SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.1 Revision Date 02.01.2018
Print Date 13.02.2018
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

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

1.1 Product identifiers

Product name : Lithium diisopropylamide solution

Product Number : 361798
Brand : Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chimie S.a.r.l
L'Isle D'Abeau Chesnes
F-38297 ST. QUENTIN FALLAVIER

Telephone : +33 (0)4 74 82 28 40
Fax : +33 (0)4 74 95 68 08
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # +33 (0)9 75 18 14 07 (CHEMTREC)
+33 (0)1 45 42 59 59 (I.N.R.S.)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Skin corrosion (Category 1B), H314
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 2), H373
Aspiration hazard (Category 1), H304
Chronic aquatic toxicity (Category 2), H411

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

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.

Supplemental Hazard information (EU)

EUH014	Reacts violently with water.
EUH019	May form explosive peroxides.

2.3 Other hazards

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

3.2 Mixtures

Synonyms : LDA

Formula : $C_6H_{14}LiN$

Molecular weight : 107,12 g/mol

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Naphtha (petroleum), hydrotreated light			
CAS-No. EC-No. Index-No.	64742-49-0 265-151-9 649-328-00-1	Flam. Liq. 2; Skin Irrit. 2; STOT SE 3; Asp. Tox. 1; Aquatic Chronic 2; H225, H315, H336, H304, H411	>= 30 - < 50 %
Lithium diisopropylamide			
CAS-No. EC-No.	4111-54-0 223-893-0	Pyr. Sol. 1; Skin Corr. 1B; H250, H314	>= 20 - < 30 %
Tetrahydrofuran			
CAS-No. EC-No. Index-No. Registration number	109-99-9 203-726-8 603-025-00-0 01-2119444314-46-XXXX	Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2; Carc. 2; STOT SE 3; H225, H302, H319, H351, H335 Concentration limits: >= 25 %: Eye Irrit. 2, H319; >= 25 %: STOT SE 3, H335;	>= 20 - < 25 %
Ethylbenzene			
CAS-No. EC-No.	100-41-4 202-849-4	Flam. Liq. 2; Acute Tox. 4; STOT RE 2; Asp. Tox. 1;	>= 10 - < 20 %

Index-No.	601-023-00-4	H225, H332, H373, H304	
Diisopropylamine			
CAS-No. EC-No. Index-No.	108-18-9 203-558-5 612-129-00-5	Flam. Liq. 2; Acute Tox. 4; Acute Tox. 3; Skin Corr. 1A; H225, H302, H331, H314 Concentration limits: >= 5 %: STOT SE 3, H335;	>= 1 - < 5 %

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
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Dry powder Dry sand

Unsuitable extinguishing media
Do NOT use water jet.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and 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). Do not flush with water.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
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. Store in cool place.
Never allow product to get in contact with water during storage.

Recommended storage temperature 2 - 8 °C

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Protective gloves against thermal risks

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 10 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: dark yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	2 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0,812 g/cm3 at 25 °C
n)	Water solubility	Not applicable, Decomposes in contact with water.
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	The substance or mixture is not classified as pyrophoric.
q)	Decomposition temperature	> 40 °C -
r)	Viscosity	No data available

s) Explosive properties In use may form flammable/explosive vapour-air mixture.

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Reacts violently with water.

10.2 Chemical stability
Decomposes on heating. Decomposes when moist.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Heat, flames and sparks. Exposure to moisture

10.5 Incompatible materials
Reacts violently with water., acids, Strong oxidizing agents, Alcohols

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx), Lithium oxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Ethylbenzene)

Reproductive toxicity
Lithium and its compounds are possible teratogens by analogy to lithium carbonate which has equivocal human teratogenic data and positive animal teratogenic data.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Inhalation of vapors may cause:, spasm, inflammation and edema of the larynx, Pneumonia, Oedema, Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting., Cough, Difficulty in breathing, Nausea, Dizziness, Headache, Blurred vision, Damage to the eyes.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence (Diisopropylamine)

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 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.

12.6 Other adverse effects
Toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Waste material must be disposed of in accordance with the Directive on waste 2008/98/EC as well as other national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3399	IMDG: 3399	IATA: 3399

14.2 UN proper shipping name

ADR/RID: ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE (Lithium diisopropylamide)
IMDG: ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE (Lithium diisopropylamide)
IATA: Organometallic substance, liquid, water-reactive, flammable (Lithium diisopropylamide)

14.3 Transport hazard class(es)

ADR/RID: 4.3 (3)	IMDG: 4.3 (3)	IATA: 4.3 (3)

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

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

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

Authorisations and/or restrictions on use

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)	: Naphtha (petroleum), hydrotreated light

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

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

EUH014	Reacts violently with water.
EUH019	May form explosive peroxides.
H225	Highly flammable liquid and vapour.
H250	Catches fire spontaneously if exposed to air.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Reference Number :SDS3; Revision Date: 22/07/2016; Rev No: 05

CAUSTIC SODA 5% =< CONC. <51%

1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Product Identifiers

-Product Name	:	**CAUSTIC SODA 5% =< CONC. <51%**
-Chemical Name	:	Sodium hydroxide
-Synonyms	:	Lye soda, Sodium hydrate, Caustic lye
-Molecular Formula	:	NaOH
-REACH Registration Number	:	01-2119457892-27-0086
-Type of Product	:	Mixture

1.2. Identified uses / Uses advised against

-Identified uses	:	- Reagent - pH-regulating agent - Ion exchange resins regenerating agent - Catalyst - Etching agent - Cleaning agent
-Uses advised against	:	- None

1.3. Manufacturer or supplier's details

-Company	:	MICRO-BIO (IRELAND) LTD.
-Address	:	Industrial Estate, Fermoy, Co Cork, Ireland
-Telephone	:	+3532531388
-Fax	:	+3532532458
-E-mail address	:	dobrien@micro-bio.ie

1.4. Emergency telephone number

-Emergency telephone number	:	+3532531388 (Available 24/7)

2. HAZARDS IDENTIFICATION

2.1. GHS Classification

2.1.1. European regulation (EC) 1272/2008, as amended

Classified as hazardous according to the European regulation (EC) 1272/2008, as amended

Hazard class	Hazard category	Route of exposure	H Phrases
Skin Corrosion	Category 1A		H314
Corrosive to metals	Category 1		H290

2.1.2. European Directive 67/548/EEC or 1999/45/EC, as amended

Classified as hazardous according to European Directive 67/548/EEC or 1999/45/EC, as amended

Hazard class / Hazard category	R-phrase(s)
C	R35

2.2. EC Label – According to Regulation (EC) 1272/2008, as amended

2.2.1. Name(s) on label

Hazardous components : Sodium hydroxide (>=5-<51%)

2.2.2. Signal word

Danger

2.2.3. Hazard symbols

2.2.4. Hazard statements

H314	-	Causes severe skin burns and eye damage.
H290	-	May be corrosive to metals.

