

ALIPHOS DICAL+

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

1.1. Product identifier

| | |
|---------------------------|---|
| Product name | : ALIPHOS DICAL+ |
| Synonyms | : calcium hydrogenorthophosphate, dihydrate; dicalcium phosphate, dihydrate |
| Registration number REACH | : 01-2119490064-41-0023 |
| Product type REACH | : Substance/mono-constituent |
| CAS number | : 7789-77-7 |
| EC number | : 231-826-1 |
| Molecular mass | : 172.09 g/mol |
| Formula | : CaHPO ₄ .2H ₂ O |

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

1.2.1 Relevant identified uses

Feed materials
Fertilizer
Paint
Fire-retarding agent

1.2.2 Uses advised against

No uses advised against known

1.3. Details of the supplier of the safety data sheet

Supplier of the safety data sheet

Aliphos Rotterdam BV
Zevenmishaven Oost 139
The Netherlands - 3133 CA Vlaardingen
☎ +31 10 445 27 77
animalnutrition@aliphos.com

Manufacturer of the product

Aliphos Rotterdam BV
Port 4404
4404 Route de Maroÿck
59279 Dunferque
France
☎ +33 366 32 08 08
animalnutrition@aliphos.com

1.4. Emergency telephone number

During business hours:
Aliphos Rotterdam BV
+31 10 445 27 77

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Not classified as dangerous according to the criteria of Regulation (EC) No 1272/2008

2.2. Label elements

Not classified as dangerous according to the criteria of Regulation (EC) No 1272/2008

2.3. Other hazards

No other hazards known

SECTION 3: Composition/information on ingredients

3.1. Substances

This substance is not classified as dangerous based upon classification criteria

| Name | CAS No | Conc. (C) | Classification according to CLP | Note | Remark |
|---|------------------------|-----------|---------------------------------|------|------------------|
| REACH Registration No | EC No | | | | |
| calcium hydrogen phosphate, dihydrate 01-2119490064-41 | 7789-77-7 231-826-1 | >98 % | | | Mono-constituent |

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

General:

If you feel unwell, seek medical advice.

After inhalation:

Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service.

After skin contact:

Rinse with water. Take victim to a doctor if irritation persists.

After eye contact:

Rinse with water. Remove contact lenses, if present and easy to do. Continue rinsing. Take victim to an ophthalmologist if irritation persists.

After ingestion:

Rinse mouth with water. Consult a doctor/medical service if you feel unwell.

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

4.2.1 Acute symptoms

After inhalation:

No effects known.

After skin contact:

Not irritating.

After eye contact:

Not irritating.

After ingestion:

No effects known.

4.2.2 Delayed symptoms

If applicable and available it will be listed below.

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

If applicable and available it will be listed below.

SECTION 5: Firefighting measures

5.1. Extinguishing media

5.1.1 Suitable extinguishing media:

Adapt extinguishing media to the environment for surrounding fires.

5.1.2 Unsuitable extinguishing media:

Not applicable.

5.2. Special hazards arising from the substance or mixture

At very high temperature: release of toxic/corrosive/combustible gases/vapours (phosphine).

5.3. Advice for firefighters

5.3.1 Instructions:

No specific fire-fighting instructions required.

5.3.2 Special protective equipment for fire-fighters:

Gloves. Protective clothing. Dust cloud production: compressed air/oxygen apparatus. Heat/fire exposure: compressed air/oxygen apparatus.

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Prevent dust cloud formation, e.g. by wetting.

6.1.1 Protective equipment for non-emergency personnel

See heading 8.2

6.1.2 Protective equipment for emergency responders

Gloves. Protective clothing. Dust cloud production: compressed air/oxygen apparatus.

Suitable protective clothing

See heading 8.2

6.2. Environmental precautions

Contain released product, pump into suitable containers. Plug the leak, cut off the supply. Knock down/dilute dust cloud with water spray.

6.3. Methods and material for containment and cleaning up

Prevent dust cloud formation. Scoop solid spill into closing containers. Clean contaminated surfaces with an excess of water. Wash clothing and equipment after handling.

6.4. Reference to other sections

See heading 13.

SECTION 7: Handling and storage

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

7.1. Precautions for safe handling

Avoid raising dust. Observe normal hygiene standards. Keep container tightly closed.

7.2. Conditions for safe storage, including any incompatibilities

7.2.1 Safe storage requirements:

Store in a dry area. Meet the legal requirements. Max. storage time: 1095 day(s).

7.2.2 Keep away from:

No data available.

7.2.3 Suitable packaging material:

Paper, polypropylene, polyethylene.

7.2.4 Non suitable packaging material:

Aluminium.

7.3. Specific end use(s)

If applicable and available, exposure scenarios are attached in annex. See information supplied by the manufacturer.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 Occupational exposure

a) Occupational exposure limit values

If limit values are applicable and available these will be listed below.

b) National biological limit values

If limit values are applicable and available these will be listed below.

8.1.2 Sampling methods

| Product name | Test | Number |
|------------------------|-------|--------|
| Calcium & Cpds (as Ca) | NIOSH | 7020 |

8.1.3 Applicable limit values when using the substance or mixture as intended

If limit values are applicable and available these will be listed below.

8.1.4 DNEL/PNEC values

DNEL/DMEL - Workers

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| Effect level (DNEL/DMEL) | Type | Value | Remark |
|--------------------------|---------------------------------------|------------------------|--------|
| DNEL | Long-term systemic effects Inhalation | 4.07 mg/m ³ | |

DNEL/DMEL - General population

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| Effect level (DNEL/DMEL) | Type | Value | Remark |
|--------------------------|---------------------------------------|------------------------|--------|
| DNEL | Long-term systemic effects Inhalation | 3.04 mg/m ³ | |

PNEC

Publication date: 2017-07-28

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| Compartments | Value | Remark |
|--------------|---------|--------|
| STP | 50 mg/l | |

8.1.5 Control banding

If applicable and available it will be listed below.

8.2. Exposure controls

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

8.2.1 Appropriate engineering controls

Avoid raising dust. Carry operations in the open/under local exhaust/ventilation or with respiratory protection.

8.2.2 Individual protection measures, such as personal protective equipment

Observe normal hygiene standards. Keep container tightly closed. Do not eat, drink or smoke during work.

a) Respiratory protection:

Dust production: dust mask with filter type P1.

b) Hand protection:

Gloves.

c) Eye protection:

Safety glasses, in case of dust production: protective goggles.

d) Skin protection:

Protective clothing.

