/l/4h

Skin corrosion/irritation	: Causes skin irritation.
Serious eye damage/irritation	: Causes serious eye damage.
Respiratory or skin sensitisation	: Not classified

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Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: May cause drowsiness or dizziness. May cause respiratory irritation.
STOT-repeated exposure	: Not classified
Aspiration hazard	: Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	: The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Not classified

Fusel oil (8013-75-0)

LC50 fish 1	120 mg/l
EC50 Daphnia 1	173 mg/l
EC50 72h algae (1)	275 mg/l

12.2. Persistence and degradability

Fusel oil (8013-75-0)

Persistence and degradability	Readily biodegradable in water.
Biodegradation	70 – 80 % in 28 days

12.3. Bioaccumulative potential

Fusel oil (8013-75-0)

Partition coefficient n-octanol/water (Log Pow)	-1.26 – -0.14
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

Fusel oil (8013-75-0)

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

12.6. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste)	: Disposal must be done according to official regulations.
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Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.
Additional information : Flammable vapours may accumulate in the container.

SECTION 14: Transport information

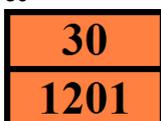
In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	ADN	RID
14.1. UN number				
UN 1201	UN 1201	UN 1201	UN 1201	UN 1201
14.2. UN proper shipping name				
FUSEL OIL	FUSEL OIL	Fusel oil	FUSEL OIL	FUSEL OIL
Transport document description				
UN 1201 FUSEL OIL, 3, III, (D/E)	UN 1201 FUSEL OIL, 3, III	UN 1201 Fusel oil, 3, III	UN 1201 FUSEL OIL, 3, III	UN 1201 FUSEL OIL, 3, III
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing group				
III	III	III	III	III
14.5. Environmental hazards				
Dangerous for the environment : No	Dangerous for the environment : No Marine pollutant : No	Dangerous for the environment : No	Dangerous for the environment : No	Dangerous for the environment : No
No supplementary information available				

14.6. Special precautions for user

Overland transport

Classification code (ADR) : F1
Limited quantities (ADR) : 5I
Excepted quantities (ADR) : E1
Packing instructions (ADR) : P001, IBC03, LP01, R001
Mixed packing provisions (ADR) : MP19
Portable tank and bulk container instructions (ADR) : T2
Portable tank and bulk container special provisions (ADR) : TP1
Tank code (ADR) : LGBF
Vehicle for tank carriage : FL
Transport category (ADR) : 3
Special provisions for carriage - Packages (ADR) : V12
Special provisions for carriage - Operation (ADR) : S2
Hazard identification number (Kemler No.) : 30
Orange plates :



Tunnel restriction code (ADR) : D/E
EAC code : •2YE

Transport by sea

Special provisions (IMDG) : 223, 955

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Limited quantities (IMDG)	: 5 L
Excepted quantities (IMDG)	: E1
Packing instructions (IMDG)	: P001, LP01
IBC packing instructions (IMDG)	: IBC03
Tank instructions (IMDG)	: T2
Tank special provisions (IMDG)	: TP1
EmS-No. (Fire)	: F-E
EmS-No. (Spillage)	: S-D
Stowage category (IMDG)	: A
Properties and observations (IMDG)	: Colourless, oily liquid with a disagreeable odour. A mixture consisting of amyl alcohols. Immiscible with water.

Air transport

PCA Excepted quantities (IATA)	: E1
PCA Limited quantities (IATA)	: Y344
PCA limited quantity max net quantity (IATA)	: 10L
PCA packing instructions (IATA)	: 355
PCA max net quantity (IATA)	: 60L
CAO packing instructions (IATA)	: 366
CAO max net quantity (IATA)	: 220L
Special provisions (IATA)	: A3
ERG code (IATA)	: 3L

Inland waterway transport

Classification code (ADN)	: F1
Limited quantities (ADN)	: 5 L
Excepted quantities (ADN)	: E1
Equipment required (ADN)	: PP, EX, A
Ventilation (ADN)	: VE01
Number of blue cones/lights (ADN)	: 0

Rail transport

Classification code (RID)	: F1
Limited quantities (RID)	: 5L
Excepted quantities (RID)	: E1
Packing instructions (RID)	: P001, IBC03, LP01, R001
Mixed packing provisions (RID)	: MP19
Portable tank and bulk container instructions (RID)	: T2
Portable tank and bulk container special provisions (RID)	: TP1
Tank codes for RID tanks (RID)	: LGBF
Transport category (RID)	: 3
Special provisions for carriage – Packages (RID)	: W12
Colis express (express parcels) (RID)	: CE4
Hazard identification number (RID)	: 30

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006:

Reference code	Applicable on
3(a)	Fusel oil
3(b)	Fusel oil
40.	Fusel oil

Fusel oil is not on the REACH Candidate List

Fusel oil is not subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.

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according to Regulation (EU) 2015/830

Fusel oil is not subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Abbreviations and acronyms:	
CAS-No.	Chemical Abstract Service number
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC50	Median effective concentration
EC-No.	European Community number
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
IOELV	Indicative Occupational Exposure Limit Value
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
N.O.S.	Not Otherwise Specified
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail

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STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
TRGS	Technical Rules for Hazardous Substances
SDS	Safety Data Sheet
VOC	Volatile Organic Compounds
WGK	Water Hazard Class
vPvB	Very Persistent and Very Bioaccumulative

Training advice : Normal use of this product shall imply use in accordance with the instructions on the packaging.

Full text of H- and EUH-statements:	
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Flam. Liq. 3	Flammable liquids, Category 3
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Narcosis
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.

SDS EU (REACH Annex II)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.