2.2.5. Precautionary statements

Prevention	P260	-	Do not breathe dust/fume/gas/mist/vapours/spray.
	P280	-	Wear protective gloves/protective clothing/eye protection/face protection.
Response	P303 + P361 + P353	-	IF ON SKIN (or hair): Remove/Take off immediately all Contaminated clothing. Rinse skin with water/shower.
	P305 + P351 + P338	-	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	P301 + P330 + P331	-	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
	P310	-	Immediately call a POISON CENTRE or doctor/physician.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Concentration

Substance name:	Concentration
Sodium hydroxide CAS-No.: 1310-73-2 / EC-No.: 215-185-5 / Index-No.: 011-002-00-6	>=5 - < 51%

3.2. Hazardous components – According to Regulation (EC) 1272/2008, as amended

Substance name	Hazard class	Hazard category	Route of exposure	H Phrases
Sodium hydroxide	Skin corrosion	Category 1A		H314
	Corrosive to metals	Category 1		H290

3.3. Hazardous components – European Directive 67/548/EEC or 1999/45/EC, as amended

Substance name	Classification	Hazard category	R-phrase(s)
Sodium hydroxide	C	Corrosive	R35

4. FIRST AID MEASURES

SPEED IS ESSENTIAL

4.1 Description of necessary first-aid measures

4.1.1. If inhaled
- Move to fresh air.
- Oxygen or artificial respiration if needed.
- Victim to lie down in the recovery position, cover and keep him warm.
- Call a physician immediately.

4.1.2. In case of eye contact
- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- In the case of difficulty of opening the lids, administer an analgesic eye wash (oxybuprocaine).
- Call a physician or poison control centre immediately.
- Take victim immediately to hospital.

4.1.3. In case of skin contact
- Take off contaminated clothing and shoes immediately.
- Wash off immediately with plenty of water.
- Keep warm and in a quiet place.
- Call a physician or poison control centre immediately.
- Wash contaminated clothing before re-use.

4.1.4. If swallowed
- Call a physician or poison control centre immediately.
- Take victim immediately to hospital.
- If swallowed, rinse mouth with water (only if the person is conscious).
- Do NOT induce vomiting.
- Artificial respiration and/or oxygen may be necessary.

4.2. Most important symptoms/effects, acute and delayed

4.2.1. Inhalation
- Corrosive to respiratory system
- Symptoms: Breathing difficulties, cough, chemical pneumonitis, pulmonary oedema
- Repeated or prolonged exposure: Risk of sore throat, nose bleeds, chronic bronchitis.

4.2.2. Skin contact
- Causes severe burns.
- Symptoms: Redness, Swelling of tissue, Burn

4.2.3. Eye contact
- Causes severe burns.
- Small amounts splashed into eyes can cause irreversible tissue damage and blindness.
- Symptoms: Redness, Lachrymation, Swelling of tissue, Burns.

4.2.4. Ingestion
- If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.
- Symptoms: Nausea, Abdominal pain, Bloody vomiting, Diarrhoea, Suffocation, Cough, Severe shortness of breath.

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

5.1.1. Suitable extinguishing media
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.1.2. Unsuitable extinguishing media
- None.

5.2. Specific hazards arising from the chemical
- The product is not flammable.
- Not combustible.
- Hazardous decomposition products formed under fire conditions.
- Gives off hydrogen by reaction with metals.

5.3. Special protective actions for fire-fighters
- In the event of fire, wear self-contained breathing apparatus.
- Use personal protective equipment.
- Wear chemical resistant oversuit.
- Cool containers / tanks with water spray.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. Advice for non-emergency personnel
- Prevent further leakage or spillage if safe to do so.
- Keep away from Incompatible products.

6.1.2. Advice for emergency responders
- Evacuate personnel to safe areas.
- Keep people away from and upwind of spill/leak.
- Ventilate the area.
- Wear suitable protective clothing.

6.2. Environmental precautions
- Should not be released into the environment.
- Do not flush into surface water or sanitary sewer system.
- If the product contaminates rivers and lakes or drains, inform respective authorities.

6.3. Methods and materials for containment and cleaning up
- Dam up.
- Soak up with inert absorbent material.
- Prevent product from entering drains.
- Keep in properly labelled containers.
- Keep in suitable, closed containers for disposal.

6.4. Reference to other sections
- Refer to protective measures listed in sections 7 and 8

7. HANDLING AND STORAGE

7.1. Precautions for safe handling
- Used in closed system
- Use only in well-ventilated areas.
- Keep away from incompatible products.

7.2. Conditions for storage, including incompatibilities

7.2.1. Storage

- Store in original container.
- Keep in a well-ventilated place.
- Keep in properly labelled containers.
- Keep container closed.
- Keep in a bunded area.
- Keep away from incompatible products.
- Regularly check the condition and temperature of the containers.
- Minimum storage temperature: 25ºC for 50% solution; 5oC for 30% Solution

The material can be stored at ambient or slightly elevated temperatures (these are needed in the case of concentrated solutions) in mild steel tanks of welded construction. Where the liquor temperature is above 40ºC for concentrations of 30 % or more or above 60ºC for lower concentrations, tanks must be stress relieved.

7.2.2. Packaging material

7.2.2.1. *Suitable material*

- Stainless steel

7.2.2.2. *Unsuitable material*

- No data available

7.3. Specific use(s)

- For further information, please contact: Supplier

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

8.1.1. Exposure Limit Values

Sodium hydroxide

- Ireland: Code of Practice for the Safety Health & Welfare at Work (Chemical Agents) Regulations 2011 (SI No. 619 of 2001)
  Occupational Exposure Limit Value(15 minute reference period) = 2 mg/m3
- US. ACGIH Threshold Limit Values 2009
  Ceiling Limit Value = 2 mg/m3

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- Ensure adequate ventilation.
- Apply technical measures to comply with the occupational exposure limits.

8.2.2. Individual protection measures

8.2.2.1. *Respiratory protection*

- In the case of dust or aerosol formation, use respirator with an approved filter.
- Recommended Filter type: P2

8.2.2.2. *Hand protection*

- Impervious gloves in compliance with EN374:2003.
- Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact). The following list may be used for guidance but is not exhaustive:
- Nitrile rubber- NBR: thickness >= 0,35mm; breakthrough time>=480min.
- Polyvinyl chloride- PVC: thickness >=0,5mm; breakthrough time>=480min.
- Butyl rubber: thickness>= 0,5mm; breakthrough time>=480min.
- Dispose of contaminated gloves appropriately.
- Unsuitable material: Leather

8.2.2.3. *Eye protection*

- Chemical resistant goggles or full-face shield must be worn.
- If splashes are likely to occur, wear: Tightly fitting safety goggles and Full-Face shield

8.2.2.4. *Skin and body protection*

- Wear suitable protective clothing.
- If splashes are likely to occur, wear:
- Rubber or plastic boots
- Rubber apron.

8.2.2.5. *Hygiene measures*

- Ensure that eyewash stations and safety showers are close to the workstation location.
- Take off contaminated clothing and shoes immediately.
- Handle in accordance with good industrial hygiene and safety practice.