8.2.3 Environmental exposure controls:

See headings 6.2, 6.3 and 13

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|---------------------------|--|
| Physical form | Crystalline solid |
| Odour | Odourless |
| Odour threshold | Not applicable |
| Colour | Off-white |
| Particle size | No data available |
| Explosion limits | Not applicable |
| Flammability | Non combustible |
| Log Kow | No data available |
| Dynamic viscosity | Not applicable |
| Kinematic viscosity | Not applicable |
| Melting point | No data available |
| Boiling point | No data available |
| Flash point | Not applicable |
| Evaporation rate | Not applicable (solid) |
| Relative vapour density | Not applicable (solid) |
| Vapour pressure | Not applicable |
| Solubility | Water ; 0.02 g/100 ml |
| Relative density | 1.0 |
| Decomposition temperature | No data available |
| Auto-ignition temperature | Not applicable |
| Explosive properties | No chemical group associated with explosive properties |
| Oxidising properties | No chemical group associated with oxidising properties |
| pH | 7 ; 1 % |

9.2. Other information

| | |
|------------------|------------------------|
| Absolute density | 1000 kg/m ³ |
|------------------|------------------------|

SECTION 10: Stability and reactivity

10.1. Reactivity

Substance has neutral reaction.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No data available.

Publication date: 2017-07-28

10.4. Conditions to avoid

Avoid raising dust.

10.5. Incompatible materials

No data available.

10.6. Hazardous decomposition products

At very high temperature: release of toxic/corrosive/combustible gases/vapours (phosphine).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

11.1.1 Test results

Acute toxicity

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| Route of exposure | Parameter | Method | Value | Exposure time | Species | Value determination | Remark |
|-------------------|-----------|----------|------------------|---------------|----------------------|---------------------|--------|
| Oral | LD50 | Other | > 10000 mg/kg bw | | Rat (female) | Experimental value | |
| Dermal | Min LD | Other | > 7940 mg/kg bw | 24 h | Rabbit (male/female) | Weight of evidence | |
| Inhalation (dust) | LCS0 | OECD 403 | > 2.6 mg/l air | 4 h | Rat (male/female) | Read-across | |

Conclusion

Not classified for acute toxicity

Corrosion/irritation

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| Route of exposure | Result | Method | Exposure time | Time point | Species | Value determination | Remark |
|-------------------|----------------|------------------------|---------------|------------|---------|---------------------|--------|
| Eye | Not irritating | OECD 405 | | | Rabbit | Experimental value | |
| Skin | Not irritating | Equivalent to OECD 404 | 24 h | | Rabbit | Experimental value | |

Conclusion

Not classified as irritating to the skin
 Not classified as irritating to the eyes
 Not classified as irritating to the respiratory system

Respiratory or skin sensitisation

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| Route of exposure | Result | Method | Exposure time | Observation time point | Species | Value determination | Remark |
|-------------------|-----------------|----------|---------------|------------------------|----------------|---------------------|--------|
| Skin | Not sensitizing | OECD 429 | | | Mouse (female) | Read-across | |

Conclusion

Not classified as sensitizing for inhalation
 Not classified as sensitizing for skin

Specific target organ toxicity

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No (test) data available

Conclusion

Not classified for subchronic toxicity

Mutagenicity (in vitro)

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No (test) data available

Mutagenicity (in vivo)

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No (test) data available

Conclusion

Not classified for mutagenic or genotoxic toxicity

Carcinogenicity

Publication date: 2017-07-28

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No (test)data available

Conclusion

Not classified for carcinogenicity

Reproductive toxicity

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No (test)data available

Conclusion

Not classified for reprotoxic or developmental toxicity

Toxicity other effects

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No (test)data available

Chronic effects from short and long-term exposure

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No effects known.

SECTION 12: Ecological information

12.1. Toxicity

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No (test)data available

Conclusion

Not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008

12.2. Persistence and degradability

Biodegradability: not applicable

12.3. Bioaccumulative potential

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Log Kow

| Method | Remark | Value | Temperature | Value determination |
|--------|-------------------|-------|-------------|---------------------|
| | No data available | | | |

calcium hydrogen phosphate dihydrate

Log Kow

| Method | Remark | Value | Temperature | Value determination |
|--------|-------------------|-------|-------------|---------------------|
| | No data available | | | |

Conclusion

No bioaccumulation data available

12.4. Mobility in soil

No (test)data on mobility of the substance available

12.5. Results of PBT and vPvB assessment

The criteria of PBT and vPvB as listed in Annex XIII of Regulation (EC) No 1907/2006 do not apply to inorganic substances.

12.6. Other adverse effects

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Fluorinated greenhouse gases (Regulation (EU) No 517/2014)

Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 517/2014)

Ozone-depleting potential (ODP)

Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009)

SECTION 13: Disposal considerations

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

13.1. Waste treatment methods

13.1.1 Provisions relating to waste

European Union

Can be considered as non hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014.
Waste material code (Directive 2008/98/EC, Decision 2000/0532/EC).

06 03 14 (wastes from the MFSU of salts and their solutions and metallic oxides: solid salts and solutions other than those mentioned in 06 03 11 and 06 03 13). Depending on branch of industry and production process, also other waste codes may be applicable.

13.1.2 Disposal methods

Recycle/reuse. Remove waste in accordance with local and/or national regulations. Do not discharge into surface water.

13.1.3 Packaging/Container

No data available

SECTION 14: Transport information

Road (ADR), Rail (RID), Inland waterways (ADN), Sea (IMDG/IMSBC), Air (ICAO-TI/IATA-DGR)

14.1. UN number

| | |
|-----------|-------------|
| Transport | Not subject |
|-----------|-------------|

14.2. UN proper shipping name

14.3. Transport hazard class(es)

| | |
|------------------------------|--|
| Hazard identification number | |
| Class | |
| Classification code | |

14.4. Packing group

| | |
|---------------|--|
| Packing group | |
| Labels | |

14.5. Environmental hazards

| | |
|--|----|
| Environmentally hazardous substance mark | no |
|--|----|

14.6. Special precautions for user

| | |
|--------------------|--|
| Special provisions | |
| Limited quantities | |

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

| | |
|--------------------------|--|
| Annex II of MARPOL 73/78 | |
|--------------------------|--|

SECTION 15: Regulatory information

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

European legislation:

VOC content Directive 2010/75/EU

| | |
|-------------|----------------------------|
| VOC content | Remark |
| | Not applicable (inorganic) |

National legislation The Netherlands

| | |
|----------------------|-------|
| Waterbezwaarlijkheid | D (5) |
|----------------------|-------|

National legislation Germany

| | |
|---------|--|
| WGK | 1; Internal classification water polluting based on the R-phrases according to method VwVwS (Anhang 3) |
| TA-Luft | 5.2.1 |

Other relevant data

| | |
|-------------------------------------|--|
| Other relevant Community provisions | Regulation (EC) No 1069/2009 and Regulation (EU) No 142/2011 |
|-------------------------------------|--|

15.2. Chemical safety assessment

A chemical safety assessment has been performed.