8.2.3. Environmental Exposure controls

- Dispose of rinse water in accordance with local and national regulations.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Physical and chemical properties (30 – 51%)

9.1.1. General Information

- **Appearance** Viscous liquid
- **Colour** Colourless
- **Odour** Odourless

9.1.2. Important health safety and environmental information

- **pH** > 13
- **pKa** No data
- **Melting point/freezing point** 0°C (30%); +12°C (50%)
- **Boiling point/boiling range** from 118 – 145°C
- **Flash point** The product is not flammable.
- **Evaporation rate** No data
- **Flammability (solid, gas)** not applicable
- **Flammability** The product is not flammable
- **Explosive properties** Not explosive, See section 10.
- **Vapour pressure** < 13.3 hPa, at 20°C
- **Vapour density** No data
- **Relative density** 1.33 (30%); 1.53 (50%)
- **Bulk density** No data
- **Solubility(ies)** Completely soluble in water
- **Solubility/qualitative** Completely miscible, Alcohol (Glycerol)
- **Partition coefficient: n-octanol/water** No data
- **Autoignition temperature** No data
- **Decomposition temperature** No data
- **Viscosity** 12 – 120 mPa.s, at 20°C
- **Oxidizing properties** Non oxidizer

10. STABILITY AND REACTIVITY

10.1. Reactivity

- Potential for exothermic hazard
- May be corrosive to metals.

10.2. Chemical stability

- Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

- Exothermic reaction with water (slight for dilutions from 40% down)
- Gives off hydrogen by reaction with metals.
- Exothermic reaction with strong acids.

10.4. Conditions to avoid

- Keep away from direct sunlight
- To avoid thermal decomposition, do not overheat.
- Exposure to moisture
- Freezing
- If electric arc welding or cutting, particular attention must be paid to the way the electrical circuit is completed to eliminate the possibility of producing Hydrogen through electrolysis of the liquor.
- A potential exists for the formation of carbon monoxide gas in closed equipment during cleaning with caustic soda solutions by reaction with certain sugars including fructose, galactose, arabinose, lovalose, lactose, maltose and dry whey powder.

10.5. Materials to avoid

- Metals, Oxidizing agents, Acids, Aluminium, other light metals and their alloys

10.6. Hazardous decomposition products

- Hydrogen

11. TOXICOLOGICAL INFORMATION

11.1. Acute toxicity

11.1.1. Acute oral toxicity

- no data available. Will immediately cause corrosion of and damage to gastrointestinal tract.

11.1.2. Acute inhalation toxicity

- no data available. Mist is severe irritant to the respiratory tract.

11.1.3. Acute dermal toxicity

- no data available. Corrosive.

11.2. Skin corrosion/irritation
- Corrosive

11.3. Serious eye damage/eye irritation
- Corrosive

11.4. Respiratory or skin sensitization
- no observed effect

11.5. Mutagenicity
- Animal testing did not show any mutagenic effects. In vitro tests did not show mutagenic effects.

11.6. Carcinogenicity
- no data available

11.7. Toxicity for reproduction
- Effect on fertility, foetotoxic effect, no observed effect

11.8. Repeated dose toxicity
- not applicable

12. ECOLOGICAL INFORMATION

12.1. Toxicity

Large discharges may contribute to the alkalisation of water and may be fatal to fish and other aquatic life. Can cause severe damage to aquatic plants.
- Fishes, various species, LC50, 96 h, 35 – 189 mg/l (Sodium hydroxide)
- Crustaceans, Ceriodaphnia sp., EC50, 48 h, 40.4 mg/l (Sodium hydroxide)

12.2. Persistence and degradability

12.2.1. Abiotic degradation
- Air Result: neutralization by natural alkalinity
- Water Result: ionization/neutralization
  Conditions: pH
- Soil Result: ionization/neutralization

12.3. Bioaccumulative potential
- Not relevant

12.4. Mobility
- Water, Soil/sediments: Considerable solubility and mobility
- Soil/sediments: Mobile, soluble, ionization/neutralization
- Air: Chemical degradation

12.5. Other adverse effects
- No data available

13. DISPOSAL CONSIDERATIONS

13.1. Waste disposal methods
- Dilute with plenty of water.
- Solutions with high pH-value must be neutralized before discharge.
- Neutralise with acid.
- In accordance with local and national regulations.

13.2. Contaminated packaging
- Where possible recycling is preferred to disposal or incineration.
- Clean container with water.
- Dispose of as unused product.
- In accordance with local and national regulations.

14. TRANSPORT INFORMATION

14.1. International transport regulations

- IATA-DGR

UN number	UN 1824
Class	8
Packing group	II
ICAO-Labels	8 - Corrosive
Proper shipping name	SODIUM HYDROXIDE SOLUTION

- IMDG

UN number	UN 1824
Class	8
Packing group	II
IMDG-Labels	8 - Corrosive
HI/UN No.	1824
EmS	F-A S-B
Proper shipping name	SODIUM HYDROXIDE SOLUTION

- ADR

UN number	UN 1824
Class	8
Packing group	II
ADR/RID-Labels	8 – Corrosive
HI/UN No.	80 / 1824
Proper shipping name	SODIUM HYDROXIDE SOLUTION

- RID

UN number	UN 1824
Class	8
Packing group	II
ADR/RID-Labels	8 – Corrosive
HI/UN No.	80 / 1824
Proper shipping name	SODIUM HYDROXIDE SOLUTION

- ADN

UN number	UN 1824
Class	8
Packing group	II
ADR/RID-Labels	8 – Corrosive
Proper shipping name	SODIUM HYDROXIDE SOLUTION

15. REGULATORY INFORMATION

15.1. Applicable Laws or Regulations

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), as amended.
- Directive 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations, as amended.
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, as amended.
- Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work, as amended.
- Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work, as amended.
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste.
- The List of Wastes (Wales) Regulations 2005. 2005 Welsh Statutory Instrument (WSI), number W.148 (1820), 14 July 2005.
- The List of Wastes (England) Regulations 2005. 2005 Statutory Instrument (SI), number 895, 6 April 2005, as amended
- EH40/2005. Workplace Exposure Limits, as amended through 1,10,2007 (WELs). Published by the Health and Safety Executive (HSE). Issued under the Control of Substances Hazardous to Health Regulations – as amended.

15.2. Notification status

Inventory Information	Status
Toxic Substance Control Act list (TSCA)	- In compliance with inventory
Australian Inventory of Chemical Substances (AICS)	- In compliance with inventory
Canadian Domestic Substances List (DSL)	- In compliance with inventory
Korean Existing Chemicals List (ECL)	- In compliance with inventory
EU list of existing chemical substances (EINECS)	- In compliance with inventory
Japanese Existing and New Chemical Substances (MITI List) (ENCS)	- In compliance with inventory
Inventory of Existing Chemical Substances (China) (IECS)	- In compliance with inventory
Philippine Inventory of Chemicals and Chemical Substances (PICCS)	- In compliance with inventory
New Zealand Inventory of Chemicals (NZIOC)	- In compliance with inventory

16. OTHER INFORMATION

16.1. Full text of H-Statements referred to under section 3

H290 - May be corrosive to metals.