Publication date: 2017-07-28

SECTION 16: Other information

| | |
|--------------|--|
| (*) | INTERNAL CLASSIFICATION BY BIG |
| CLP (EU-GHS) | Classification, labelling and packaging (Globally Harmonised System in Europe) |
| DMEL | Derived Minimal Effect Level |
| DNEL | Derived No Effect Level |
| EC50 | Effect Concentration 50 % |
| ErC50 | EC50 in terms of reduction of growth rate |
| LC50 | Lethal Concentration 50 % |
| LD50 | Lethal Dose 50 % |
| NOAEL | No Observed Adverse Effect Level |
| NOEC | No Observed Effect Concentration |
| OECD | Organisation for Economic Co-operation and Development |
| PBT | Persistent, Bioaccumulative & Toxic |
| PNEC | Predicted No Effect Concentration |
| STP | Sludge Treatment Process |
| vPvB | very Persistent & very Bioaccumulative |

The information in this safety data sheet is based on data and samples provided to BIG. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned under point 1. New safety data sheets are written from time to time. Only the most recent versions may be used. Old versions must be destroyed. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form, mixed with other substances or in processes. The safety data sheet offers no quality specification for the substances/preparations/mixtures in question. Compliance with the instructions in this safety data sheet does not release the user from the obligation to take all measures dictated by common sense, regulations and recommendations or which are necessary and/or useful based on the real applicable circumstances. BIG does not guarantee the accuracy or exhaustiveness of the information provided and cannot be held liable for any changes by third parties. This safety data sheet is only to be used within the European Union, Switzerland, Iceland, Norway and Liechtenstein. Any use outside of this area is at your own risk. Use of this safety data sheet is subject to the licence and liability limiting conditions as stated in your BIG licence agreement or when this is falling the general conditions of BIG. All intellectual property rights to this sheet are the property of BIG and its distribution and reproduction are limited. Consult the mentioned agreement/conditions for details.

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Revision number: 0000

Product number: 39045

8 / 8



SAFETY DATA SHEET

CleanAirBlue® AdBlue®

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

1.1. Product identifier

| | |
|-----------------------|------------------------------------|
| Product name | CleanAirBlue® AdBlue® |
| Product number | 4303 |
| Synonyms; trade names | AdBlue®/ Urea Solution/DEF/ARLA 32 |
| CAS number | 57-13-6 |
| EC number | 200-315-5 |

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

| | |
|-----------------|----------------|
| Identified uses | Fuel additive. |
|-----------------|----------------|

1.3. Details of the supplier of the safety data sheet

| | |
|----------------|---|
| Supplier | Samuel Banner & Co Ltd Hampton Court Manor Park Runcorn Cheshire WA7 1TU, UK +44 (0)1928 597 000 (General Enquiries) +44 (0)1928 597 001 (Fax) sdsadmin@bannerchemicals.com |
| Contact person | sdsorder@bannerchemicals.com |

1.4. Emergency telephone number

| | |
|---------------------|--|
| Emergency telephone | 0207 405 5375 (National Chemical Emergency Centre) 0870 190 6777 (National Chemical Emergency Centre) +44 (0)1270 502891 |
|---------------------|--|

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

| | |
|-----------------------|----------------|
| Physical hazards | Not Classified |
| Health hazards | Not Classified |
| Environmental hazards | Not Classified |

2.2. Label elements

| | |
|--------------------------|---|
| EC number | 200-315-5 |
| Hazard statements | NC Not Classified |
| Precautionary statements | P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |

2.3. Other hazards

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SECTION 3: Composition/information on ingredients

3.2. Mixtures

| | |
|---|---|
| urea | 30-60% |
| CAS number: 57-13-6 | EC number: 200-315-5 |
| Classification Not Classified | Classification (67/548/EEC or 1999/45/EC) - |

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

Composition comments Contains water and preservative

SECTION 4: First aid measures

4.1. Description of first aid measures

| | |
|---------------------|---|
| Inhalation | Remove affected person from source of contamination. Get medical attention if any discomfort continues. |
| Ingestion | Do not induce vomiting. Get medical attention if any discomfort continues. |
| Skin contact | Wash skin thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation persists after washing. |
| Eye contact | Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Continue to rinse for at least 15 minutes. Get medical attention if any discomfort continues. |

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

General information No additional symptoms or effects are anticipated.

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

Notes for the doctor Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media Use foam, carbon dioxide, dry powder or water fog to extinguish.

5.2. Special hazards arising from the substance or mixture

| | |
|--------------------------------------|---|
| Specific hazards | In case of fire, toxic gases may be formed. |
| Hazardous combustion products | Does not decompose when used and stored as recommended. |

5.3. Advice for firefighters

| | |
|--|---|
| Protective actions during firefighting | Use water spray to reduce vapours. |
| Special protective equipment for firefighters | Use air-supplied respirator, gloves and protective goggles. |

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Provide adequate ventilation.

6.2. Environmental precautions

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Environmental precautions Contain spillage with sand, earth or other suitable non-combustible material. Avoid discharge into drains or watercourses or onto the ground.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Absorb spillage with non-combustible, absorbent material. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water.

6.4. Reference to other sections

Reference to other sections For personal protection, see Section 8. For waste disposal, see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Avoid contact with skin and eyes. Provide adequate ventilation.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Store at moderate temperatures in dry, well ventilated area. Store in closed original container at temperatures between 0°C and 30°C. Do not use containers made of the following materials: Copper and its alloys. Galvanised containers.

7.3. Specific end use(s)

SECTION 8: Exposure Controls/personal protection

8.1. Control parameters

Occupational exposure limits

urea

Long-term exposure limit (8-hour TWA): WEL No std.

Short-term exposure limit (15-minute): WEL No std.

WEL = Workplace Exposure Limit

Ingredient comments No exposure limits known for ingredient(s).

DNEL No DNEL information available.

PNEC No PNEC information available.

8.2. Exposure controls

Protective equipment



Appropriate engineering controls

Provide adequate ventilation.

Eye/face protection

Wear tight-fitting, chemical splash goggles or face shield. Personal protective equipment for eye and face protection should comply with European Standard EN166.

Hand protection

Wear protective gloves. Wear protective gloves made of the following material: Polyvinyl chloride (PVC). To protect hands from chemicals, gloves should comply with European Standard EN374.

Other skin and body protection

Wear suitable protective clothing as protection against splashing or contamination.

Hygiene measures

Provide eyewash station. Wash hands at the end of each work shift and before eating, smoking and using the toilet.