H314 - Causes severe skin burns and eye damage.

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

16.2.1. Full text of R-phrases referred to under section 2

R35 - Causes severe burns.

16.2.2. Full text of R-phrases referred to under section 3

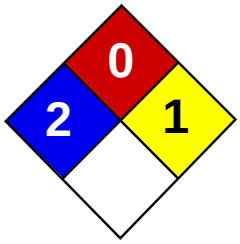
R35 - Causes severe burns.

16.3. Other information

Section	Revisions to Previous issue
8	Inclusion of OELV's from Irish Code of Practice-Chemical Agents. Update of information on hand protection.
All	General reformatting without content change.

- Distribute new edition to clients

This SDS is only intended for the indicated country to which it is applicable. The European SDS format compliant with the applicable European legislation is not intended for use nor distribution in countries outside the European Union with the exception of Norway and Switzerland. Safety datasheets applicable in other countries/regions are available upon request. The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product which conforms to the specification, unless otherwise stated. In this case of combinations and mixtures one must make sure that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and the environment.



Material Safety Data Sheet
Sulfuric Acid, 20% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sulfuric Acid, 20%

Catalog Codes: SLS2890

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Sulfuric acid; Water

CI#: Not applicable.

Synonym:

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sulfuric acid	7664-93-9	20
Water	7732-18-5	80

Toxicological Data on Ingredients: Sulfuric acid: ORAL (LD50): Acute: 2140 mg/kg [Rat.]. VAPOR (LC50): Acute: 255 ppm 4 hour(s) [Rat.].

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion, of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Extremely hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion, of inhalation. Non-sensitizer for skin. Non-permeator by skin. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated

or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated or prolonged inhalation of vapors may lead to chronic respiratory irritation.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as metals, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage:
May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package. Corrosive materials should be stored in a separate safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Sulfuric acid TWA: 1 STEL: 3 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): 2 [Acidic.]

Boiling Point: The lowest known value is 100°C (212°F) (Water). Weighted average: 138°C (280.4°F)

Melting Point: May start to solidify at 10.49°C (50.9°F) based on data for: Sulfuric acid.

Critical Temperature: Not available.

Specific Gravity: Weighted average: 1.1 (Water = 1)

Vapor Pressure: The highest known value is 17.535 mm of Hg (@ 20°C) (Water). Weighted average: 14.03 mm of Hg (@ 20°C)

Vapor Density: The highest known value is 3.4 (Air = 1) (Sulfuric acid). Weighted average: 1.18 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is much more soluble in water.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Easily soluble in cold water, hot water. Insoluble in methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances:
Extremely reactive or incompatible with alkalis. Reactive with metals. Slightly reactive to reactive with oxidizing agents, reducing agents, combustible materials, organic materials, acids.

Corrosivity:
Extremely corrosive in presence of aluminum, of zinc. Highly corrosive in presence of steel, of copper. Slightly corrosive to corrosive in presence of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity: Reacts violently with water especially when water is added to the product. (Sulfuric acid)

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 10700 mg/kg (Rat.) (Calculated value for the mixture). Acute toxicity of the vapor (LC50): 1275 ppm 4 hour(s) (Rat.) (Calculated value for the mixture).

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans: Extremely hazardous in case of skin contact (corrosive, irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 8: Corrosive liquid.

Identification: : Sulfuric acid, solution (Sulfuric acid) : UN2796 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Sulfuric acid; Water

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC): R35- Causes severe burns.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 2

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:15 PM

Last Updated: 05/21/2013 12:00 PM

Merck & Co., Inc.
One Merck Dr.
Whitehouse Station, NJ 08889

MATERIAL SAFETY DATA SHEET

Merck urges each user or recipient of this MSDS to read the entire data sheet to become aware of the hazards associated with this material.

SECTION 1. IDENTIFICATION OF SUBSTANCE AND CONTACT INFORMATION

MSDS NAME: **SCH 530348 [Base]**

SYNONYM(S): SCH 530348-W (Crude)
SCH 530348-WW (Recrystallized)
SCH 530348-X (Micronized)
SCH 530348-W/X

MSDS NUMBER: SP001377

EMERGENCY NUMBER(S): (908) 423-6000 (24/7/365) English Only
Emergencies - CHEMTREC:
(800) 424-9300 (Inside Continental USA)
(703) 527-3887 (Outside Continental USA)

MERCK MSDS HELPLINE: (800) 770-8878 (US and Canada)
(908) 473-3371 (Worldwide)
Monday to Friday, 9am to 5pm (US Eastern Time)

SECTION 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Crystalline solid
White
Odorless
May cause effects to:
blood
gastrointestinal tract
nervous system
immune system
liver

POTENTIAL HEALTH EFFECTS:

Throughout this SDS, SCH 530348 refers to both the base and salt forms of this drug. Animal data was generated using the free base or hydrochloride salt form whereas the clinical studies were performed using the bisulfate salt, unless otherwise indicated.

At low clinical doses, SCH 530348 inhibits platelet aggregation. Overexposure may cause bleeding. Overall, this drug was well tolerated in clinical trials with healthy volunteers.

In animals, SCH 530348 was well tolerated. Adverse effects observed at high doses included liver, gastrointestinal, immune, and nervous system effects. In a two generation reproductive and developmental study in rats, adverse effects were observed in some offspring. Relevance of these effects to humans is unknown.

LISTED CARCINOGENS

Not listed as a carcinogen by OSHA, IARC, NTP or ACGIH.

SECTION 3. COMPOSITION AND INFORMATION ON INGREDIENTS

CHEMICAL NAME: Ethyl[(1R,3aR,4aR,6R,8aR,9S,9aS)-9-[(E)-2-[5-(3-fluorophenyl)-2-pyridinyl]ethenyl]-dodecahydro-1-methyl-3-oxonaphtho[2,3-c)furan-6-yl]carbamate

CHEMICAL FAMILY: Carbamate

PRODUCT USE: Active pharmaceutical ingredient (API)

CHEMICAL FORMULA: C29H33FN2O4

MOLECULAR WEIGHT: 492.58

CHEMICAL COMPOSITION

INGREDIENT	CAS NUMBER	PERCENT
SCH 530348 [Base]	618385-01-6	100

SECTION 4. FIRST AID MEASURES

INHALATION: Remove to fresh air. If any trouble breathing, get immediate medical attention. Administer artificial respiration if breathing has ceased. If irritation or symptoms occur or persist, consult a physician.

SKIN CONTACT: In case of skin contact, while wearing protective gloves, carefully remove any contaminated clothing, including shoes, and wash skin thoroughly with soap and water. If irritation or symptoms occur or persist, consult a physician.

EYE CONTACT: In case of eye contact, immediately rinse eyes thoroughly with plenty of water. If wearing contact lenses, remove only after initial rinse, and continue rinsing eyes for at least 15 minutes. If irritation occurs or persists, consult a physician.

INGESTION: Rinse mouth and drink a glass of water. Do not induce vomiting unless under the direction of a qualified medical professional or Poison Control Center. If symptoms persist, consult a physician.

NOTE TO PHYSICIAN: This material is being evaluated for use as a pharmaceutical agent or in the manufacture of a pharmaceutical agent. No antidotes have been identified.

SECTION 5. FIRE FIGHTING MEASURES

FLAMMABILITY DATA:

Flash Point: Not determined (liquids) or not applicable (solids).

EXPLOSION HAZARDS:
Under normal conditions of use, this material does not present a significant fire or explosion hazard. However, like most organic compounds, this material may present a dust deflagration hazard if sufficient quantities are suspended in air. This hazard may exist where sufficient quantities of finely divided material are (or may become) suspended in air during typical process operations. An assessment of each operation should be conducted and suitable deflagration prevention and protection techniques employed.

The sensitivity of this material to ignition by electrostatic discharges has not been determined. In the absence of testing data, all conductive plant items and operations personnel handling this material should be suitably grounded.

SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing and self-contained breathing apparatus (SCBA).

SUITABLE EXTINGUISHING MEDIA:
Carbon dioxide (CO2), extinguishing powder or water spray.

See Section 9 for Physical and Chemical Properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:
Avoid generation of dust during clean-up. Wear appropriate personal protective equipment as specified in Section 8. Keep personnel away from the clean-up area.

SPILL RESPONSE / CLEANUP:
All spills should be handled according to site requirements and based on precautions cited in the MSDS. In the case of liquids, use proper absorbent materials. For laboratories and small-scale operations, incidental spills within a hood or enclosure should be cleaned by using a HEPA filtered vacuum or wet cleaning methods as appropriate. For large dry or liquid spills or those spills outside enclosure or hood, appropriate emergency response personnel should be notified. In manufacturing and large-scale operations, HEPA vacuuming prior to wet mopping or cleaning is required.

ENVIRONMENTAL PRECAUTIONS:
This product is very toxic to aquatic organisms. Do not allow product to reach ground water, water course, sewage or drainage systems.

See Sections 9 and 10 for additional physical, chemical, and hazard information.

SECTION 7. HANDLING AND STORAGE

HANDLING:
Keep containers adequately sealed during material transfer, transport, or when not in use. Wash face, hands, and any exposed skin after handling. Do not eat, drink, or smoke when using this substance or mixture.

Appropriate handling of this material is dependent on many factors, including physical form, duration and frequency of process or task, and effectiveness of engineering controls. Site-specific risk assessments should be conducted to determine the feasibility and the appropriateness of all exposure control measures. See Section 8 (Exposure Controls) for additional guidance.

STORAGE:
Store between 2 and 8 deg C. Store in dark container or away from light.

See Section 8 for exposure controls and additional safe handling information.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE BAND (OEB):
OEB 4: 1-10 mcg/m^3. Materials in an OEB 4 category are considered high health hazards. The OEB is range of airborne concentrations expressed as an 8-hour Time Weighted Average (8-hr. TWA) and is intended to be used with Industrial Hygiene Risk Assessment to assist with industrial hygiene sampling and selection of proper controls for worker protection. Consult your site safety and industrial hygiene staff for guidance on handling and control strategies.

INTERNAL OCCUPATIONAL EXPOSURE LIMIT (8-hr TWA):
4 mcg/m^3

EXPOSURE CONTROLS
The health hazard risks of handling this material are dependent on many factors, including physical form, duration and frequency of process or task, and effectiveness of engineering controls. Site-specific risk assessments should be conducted to determine the feasibility and the appropriateness of all exposure control measures. Exposure controls for normal operating or routine procedures follow a tiered strategy. Engineering controls are the preferred means of long-term or permanent exposure control. If engineering controls are not feasible, appropriate use of personal protective equipment (PPE) may be considered as alternative control measures. Exposure controls for non-routine operations must be evaluated and addressed as part of the site-specific risk assessment.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

Respiratory Protection:	Respiratory protective equipment (RPE) may be required for certain laboratory and large-scale manufacturing tasks if potential airborne breathing zone concentrations of substances exceed the relevant exposure limit(s). Workplace risk assessment should be completed before specifying and implementing RPE usage. Potential exposure points and pathways, task duration and frequency, potential employee contact with the substance, and the ability of the substance to be rendered airborne during specific tasks should be evaluated. Initial and ongoing strategies of quantitative exposure measurement should be obtained as required by the workplace risk assessment. All RPE must conform to local and regional specifications for efficacy and performance. Consult your site or corporate health and safety professional for additional guidance.
Skin Protection:	Gloves that provide an appropriate barrier to the skin are recommended if there is potential for contact with this material. Consult your site safety staff for guidance.
Eye Protection:	Safety glasses with side shields. Use of goggles or full face protection may be required based on hazard, potential for contact, or level of exposure. Consult your site safety staff for guidance.

Body Protection:

In small-scale or laboratory operations, lab coats or equivalent protection is required. Disposable Tyvek or other dust impermeable suit should be considered based on procedure or level of exposure. Use of additional PPE such as shoe coverings, gauntlets, hood, or head covering may be necessary. Consult your site safety staff for guidance.

In large-scale or manufacturing operations, disposable Tyvek or other dust impermeable suit is recommended and based on level of exposure. Use of additional PPE such as shoe coverings, gauntlets, hood, or head covering may be necessary. Consult your site safety staff for guidance.

EXPOSURE LIMIT VALUES

No exposure limits are available for this material.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

FORM:	Crystalline solid
COLOR:	White
ODOR:	Odorless
MELTING POINT / RANGE:	121 deg C (250 deg F)
SOLUBILITY:	
Water:	Insoluble
Acetone:	403 mg/mL
DMSO:	469 mg/mL
Ethanol:	12 mg/mL

See Section 5 for flammability/explosivity information.

SECTION 10. STABILITY AND REACTIVITY

STABILITY/ REACTIVITY:
Stable under normal conditions.

INCOMPATIBLE MATERIALS / CONDITIONS TO AVOID:
None known.

HAZARDOUS DECOMPOSITION PRODUCTS / REACTIONS:
No dangerous decomposition is expected if used according to manufacturer's specifications.

SECTION 11. TOXICOLOGICAL INFORMATION

Throughout this SDS, SCH 530348 refers to both the base and salt forms of this drug. Animal data was generated using the free base or hydrochloride salt form whereas the clinical studies were performed using the bisulfate salt, unless otherwise indicated.

ACUTE TOXICITY DATA

SKIN:
SCH 530348 (base and bisulfate salt) was non-irritating in a skin irritation study in rabbits (PII = 0). No skin reactions of any kind were elicitated by this material in any animal tested.

SCH 530348 did not elicit a skin phototoxicity reaction in rats (NOAEL: > 30 mg/kg).

EYE:
SCH 530348 (base and bisulfate salt) was a slight eye irritant in a low volume eye irritation study in rabbits. Slight, early-onset and transient conjunctival reddening was reported. Two animals were noted with slight discharge at the 1-hour reading, which resolved by 24 hours. (MTS = 1.33)

SCH 530348 did not elicit an ocular phototoxicity reaction in rats (NOAEL: > 30 mg/kg).