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Respiratory protection If ventilation is inadequate, suitable respiratory protection must be worn.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

| | |
|---------------------------------|--------------------------------|
| Appearance | Clear liquid. |
| Colour | Colourless. |
| Odour | Slight. |
| pH | pH (concentrated solution): 10 |
| Initial boiling point and range | 103°C @ |
| Relative density | 1.09 @ 20°C |
| Solubility(ies) | Miscible with water. |
| Viscosity | 1.4 mPa s @ 25°C |

9.2. Other information

| | |
|------------------|-----------------|
| Refractive index | 1.3814 - 1.3843 |
|------------------|-----------------|

SECTION 10: Stability and reactivity

10.1. Reactivity

| | |
|------------|---|
| Reactivity | There are no known reactivity hazards associated with this product. |
|------------|---|

10.2. Chemical stability

| | |
|-----------|--|
| Stability | Stable at normal ambient temperatures and when used as recommended. Product freezes at -11°C. Product starts to hydrolyse at 30°C. |
|-----------|--|

10.3. Possibility of hazardous reactions

| | |
|------------------------------------|-------------------------------|
| Possibility of hazardous reactions | None under normal processing. |
|------------------------------------|-------------------------------|

10.4. Conditions to avoid

| | |
|---------------------|------------|
| Conditions to avoid | Not known. |
|---------------------|------------|

10.5. Incompatible materials

| | |
|--------------------|-----------------------------------|
| Materials to avoid | Strong oxidising agents. Nitrites |
|--------------------|-----------------------------------|

10.6. Hazardous decomposition products

| | |
|----------------------------------|---------|
| Hazardous decomposition products | Ammonia |
|----------------------------------|---------|

SECTION 11: Toxicological information

11.1. Information on toxicological effects

| | |
|------------|--|
| Inhalation | Remove from contaminated area. Lay patient down. Keep warm and rested. |
| Ingestion | Although ingestion is not thought to be harmful, the material may lead to discomforting effects by inducing gastrointestinal tract pain leading to nausea and vomiting. In an occupational setting, ingestion of insignificant quantities should not be a cause for concern. |

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| | |
|---------------------|--|
| Skin contact | Product can produce inflammation of the skin following prolonged contact or immersion. Skin contact is not thought to have harmful health effects, the material may still produce adverse effects following entry through wounds, lesions or abrasions, where a stinging sensation will be felt. |
| Eye contact | Although the material is not classed as an irritant, direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness. |

SECTION 12: Ecological Information

12.1. Toxicity

Acute toxicity - fish LC₅₀, 96 hours: >6810 mg/l, Fish

12.2. Persistence and degradability

Persistence and degradability The product is biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential No data available on bioaccumulation.

12.4. Mobility in soil

Mobility No information available.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment No information available

12.6. Other adverse effects

Other adverse effects None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

General information Waste should be treated as controlled waste. Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

Disposal methods Recycle containers wherever possible. This product is not classified as hazardous waste.

SECTION 14: Transport information

General The product is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, ADR/RID).

14.1. UN number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

No transport warning sign required.

14.4. Packing group

Not applicable.

14.5. Environmental hazards

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Environmentally hazardous substance/marine pollutant

No.

14.6. Special precautions for user

Not applicable.

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

Transport in bulk according to Not applicable.

Annex II of MARPOL 73/78
and the IBC Code

SECTION 15: Regulatory information

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

| | |
|-----------------------------|---|
| National regulations | The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (SI 2009 No. 716). |
| EU legislation | Regulation (EC) No 1272/2008 CLP. Regulation (EC) No 1907/2006 REACH. |
| Guidance | Workplace Exposure Limits EH40. |

15.2. Chemical safety assessment

No chemical safety assessment has been carried out.

SECTION 16: Other information

| | |
|-----------------------------|--|
| General information | Only trained personnel should use this material. |
| Revision comments | MSDS re-formatted on new software. No classification changes made, however please review all sections to ensure familiarisation with contents. |
| Issued by | Compliance Department |
| Revision date | 26/05/2016 |
| Revision | 7 |
| Supersedes date | 27/11/2015 |
| SDS status | Approved. |
| Risk phrases in full | Not classified. |

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy themselves as to the suitability of such information for his own particular use.

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 301 SACOX V4

TUB8836018

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

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

1.1 Product identifier

Trade name : CROWN FINISHER (8cc) 301 SACOX V4

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

1.3 Details of the supplier of the safety data sheet

Company : DSM Nutritional Products (UK) Ltd.
Heanor Gate
αGB061EI0017
Delves Road
GB-DE75 7SG Heanor

Telephone : +441773536500
Telefax : +441773536600
E-mail address of person responsible for the SDS : sds.nutritionalproducts@dsm.com

1.4 Emergency telephone number

+441773536623 / +41628662314

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

| | |
|--------------------------------------|--|
| Eye irritation, Category 2 | H319: Causes serious eye irritation. |
| Reproductive toxicity, Category 1B | H360D: May damage the unborn child. |
| Chronic aquatic toxicity, Category 2 | H411: Toxic to aquatic life with long lasting effects. |

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal word : Danger

Hazard statements : H319 Causes serious eye irritation.
H360D May damage the unborn child.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**
P201 Obtain special instructions before use.
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.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P391 Collect spillage.

Hazardous components which must be listed on the label:

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 301 SACOX V4

TUB8836018

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

55721-31-8 Salinomycin sodium salt

2.3 Other hazards

Risk of dust explosion.

Women of childbearing age must avoid any overexposure.

SECTION 3: Composition/information on ingredients

Brief description of the product : Mixture
uct

3.1 Substances

Not applicable

3.2 Mixtures

Hazardous components

| Chemical name | CAS-No. EC-No. Registration number | Classification | Concentration (% w/w) |
|--|--|---|--------------------------|
| zinc oxide | 1314-13-2 215-222-5 | Aquatic Acute 1; H400 Aquatic Chronic 1; H410 | >= 1 - < 2.5 |
| Salinomycin sodium salt | 55721-31-8 | Acute Tox. 2; H300 Skin Irrit. 2; H315 Eye Irrit. 2; H319 Repr. 1B; H360D Aquatic Chronic 2; H411 | >= 1 - < 2.5 |
| iron sulphate monohydrate | 17375-41-6 231-753-5 | Acute Tox. 4; H302 Skin Irrit. 2; H315 Eye Irrit. 2; H319 | >= 1 - < 5 |
| copper sulphate pentahydrate | 7758-99-8 231-847-6 | Acute Tox. 4; H302 Eye Dam. 1; H318 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 | >= 1 - < 2.5 |
| Substances with a workplace exposure limit : | | | |
| choline chloride | 67-48-1 200-655-4 | | >= 1 - < 5 |

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
After any accidental exposure women should seek medical advice from a physician.
- If inhaled : Move to fresh air.
Consult a physician after significant exposure.
- In case of skin contact : Take off contaminated clothing and shoes immediately.
Wash off with soap and plenty of water.
If symptoms persist, call a physician.
- In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 301 SACOX V4

TUB8836018

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

If swallowed : Clean mouth with water and drink afterwards plenty of water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
Obtain medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : No specific symptoms known.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Water
Foam

5.2 Special hazards arising from the substance or mixture

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

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

Further information : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Consider dust explosion hazard.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate personnel to safe areas.
Use personal protective equipment.
Ensure adequate ventilation.
Avoid dust formation.
Avoid breathing dust.

6.2 Environmental precautions

Do not flush into surface water or sanitary sewer system.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and material for containment and cleaning up

Pick up and arrange disposal without creating dust.
Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For personal protection see section 8.
For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Advice on safe handling : Avoid formation of respirable particles.
Avoid exposure - obtain special instructions before use.
For personal protection see section 8.
Dispose of rinse water in accordance with local and national regulations.
Smoking, eating and drinking should be prohibited in the application area.
- Advice on protection against fire and explosion : Avoid dust formation. Provide appropriate exhaust ventilation at places where dust is formed. Take precautionary measures against static discharges.
- Hygiene measures : When using do not eat or drink. When using do not smoke.
Avoid contact with skin, eyes and clothing.

7.2 Conditions for safe storage, including any incompatibilities

- Requirements for storage areas and containers : Store at room temperature.
Keep container tightly closed and dry.

7.3 Specific end use(s)

- Specific use(s) : Not applicable

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

| Components | CAS-No. | Value type (Form of exposure) | Control parameters | Basis |
|---|------------|-------------------------------|--------------------------------------|--------------------|
| calcium carbonate | 471-34-1 | TWA (inhalable dust) | 10 mg/m ³ | GB EH40 |
| | | TWA (Respirable dust) | 4 mg/m ³ | GB EH40 |
| The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m ⁻³ 8-hour TWA of inhalable dust or 4 mg.m ⁻³ 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit. | | | | |
| choline chloride | 67-48-1 | TWA | 10 mg/m ³ | DSM Internal Limit |
| manganese oxide | 1344-43-0 | TWA | 0.5 mg/m ³ (Manganese) | GB EH40 |
| Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used | | | | |
| Salinomycin sodium salt | 55721-31-8 | TWA | 0.04 mg/m ³ | DSM Internal Limit |
| iron sulphate monohydrate | 17375-41-6 | TWA | 1 mg/m ³ (Iron) | GB EH40 |
| | | STEL | 2 mg/m ³ (Iron) | GB EH40 |

8.2 Exposure controls

Personal protective equipment

- Eye protection : Safety glasses with side-shields

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 301 SACOX V4

TUB8836018

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

Hand protection

- : Consider the hazard characteristics of this product and any special workplace conditions when selecting the appropriate type of protective gloves.
Glove material: for example nitrile rubber

Skin and body protection

- : Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Respiratory protection

- : In the case of dust or aerosol formation use respirator with an approved filter.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|--|--|
| Appearance | : powder |
| Odour | : No information available. |
| Odour Threshold | : No information available. |
| pH | : No data available |
| Melting point/range | : not determined |
| Boiling point/boiling range | : not determined |
| Flash point | : Not applicable |
| Flammability (solid, gas) | : May form combustible dust concentrations in air. |
| Vapour pressure | : Not applicable |
| Relative vapour density | : Not applicable |
| Density | : not determined |
| Water solubility | : not determined |
| Partition coefficient: n-octanol/water | : Not applicable |
| Auto-ignition temperature | : No data available |
| Thermal decomposition | : No data available |
| Explosive properties | : No data available |
| Oxidizing properties | : No data available |

9.2 Other information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No hazards to be specially mentioned.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Dust may form explosive mixture in air.

10.4 Conditions to avoid

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 301 SACOX V4

TUB8836018

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

Heat

10.5 Incompatible materials

Strong acids and strong bases
Strong oxidizing agents

10.6 Hazardous decomposition products

No decomposition if used as directed.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

- Acute oral toxicity : Acute toxicity estimate : > 2,000 mg/kg
(Calculation method)
- Skin irritation : May cause skin irritation and/or dermatitis.
- Eye irritation : Dust contact with the eyes can lead to mechanical irritation.
- STOT - single exposure (A-
cute exposure) : The substance or mixture is not classified as specific target
organ toxicant, single exposure.
- STOT - repeated exposure
Salinomycin sodium salt : May cause damage to organs through prolonged or repeated
exposure if inhaled.
- Experience with human exposure: Ingestion
iron sulphate monohydrate : Acute overdose produces the following symptoms:
Stomach/intestinal disorders, Liver disorders
- Further information : May cause irritation of respiratory tract.
- Aspiration toxicity : No aspiration toxicity classification

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish
Salinomycin sodium salt : Oncorhynchus mykiss (rainbow trout)
LC50 (96 h) 1.14 mg/l
- copper sulphate pentahydra-
te : Oncorhynchus mykiss (rainbow trout)
LC50 (96 h) 0.2 mg/l
Test substance: anhydrous substance
- choline chloride : Oryzias latipes (Japanese medaka)
LC50 (96 h) > 100 mg/l

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 301 SACOX V4

TUB8836018

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

(OECD Test Guideline 203)

Toxicity to algae
copper sulphate pentahydrate : Selenastrum capricornutum (green algae)
EC50 (72 h) 0.07 mg/l
Test substance: anhydrous substance

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
zinc oxide : Daphnia magna (Water flea)
NOEC (21 d) 0.058 mg/l
(OECD Test Guideline 211)

No data is available on the product itself.

12.2 Persistence and degradability

No data is available on the product itself.

12.3 Bioaccumulative potential

Bioaccumulation : No data available

Partition coefficient: n-octanol/water : Not applicable

12.4 Mobility in soil

Distribution among environmental compartments : No data available

12.5 Results of PBT and vPvB assessment

Assessment : not determined

12.6 Other adverse effects

Additional ecological information : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Discharge into the environment must be avoided.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Do not dispose of waste into sewer.
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging : Dispose of as unused product.
Do not re-use empty containers.

SECTION 14: Transport information

14.1 UN number

ADN : UN 3077

ADR : UN 3077

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

**CROWN FINISHER (8cc) 301 SACOX V4****TUB8836018**

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

RID : UN 3077**IMDG** : UN 3077**IATA** : UN 3077**14.2 UN proper shipping name****ADN** : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,
N.O.S.
(copper sulfate, zinc oxide)**ADR** : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,
N.O.S.
(copper sulfate, zinc oxide)**RID** : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,
N.O.S.
(copper sulfate, zinc oxide)**IMDG** : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,
N.O.S.
(copper sulfate, zinc oxide, copper sulfate, zinc oxide)**IATA** : Environmentally hazardous substance, solid, n.o.s.
(copper sulfate, zinc oxide)**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 : (-)**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

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 301 SACOX V4

TUB8836018

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

Packing instruction (LQ) : Y956
Packing group : III
Labels : Miscellaneous Dangerous Goods

IATA (Passenger)

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

14.5 Environmental hazards

ADN

Environmentally hazardous : yes

ADR

Environmentally hazardous : yes

RID

Environmentally hazardous : yes

IMDG

Marine pollutant : yes

IATA (Passenger)

Marine pollutant : yes

IATA (Cargo)

Marine pollutant : yes

14.6 Special precautions for user

Not applicable

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

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

15.2 Chemical safety assessment

Not applicable

SECTION 16: Other information

Full text of H-Statements

H300 : Fatal if swallowed.
H302 : Harmful if swallowed.
H315 : Causes skin irritation.
H318 : Causes serious eye damage.
H319 : Causes serious eye irritation.
H360D : May damage the unborn child.
H400 : Very toxic to aquatic life.
H410 : Very toxic to aquatic life with long lasting effects.
H411 : Toxic to aquatic life with long lasting effects.