ORAL:
In a single oral gavage cardiovascular safety study with SCH 530348, male cynomolgus monkeys received a dose of either 5 or 20 mg/kg. No treatment related clinical effects were observed.

In an acute rising-dose toxicity study, monkeys (1 monkey/sex/group) received either a single oral dose of 100 mg/kg followed subsequently by a single dose of 200 mg/kg, or a single oral dose of 50 mg/kg followed by single doses of 400, 800, and 1000 (female only) mg/kg. Doses were separated by a two- to five-day observation period. Clinical signs of toxicity in the male dosed with 800 mg/kg were limited to emesis. Clinical signs of toxicity in the female dosed with 1000 mg/kg consisted of emesis, excessive vocalization, and tremors. There were no clinical signs in female monkeys dosed at 50 and 100 mg/kg. Loose or soft stool was observed in males at all doses and in females dosed with 200 mg/kg or greater. Observations were bacterial in nature; however, it is uncertain whether they were caused from treatment. The NOEL was <50 mg/kg in males and 100 mg/kg in females.

No central nervous sytem effects were noted in rats that received oral doses of 3, 30, and 100 mg/kg in an acute central nervous system pharmacological profile study.

No mortality was observed in rats dosed with 200-2000 mg/kg. Salivation, excessive food spillage, and urogenital staining (females only) was observed at 2000 mg/kg. Lower mean body weight gain was reported for both the 800 and 2000 mg/kg dose groups. NOAEL: 400 mg/kg (females) and 800 mg/kg (males).

DERMAL AND RESPIRATORY SENSITIZATION:
SCH 530348 (base and bisulfate salt) was not a skin sensitizer in the local lymph node assay (LLNA) in mice.

An ocular and skin phototoxicity was conducted in rats because SCH 530348 has the ability to partition to the eyes and skin. SCH 530348 did not elicit a phototoxicity reaction in eyes or skin.

ADDITIONAL INFORMATION:
In an acute intraperitoneal toxicity study, rats were administered a single dose of 100, 200, 400, or 1000 mg/kg of SCH 530348. In the 1000 mg/kg dose group, rats were either found dead or terminated in moribund condition. One female, in the 400 mg/kg dose group was terminated in moribund condition. Clinical signs of toxicity noted in the high dose group included convulsions, hunched appearance, lethargy, prostration, and weakness. Additional clinical signs of toxicity noted in female rats dosed with 400 mg/kg included weakness, tremors, chromorhinorrhea, and scant feces. No other adverse clinical effects were observed in the other dose groups.

REPEAT DOSE TOXICITY DATA

SUBCHRONIC / CHRONIC TOXICITY:
SCH 530348 was tested in rats for one- to six-months and in monkeys for one to twelve months. In the one-month study in monkeys, no adverse effects were observed (NOEL: >20 mg/kg). In the one-month study in rats, adverse clinical effects observed were limited to decreased body weight and body weight gain in the high dosage group (100 mg/kg/day). Common histopathological findings seen in both the one-month and six-month studies included vacuolation of the bile duct epithelium of the liver. Other histopathological findings noted in the one-month study included vacuolated macrophages in the spleen, lymph nodes, or small intestine. In the six-month study, other histopathological findings included vacuolation of the seminal vesicle epithelium. Vacuolation is consistent with phospholipidosis (lipid accumulation in cells). [NOEL- One-Month study: 3 mg/kg; NOEL- Six-Month study: 3 mg/kg (males) and 10 mg/kg (females)]

In a three-month oral gavage dose range finding study in mice (25, 75, 150 mg/kg), mortality was seen at 150 mg/kg. Vacuolations similar to those seen in rats and monkeys were also observed. [NOAEL in females was 25 mg/kg, none established in males]

REPRODUCTIVE / DEVELOPMENTAL TOXICITY:
Rats received oral doses of SCH 530348 ranging from 5 to 50 mg/kg in a fertility and early embryonic developmental toxicity study, and 5 to 75 mg/kg in an embryo-fetal developmental study in rats. In both studies, adverse paternal and maternal effects were observed in the high dosage groups and were limited to decreased body weight gain and food consumption. In the embryo-fetal developmental study, decreased fetal weight was also observed in the high dosage group. No other effects were observed. [Maternal and paternal toxicity NOEL: 25 mg/kg; Embryo-fetal toxicity NOEL: 25 mg/kg; Fertility and early embryonic development toxicity NOEL: >50 mg/kg]

In rabbits, SCH 530348 did not cause teratogenicity or maternal toxicity when administered at doses ranging from 2 to 20 mg/kg.

A Pre/Postnatal development (PPND) study was conducted in rats dosed orally with 5-50 mg/kg on gestation day 6 through lactation day 21. No significant effects were reported in the dams (F0). Reversible decreased locomotor activity in females (PND 21) was reported in F1 generation animals at >=25 mg/kg. Decreased postnatal survival (up to PND 4), decreased pup body weights (PND 1), decreased pup body weight gain (pre-weaning period), and decreased pup acoustic startle response (PND 20) was reported in the F1 generation at 50 mg/kg. Decreased number of live pups (PND 0), decreased postnatal survival (PND 1-7), and slight reduction of pup body weight gains (by PND 7) were observed in the second generation (F2) animals at >=25 mg/kg. NOAEL: 50 mg/kg (maternal toxicity), 5 mg/kg (F1 and F2 toxicity).

MUTAGENICITY / GENOTOXICITY:
Negative in a bacterial mutagenicity study (Ames), chromosomal abberation assay, and in vitro micronucleus assay both with and without metabolic activation. Negative in a chromosome aberration study in human lymphocytes. In the mouse bone marrow micronucleus assay, bone marrow toxicity was observed in male mice; however, increases in micronucleus frequency was not observed in test animals at any dose administered.

CARCINOGENICITY:
This material or product has not been evaluated for carcinogenicity.

SECTION 12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA

PRODUCT / CHEMICAL NAME	STUDY TYPE	RESULT	COMMENTS
SCH 530348-W	48-hr EC50 (daphnid)	0.19 mg/L	0.065 mg/L (NOEC)

ENVIRONMENTAL DATA

PRODUCT / CHEMICAL NAME: SCH 530348-W

Water Solubility:	1.29 mg/L
Partition Coefficient (log Pow) Results:	2.16
Biodegradation Results:	Not readily biodegradable.

SECTION 13. DISPOSAL CONSIDERATIONS

MATERIAL WASTE:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations. Incineration is the preferred method of disposal, when appropriate. Operations that involve the crushing or shredding of waste materials or returned goods must be handled to meet the recommended exposure limit(s).

PACKAGING AND CONTAINERS:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations.

SPECIAL ENVIRONMENTAL HANDLING PROCEDURES:
This material is harmful to the environment. Do not allow product to reach ground water, water courses, sewage or drainage systems.