Full text of other abbreviations

Acute Tox. : Acute toxicity
Aquatic Acute : Acute aquatic toxicity
Aquatic Chronic : Chronic aquatic toxicity

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 301 SACOX V4

TUB8836018

Version 1.0

Revision Date 29.11.2017

Date of last issue: -

| | |
|-------------|-------------------------|
| Eye Dam. | : Serious eye damage |
| Eye Irrit. | : Eye irritation |
| Repr. | : Reproductive toxicity |
| Skin Irrit. | : Skin irritation |

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

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

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

1.1 Product identifier

Trade name : CROWN FINISHER (8cc) 302 MONTEBAN V4

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

1.3 Details of the supplier of the safety data sheet

Company : DSM Nutritional Products (UK) Ltd.
Heanor Gate
αGB061EI0017
Delves Road
GB-DE75 7SG Heanor

Telephone : +441773536500
Telefax : +441773536600
E-mail address of person responsible for the SDS : sds.nutritionalproducts@dsm.com

1.4 Emergency telephone number

+44 1865 407333

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

| | |
|--|--|
| Eye irritation, Category 2 | H319: Causes serious eye irritation. |
| Specific target organ toxicity - repeated exposure, Category 2 | H373: May cause damage to organs through prolonged or repeated exposure. |
| Chronic aquatic toxicity, Category 2 | H411: 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 : H319 Causes serious eye irritation.
H373 May cause damage to organs through prolonged or repeated exposure.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P273 Avoid release to the environment.
P280 Wear eye protection/ face protection.
Response:
P314 Get medical advice/ attention if you feel unwell.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P391 Collect spillage.

Hazardous components which must be listed on the label:

55134-13-9 Narasin

2.3 Other hazards

Risk of dust explosion.

SECTION 3: Composition/information on ingredients

Brief description of the product : Mixture
uct

3.1 Substances

Not applicable

3.2 Mixtures

Hazardous components

| Chemical name | CAS-No. EC-No. Registration number | Classification | Concentration (% w/w) |
|--|--|--|--------------------------|
| zinc oxide | 1314-13-2 215-222-5 | Aquatic Acute 1; H400 Aquatic Chronic 1; H410 | >= 1 - < 2.5 |
| Narasin | 55134-13-9 | Acute Tox. 2; H300 Acute Tox. 2; H330 Eye Dam. 1; H318 STOT RE 1; H372 Aquatic Chronic 2; H411 | >= 1 - < 2.5 |
| iron sulphate monohydrate | 17375-41-6 231-753-5 | Acute Tox. 4; H302 Skin Irrit. 2; H315 Eye Irrit. 2; H319 | >= 1 - < 5 |
| copper sulphate pentahydrate | 7758-99-8 231-847-6 | Acute Tox. 4; H302 Eye Dam. 1; H318 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 | >= 1 - < 2.5 |
| Substances with a workplace exposure limit : | | | |
| choline chloride | 67-48-1 200-655-4 | | >= 1 - < 5 |

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
- If inhaled : Move to fresh air.
Consult a physician after significant exposure.
- In case of skin contact : Take off contaminated clothing and shoes immediately.
Wash off with soap and plenty of water.
If symptoms persist, call a physician.
- In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

If swallowed : Clean mouth with water and drink afterwards plenty of water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
Obtain medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : No specific symptoms known.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Water
Foam

5.2 Special hazards arising from the substance or mixture

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

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

Further information : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Consider dust explosion hazard.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate personnel to safe areas.
Use personal protective equipment.
Ensure adequate ventilation.
Avoid dust formation.
Avoid breathing dust.

6.2 Environmental precautions

Do not flush into surface water or sanitary sewer system.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and material for containment and cleaning up

Pick up and arrange disposal without creating dust.
Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For personal protection see section 8.
For disposal considerations see section 13.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Advice on safe handling : Avoid formation of respirable particles.
Avoid exceeding the given occupational exposure limits (see section 8).
Avoid contact with skin and eyes.
For personal protection see section 8.
Dispose of rinse water in accordance with local and national regulations.
Do not breathe vapours/dust.
Smoking, eating and drinking should be prohibited in the application area.
- Advice on protection against fire and explosion : Avoid dust formation. Provide appropriate exhaust ventilation at places where dust is formed. Take precautionary measures against static discharges.
- Hygiene measures : When using do not eat or drink. When using do not smoke.
Avoid contact with skin, eyes and clothing.

7.2 Conditions for safe storage, including any incompatibilities

- Requirements for storage areas and containers : Store at room temperature.
Keep container tightly closed and dry.

7.3 Specific end use(s)

- Specific use(s) : Not applicable

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

| Components | CAS-No. | Value type (Form of exposure) | Control parameters | Basis |
|---------------------------|---|-------------------------------|--------------------------------------|--------------------|
| calcium carbonate | 471-34-1 | TWA (inhalable dust) | 10 mg/m ³ | GB EH40 |
| | | TWA (Respirable dust) | 4 mg/m ³ | GB EH40 |
| | The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m ⁻³ 8-hour TWA of inhalable dust or 4 mg.m ⁻³ 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit. | | | |
| choline chloride | 67-48-1 | TWA | 10 mg/m ³ | DSM Internal Limit |
| manganese oxide | 1344-43-0 | TWA | 0.5 mg/m ³ (Manganese) | GB EH40 |
| | Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used | | | |
| iron sulphate monohydrate | 17375-41-6 | TWA | 1 mg/m ³ (Iron) | GB EH40 |
| | | STEL | 2 mg/m ³ (Iron) | GB EH40 |

8.2 Exposure controls

Personal protective equipment

- Eye protection : Safety glasses with side-shields

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

- Hand protection : Consider the hazard characteristics of this product and any special workplace conditions when selecting the appropriate type of protective gloves.
Glove material: for example nitrile rubber
- Skin and body protection : Choose body protection according to the amount and concentration of the dangerous substance at the work place.
- Respiratory protection : In the case of dust or aerosol formation use respirator with an approved filter.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- Appearance : powder
- Odour : No information available.
- Odour Threshold : No information available.
- pH : No data available
- Melting point/range : not determined
- Boiling point/boiling range : not determined
- Flash point : Not applicable
- Flammability (solid, gas) : May form combustible dust concentrations in air.
- Vapour pressure : Not applicable
- Relative vapour density : Not applicable
- Density : not determined
- Water solubility : not determined
- Partition coefficient: n-octanol/water : Not applicable
- Auto-ignition temperature : No data available
- Thermal decomposition : No data available
- Explosive properties : No data available
- Oxidizing properties : No data available

9.2 Other information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No hazards to be specially mentioned.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Dust may form explosive mixture in air.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

10.4 Conditions to avoid

Heat

10.5 Incompatible materials

Strong acids and strong bases
Strong oxidizing agents

10.6 Hazardous decomposition products

No decomposition if used as directed.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

- Acute oral toxicity : Acute toxicity estimate : > 2,000 mg/kg
(Calculation method)
- Acute inhalation toxicity : Acute toxicity estimate : > 5 mg/l
(Calculation method)
- Skin irritation : May cause skin irritation and/or dermatitis.
- Eye irritation : Dust contact with the eyes can lead to mechanical irritation.
- STOT - single exposure (Acute exposure) : The substance or mixture is not classified as specific target organ toxicant, single exposure.
- STOT - repeated exposure
Narasin : Target Organs: Central nervous system, Heart, Musculo-skeletal system
Causes damage to organs through prolonged or repeated exposure.
- Experience with human exposure: Ingestion
iron sulphate monohydrate : Acute overdose produces the following symptoms:
Stomach/intestinal disorders, Liver disorders
- Further information : May cause irritation of respiratory tract.
- Aspiration toxicity : No aspiration toxicity classification

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish
Narasin : Oncorhynchus mykiss (rainbow trout)
LC50 (96 h) 1.4 - 2 mg/l
- copper sulphate pentahydra- : Oncorhynchus mykiss (rainbow trout)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

- te : LC50 (96 h) 0.2 mg/l
Test substance: anhydrous substance
- choline chloride : *Oryzias latipes* (Japanese medaka)
LC50 (96 h) > 100 mg/l
(OECD Test Guideline 203)
- Toxicity to algae
copper sulphate pentahydrate : *Selenastrum capricornutum* (green algae)
EC50 (72 h) 0.07 mg/l
Test substance: anhydrous substance
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
zinc oxide : *Daphnia magna* (Water flea)
NOEC (21 d) 0.058 mg/l
(OECD Test Guideline 211)

No data is available on the product itself.

12.2 Persistence and degradability

No data is available on the product itself.

12.3 Bioaccumulative potential

- Bioaccumulation : No data available
- Partition coefficient: n-octanol/water : Not applicable

12.4 Mobility in soil

- Distribution among environmental compartments : No data available

12.5 Results of PBT and vPvB assessment

- Assessment : not determined

12.6 Other adverse effects

- Additional ecological information : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

- Product : Discharge into the environment must be avoided.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Do not dispose of waste into sewer.
Offer surplus and non-recyclable solutions to a licensed disposal company.
- Contaminated packaging : Dispose of as unused product.
Do not re-use empty containers.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

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.
(copper sulfate, zinc oxide)
ADR : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,
N.O.S.
(copper sulfate, zinc oxide)
RID : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,
N.O.S.
(copper sulfate, zinc oxide)
IMDG : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,
N.O.S.
(copper sulfate, zinc oxide, copper sulfate, zinc oxide)
IATA : Environmentally hazardous substance, solid, n.o.s.
(copper sulfate, zinc oxide)

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 : (-)

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

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

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 Dangerous Goods

IATA (Passenger)

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

14.5 Environmental hazards

ADN

Environmentally hazardous : yes

ADR

Environmentally hazardous : yes

RID

Environmentally hazardous : yes

IMDG

Marine pollutant : yes

IATA (Passenger)

Marine pollutant : yes

IATA (Cargo)

Marine pollutant : yes

14.6 Special precautions for user

Not applicable

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

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

15.2 Chemical safety assessment

Not applicable

SECTION 16: Other information

Full text of H-Statements

H300 : Fatal if swallowed.
H302 : Harmful if swallowed.
H315 : Causes skin irritation.
H318 : Causes serious eye damage.
H319 : Causes serious eye irritation.
H330 : Fatal if inhaled.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN FINISHER (8cc) 302 MONTEBAN V4

TUB8832018

Version 1.0

Revision Date 22.11.2017

Date of last issue: -

- H372 : Causes damage to organs through prolonged or repeated exposure.
H400 : Very toxic to aquatic life.
H410 : Very toxic to aquatic life with long lasting effects.
H411 : Toxic to aquatic life with long lasting effects.

Full text of other abbreviations

- Acute Tox. : Acute toxicity
Aquatic Acute : Acute aquatic toxicity
Aquatic Chronic : Chronic aquatic toxicity
Eye Dam. : Serious eye damage
Eye Irrit. : Eye irritation
Skin Irrit. : Skin irritation
STOT RE : Specific target organ toxicity - repeated exposure

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

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GB / EN

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN REARER (7cc) 202 MAXIBAN V7

TUB8684018

Version 1.1

Revision Date 15.11.2017

Date of last issue: 23.06.2017

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

1.1 Product identifier

Trade name : CROWN REARER (7cc) 202 MAXIBAN V7

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

1.3 Details of the supplier of the safety data sheet

Company : DSM Nutritional Products (UK) Ltd.
Heanor Gate
αGB061EI0017
Delves Road
GB-DE75 7SG Heanor

Telephone : +441773536500
Telefax : +441773536600
E-mail address of person responsible for the SDS : sds.nutritionalproducts@dsm.com

1.4 Emergency telephone number

+44 1865 407333

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Eye irritation, Category 2 H319: Causes serious eye irritation.
Chronic aquatic toxicity, Category 2 H411: 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 : H319 Causes serious eye irritation.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear eye protection/ face protection.
Response:
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P391 Collect spillage.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards

Risk of dust explosion.

SECTION 3: Composition/information on ingredients

Brief description of the product : Mixture
uct

3.1 Substances

Not applicable

3.2 Mixtures

Hazardous components

| Chemical name | CAS-No. EC-No. Registration number | Classification | Concentration (% w/w) |
|--|--|--|--------------------------|
| zinc oxide | 1314-13-2 215-222-5 | Aquatic Acute 1; H400 Aquatic Chronic 1; H410 | >= 1 - < 2.5 |
| iron sulphate monohydrate | 17375-41-6 231-753-5 | Acute Tox. 4; H302 Skin Irrit. 2; H315 Eye Irrit. 2; H319 | >= 1 - < 5 |
| copper sulphate pentahydrate | 7758-99-8 231-847-6 | Acute Tox. 4; H302 Eye Dam. 1; H318 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 | >= 1 - < 2.5 |
| Narasin | 55134-13-9 | Acute Tox. 2; H300 Acute Tox. 2; H330 Eye Dam. 1; H318 STOT RE 1; H372 Aquatic Chronic 2; H411 | >= 0.25 - < 1 |
| Substances with a workplace exposure limit : | | | |
| choline chloride | 67-48-1 200-655-4 | | >= 1 - < 5 |

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
- If inhaled : Move to fresh air.
Consult a physician after significant exposure.
- In case of skin contact : Take off contaminated clothing and shoes immediately.
Wash off with soap and plenty of water.
If symptoms persist, call a physician.
- In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.
- If swallowed : Clean mouth with water and drink afterwards plenty of water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
Obtain medical attention.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN REARER (7cc) 202 MAXIBAN V7

TUB8684018

Version 1.1

Revision Date 15.11.2017

Date of last issue: 23.06.2017

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : No specific symptoms known.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Water
Foam

5.2 Special hazards arising from the substance or mixture

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

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

Further information : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Consider dust explosion hazard.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment.
Ensure adequate ventilation.
Avoid dust formation.
Avoid breathing dust.