SECTION 14. TRANSPORT INFORMATION

This material is not regulated for transportation when it is shipped without mixture with other hazardous components. This classification is based on the evaluation of available information until full testing is completed or additional information is available to further classify hazards for transportation. Therefore, the use of PG I UN-specification packaging is recommended to ensure safe transportation of this material.

SECTION 15. REGULATORY INFORMATION

TSCA LISTING

Consult the Toxic Substance Control Inventory.

U.S. STATE REGULATIONS

Check state requirements for ingredient listing.

SECTION 16. OTHER INFORMATION

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequence of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

DEPARTMENT ISSUING MSDS:	Global Safety & the Environment Merck & Co., Inc. One Merck Drive Whitehouse Station, NJ 08889
MERCK MSDS HELPLINE:	(800) 770-8878 (US and Canada) (908) 473-3371 (Worldwide) Monday to Friday, 9am to 5pm (US Eastern Time)
MSDS CREATION DATE:	12-Nov-2002
SUPERSEDES DATE:	21-Mar-2008
SECTIONS CHANGED (US SUBFORMAT):	2, 8, 11, 12
SIGNIFICANT CHANGES (US SUBFORMAT):	OEB

Vorapaxar

Version	Revision Date:	SDS Number:	Date of last issue: 25.06.2015
3.1	04.02.2016	78984-00003	Date of first issue: 19.03.2015

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

1.1 Product identifier

Trade name	:	Vorapaxar
Product code	:	Vorapaxar
Substance name	:	Vorapaxar
CAS-No.	:	705260-08-8

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

Use of the Substance/Mixture	:	Pharmaceutical

1.3 Details of the supplier of the safety data sheet

Company	:	MSD Hertford Road EN11 9BU Hoddesdon - Great Britain
Telephone	:	44 1 992 46 72 72
Telefax	:	908-735-1496
E-mail address of person responsible for the SDS	:	EHSDATASTEWARD@merck.com

1.4 Emergency telephone number

908-423-6000

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Reproductive toxicity, Category 2	H361d: Suspected of damaging the unborn child.
Specific target organ toxicity - repeated exposure, Category 2, Liver, Blood, thymus, Kidney, Skeletal muscle, Testes, eye - retina	H373: May cause damage to organs through prolonged or repeated exposure if swallowed.
Chronic aquatic toxicity, Category 1	H410: Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Warning

Hazard statements :	H361d	Suspected of damaging the unborn child.
	H373	May cause damage to organs (Liver, Blood, thymus, Kidney, Skeletal muscle, Testes, eye - retina) through prolonged or repeated exposure if swallowed.
	H410	Very toxic to aquatic life with long lasting effects.
Precautionary statements :	**Prevention:**	
	P201	Obtain special instructions before use.
	P260	Do not breathe dust.
	P273	Avoid release to the environment.
	P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
	Response:	
	P308 + P313	IF exposed or concerned: Get medical advice/ attention.
	P391	Collect spillage.

2.3 Other hazards

Potential dust explosion hazard.
Dust contact with the eyes can lead to mechanical irritation.
Contact with dust can cause mechanical irritation or drying of the skin.

SECTION 3: Composition/information on ingredients

3.1 Substances

Substance name : Vorapaxar

Hazardous components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
Vorapaxar	705260-08-8	>= 90 - <= 100

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : In the case of accident or if you feel unwell, seek medical ad-

vice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.

If inhaled : If inhaled, remove to fresh air.
Get medical attention.

In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water.
Remove contaminated clothing and shoes.
Get medical attention.
Wash clothing before reuse.
Thoroughly clean shoes before reuse.

In case of eye contact : If in eyes, rinse well with water.
Get medical attention if irritation develops and persists.

If swallowed : If swallowed, DO NOT induce vomiting.
Get medical attention.
Rinse mouth thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed

Risks : Contact with dust can cause mechanical irritation or drying of the skin.
Dust contact with the eyes can lead to mechanical irritation.
Suspected of damaging the unborn child.
May cause damage to organs through prolonged or repeated exposure if swallowed.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically and supportively.

SECTION 5: Firefighting measures

5.1 Extinguishing media

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

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : Exposure to combustion products may be a hazard to health.

Hazardous combustion products	:	Carbon oxides

5.3 Advice for firefighters

Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.

6.2 Environmental precautions

Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up	:	Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Technical measures	:	Static electricity may accumulate and ignite suspended dust causing an explosion. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.
Local/Total ventilation	:	Use only with adequate ventilation.
Advice on safe handling	:	Do not breathe dust. Do not swallow. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Handle in accordance with good industrial hygiene and safety practice. Minimize dust generation and accumulation. Keep container closed when not in use. Keep away from heat and sources of ignition. Take care to prevent spills, waste and minimize release to the environment.
Hygiene measures	:	Ensure that eye flushing systems and safety showers are located close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Keep in properly labelled containers. Store locked up. Store in accordance with the particular national regulations.
Advice on common storage	:	Do not store with the following product types: Strong oxidizing agents

7.3 Specific end use(s)

Specific use(s)	:	No data available No data available

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Vorapaxar	705260-08-8	TWA	5 µg/m3	Merck
Further information	Skin			
		Wipe limit	50 µg/100 cm²	Merck

8.2 Exposure controls

Engineering measures

Ensure adequate ventilation, especially in confined areas.

Minimize workplace exposure concentrations.
Apply measures to prevent dust explosions.
Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

Personal protective equipment

Eye protection : Wear the following personal protective equipment:
Safety goggles

Hand protection
Material : Impervious gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Filter type : Particulates type (P)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	Crystalline powder
Colour	:	white
Odour	:	odourless
Odour Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	220 °C
Initial boiling point and boiling range	:	No data available

Flash point	:	No data available
Evaporation rate	:	No data available
Flammability (solid, gas)	:	May form explosive dust-air mixture during processing, handling or other means
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapour pressure	:	No data available
Relative vapour density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	80.8 mg/l
Partition coefficient: n-octanol/water	:	log Pow: 5.11
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

9.2 Other information

Molecular weight	:	590.66 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity

Not classified as a reactivity hazard.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions	:	Dust can form an explosive mixture in air. Can react with strong oxidizing agents.

10.4 Conditions to avoid

Conditions to avoid	:	None known.

10.5 Incompatible materials

Materials to avoid : Oxidizing agents

10.6 Hazardous decomposition products

No hazardous decomposition products are known.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Information on likely routes of exposure : Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity

Not classified based on available information.

Components:

Vorapaxar:

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg

Skin corrosion/irritation

Not classified based on available information.

Components:

Vorapaxar:

Species: Rabbit
Result: No skin irritation

Serious eye damage/eye irritation

Not classified based on available information.

Components:

Vorapaxar:

Species: Rabbit
Result: Mild eye irritation
Remarks: slight irritation

Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information.
Respiratory sensitisation: Not classified based on available information.

Components:

Vorapaxar:

Test Type: Local lymph node assay (LLNA)
Exposure routes: Dermal
Species: Mouse
Assessment: Does not cause skin sensitisation.

Result: negative

Germ cell mutagenicity

Not classified based on available information.

Components:

Vorapaxar:

Genotoxicity in vitro	:	Test Type: Bacterial reverse mutation assay (AMES) Result: negative
	:	Test Type: Chromosome aberration test in vitro Result: negative
Genotoxicity in vivo	:	Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Mouse Application Route: Oral Result: negative
Germ cell mutagenicity- Assessment	:	Weight of evidence does not support classification as a germ cell mutagen.

Carcinogenicity

Not classified based on available information.

Components:

Vorapaxar:

Species: Rat
Application Route: Oral
Exposure time: 2 Years
Result: negative

Species: Mouse
Application Route: Oral
Exposure time: 2 Years
Result: negative

Reproductive toxicity

Suspected of damaging the unborn child.

Components:

Vorapaxar:

Effects on fertility	:	Species: Rat, male and female Application Route: Oral Fertility: No observed adverse effect level: >= 50 mg/kg body weight
Effects on foetal development	:	Test Type: Embryo-foetal development Species: Rat Application Route: Oral Developmental Toxicity: Lowest observed adverse effect level:

		75 mg/kg body weight Result: negative Remarks: The effects were seen only at maternally toxic doses. Test Type: Embryo-foetal development Species: Rat Application Route: Oral Developmental Toxicity: No observed adverse effect level: 25 mg/kg body weight Result: negative Remarks: The effects were seen only at maternally toxic doses. Test Type: Embryo-foetal development Species: Rabbit Application Route: Oral Developmental Toxicity: Lowest observed adverse effect level: 20 mg/kg body weight Symptoms: Malformations were observed. Result: positive Test Type: Embryo-foetal development Species: Rabbit Application Route: Oral Developmental Toxicity: No observed adverse effect level: 10 mg/kg body weight Symptoms: Malformations were observed. Result: positive Test Type: Embryo-foetal development Species: Rat Application Route: Oral Developmental Toxicity: Lowest observed adverse effect level: 25 mg/kg body weight Result: positive Test Type: Embryo-foetal development Species: Rat Application Route: Oral Developmental Toxicity: No observed adverse effect level: 5 mg/kg body weight Result: positive
Reproductive toxicity - Assessment	:	Some evidence of adverse effects on development, based on animal experiments.

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

May cause damage to organs (Liver, Blood, thymus, Kidney, Skeletal muscle, Testes, eye - ret-

ina) through prolonged or repeated exposure if swallowed.

Components:

Vorapaxar:

Target Organs: Liver, Blood, thymus, Kidney, Skeletal muscle, Testes, eye - retina
Assessment: May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Vorapaxar:

Species: Monkey
NOAEL: 20 mg/kg
Application Route: Oral
Exposure time: 12 Months

Species: Monkey
LOAEL: 30 mg/kg
Application Route: Oral
Exposure time: 3 Months
Target Organs: Liver, Blood

Species: Rat
NOAEL: 3 mg/kg
LOAEL: 10 mg/kg
Application Route: Oral
Exposure time: 6 Months
Target Organs: Liver

Species: Mouse
LOAEL: 25 mg/kg
Application Route: Oral
Exposure time: 3 Months
Target Organs: Liver, thymus, Kidney, Skeletal muscle

Aspiration toxicity

Not classified based on available information.

Experience with human exposure

Components:

Vorapaxar:

Ingestion	:	Symptoms: bleeding

SECTION 12: Ecological information

12.1 Toxicity

Components:

Vorapaxar:

Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): > 6.8 mg/l

		Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 0.13 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to bacteria	:	EC50 : > 1,000 mg/l Exposure time: 3 h Test Type: Respiration inhibition Method: OECD Test Guideline 209 NOEC : 148 mg/l Exposure time: 3 h Test Type: Respiration inhibition Method: OECD Test Guideline 209
Toxicity to fish (Chronic toxicity)	:	NOEC: 0.027 mg/l Exposure time: 32 d Species: Pimephales promelas (fathead minnow) Method: OECD Test Guideline 210
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 0.055 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Method: OECD Test Guideline 211
M-Factor (Chronic aquatic toxicity)	:	1

12.2 Persistence and degradability

Components:

Vorapaxar:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 0 % Exposure time: 28 d Method: OECD Test Guideline 301

12.3 Bioaccumulative potential

Components:

Vorapaxar:

Bioaccumulation	:	Species: Lepomis macrochirus (Bluegill sunfish) Bioconcentration factor (BCF): 776 - 858
Partition coefficient: n-octanol/water	:	log Pow: 5.11

12.4 Mobility in soil

Components:

Vorapaxar:

Distribution among environmental compartments	:	log Koc: 5.01 Method: OECD Test Guideline 106

12.5 Results of PBT and vPvB assessment

Not relevant

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product	:	Dispose of in accordance with local regulations. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADN	:	UN 3077
ADR	:	UN 3077
RID	:	UN 3077
IMDG	:	UN 3077
IATA	:	UN 3077

14.2 UN proper shipping name

ADN	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Vorapaxar)
ADR	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Vorapaxar)
RID	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Vorapaxar)
IMDG	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Vorapaxar)

IATA : Environmentally hazardous substance, solid, n.o.s. (Vorapaxar)

14.3 Transport hazard class(es)

ADN : 9

ADR : 9

RID : 9

IMDG : 9

IATA : 9

14.4 Packing group

ADN

Packing group	:	III
Classification Code	:	M7
Hazard Identification Number	:	90
Labels	:	9

ADR

Packing group	:	III
Classification Code	:	M7
Hazard Identification Number	:	90
Labels	:	9
Tunnel restriction code	:	(E)

RID

Packing group	:	III
Classification Code	:	M7
Hazard Identification Number	:	90
Labels	:	9

IMDG

Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F

IATA (Cargo)

Packing instruction (cargo aircraft)	:	956
Packing instruction (LQ)	:	Y956
Packing group	:	III
Labels	:	Miscellaneous

IATA (Passenger)

Packing instruction (passenger aircraft)	:	956
Packing instruction (LQ)	:	Y956
Packing group	:	III
Labels	:	Miscellaneous

14.5 Environmental hazards

ADN

Environmentally hazardous : yes

ADR
Environmentally hazardous : yes

RID
Environmentally hazardous : yes

IMDG
Marine pollutant : yes

14.6 Special precautions for user

Not applicable

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

Remarks : Not applicable for product as supplied.

SECTION 15: Regulatory information

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

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals : Not applicable

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer : Not applicable

Regulation (EC) No 850/2004 on persistent organic pollutants : Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

		Quantity 1	Quantity 2
E1	ENVIRONMENTAL HAZARDS	100 t	200 t

Other regulations : Take note of Dir 94/33/EC on the protection of young people at work.
Take note of Dir 92/85/EEC on the safety and health at work of pregnant workers.

Take note of Directive 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

The components of this product are reported in the following inventories:

AICS	:	not determined
DSL	:	not determined
IECSC	:	not determined

15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

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; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

Sources of key data used to compile the Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/

Vorapaxar

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Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

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