6.2 Environmental precautions

Do not flush into surface water or sanitary sewer system.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and material for containment and cleaning up

Pick up and arrange disposal without creating dust.
Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For personal protection see section 8.
For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling : Avoid contact with skin and eyes.
For personal protection see section 8.
Dispose of rinse water in accordance with local and national

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN REARER (7cc) 202 MAXIBAN V7

TUB8684018

Version 1.1

Revision Date 15.11.2017

Date of last issue: 23.06.2017

regulations.

Smoking, eating and drinking should be prohibited in the application area.

Advice on protection against fire and explosion : Avoid dust formation. Provide appropriate exhaust ventilation at places where dust is formed. Take precautionary measures against static discharges.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of work-day.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store at room temperature.

Keep container tightly closed and dry.

7.3 Specific end use(s)

Specific use(s) : Not applicable

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

| Components | CAS-No. | Value type (Form of exposure) | Control parameters | Basis |
|---------------------------|---|-------------------------------|--------------------------------------|--------------------|
| calcium carbonate | 471-34-1 | TWA (inhalable dust) | 10 mg/m ³ | GB EH40 |
| | | TWA (Respirable dust) | 4 mg/m ³ | GB EH40 |
| | The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m ⁻³ 8-hour TWA of inhalable dust or 4 mg.m ⁻³ 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit. | | | |
| choline chloride | 67-48-1 | TWA | 10 mg/m ³ | DSM Internal Limit |
| manganese oxide | 1344-43-0 | TWA | 0.5 mg/m ³ (Manganese) | GB EH40 |
| | Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used | | | |
| iron sulphate monohydrate | 17375-41-6 | TWA | 1 mg/m ³ (Iron) | GB EH40 |
| | | STEL | 2 mg/m ³ (Iron) | GB EH40 |

8.2 Exposure controls

Personal protective equipment

Eye protection : Safety glasses with side-shields

Hand protection : Consider the hazard characteristics of this product and any special workplace conditions when selecting the appropriate type of protective gloves.
Glove material: for example nitrile rubber

Skin and body protection : Choose body protection according to the amount and concentration of the dangerous substance at the work place.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN REARER (7cc) 202 MAXIBAN V7

TUB8684018

Version 1.1

Revision Date 15.11.2017

Date of last issue: 23.06.2017

Respiratory protection : In the case of dust or aerosol formation use respirator with an approved filter.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|--|--|
| Appearance | : powder |
| Odour | : No information available. |
| Odour Threshold | : No information available. |
| pH | : No data available |
| Melting point/range | : not determined |
| Boiling point/boiling range | : not determined |
| Flash point | : Not applicable |
| Flammability (solid, gas) | : May form combustible dust concentrations in air. |
| Vapour pressure | : Not applicable |
| Relative vapour density | : Not applicable |
| Density | : not determined |
| Water solubility | : not determined |
| Partition coefficient: n-octanol/water | : Not applicable |
| Auto-ignition temperature | : No data available |
| Thermal decomposition | : No data available |
| Explosive properties | : No data available |
| Oxidizing properties | : No data available |

9.2 Other information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No hazards to be specially mentioned.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Dust may form explosive mixture in air.

10.4 Conditions to avoid

Heat

10.5 Incompatible materials

Strong acids and strong bases
Strong oxidizing agents

10.6 Hazardous decomposition products

No decomposition if used as directed.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN REARER (7cc) 202 MAXIBAN V7

TUB8684018

Version 1.1

Revision Date 15.11.2017

Date of last issue: 23.06.2017

SECTION 11: Toxicological information

11.1 Information on toxicological effects

- Acute oral toxicity : Acute toxicity estimate : > 2,000 mg/kg
(Calculation method)
- Acute inhalation toxicity : Acute toxicity estimate : > 5 mg/l
(Calculation method)
- Skin irritation : May cause skin irritation and/or dermatitis.
- Eye irritation : Dust contact with the eyes can lead to mechanical irritation.
- STOT - single exposure (Acute exposure) : The substance or mixture is not classified as specific target organ toxicant, single exposure.
- STOT - repeated exposure
Narasin : Target Organs: Central nervous system, Heart, Musculo-skeletal system
Causes damage to organs through prolonged or repeated exposure.
- Experience with human exposure: Ingestion
iron sulphate monohydrate : Acute overdose produces the following symptoms:
Stomach/intestinal disorders, Liver disorders
- Further information : May cause irritation of respiratory tract.
- Aspiration toxicity : No aspiration toxicity classification

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish
copper sulphate pentahydrate : Oncorhynchus mykiss (rainbow trout)
LC50 (96 h) 0.2 mg/l
Test substance: anhydrous substance
- Narasin : Oncorhynchus mykiss (rainbow trout)
LC50 (96 h) 1.4 - 2 mg/l
- choline chloride : Oryzias latipes (Japanese medaka)
LC50 (96 h) > 100 mg/l
(OECD Test Guideline 203)
- Toxicity to algae
copper sulphate pentahydrate : Selenastrum capricornutum (green algae)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN REARER (7cc) 202 MAXIBAN V7

TUB8684018

Version 1.1

Revision Date 15.11.2017

Date of last issue: 23.06.2017

te
EC50 (72 h) 0.07 mg/l
Test substance: anhydrous substance

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
zinc oxide : Daphnia magna (Water flea)
NOEC (21 d) 0.058 mg/l
(OECD Test Guideline 211)

No data is available on the product itself.

12.2 Persistence and degradability

No data is available on the product itself.

12.3 Bioaccumulative potential

Bioaccumulation : No data available

Partition coefficient: n-
octanol/water : Not applicable

12.4 Mobility in soil

Distribution among environ-
mental compartments : No data available

12.5 Results of PBT and vPvB assessment

Assessment : not determined

12.6 Other adverse effects

Additional ecological informa-
tion : Toxic to aquatic organisms, may cause long-term adverse
effects in the aquatic environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Discharge into the environment must be avoided.
Do not contaminate ponds, waterways or ditches with chemi-
cal or used container.
Do not dispose of waste into sewer.
Offer surplus and non-recyclable solutions to a licensed dis-
posal company.

Contaminated packaging : Dispose of as unused product.
Do not re-use empty containers.

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

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

**CROWN REARER (7cc) 202 MAXIBAN V7****TUB8684018**

Version 1.1

Revision Date 15.11.2017

Date of last issue: 23.06.2017

| | | |
|-------------|---|--|
| ADN | : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (copper sulfate, zinc oxide) |
| ADR | : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (copper sulfate, zinc oxide) |
| RID | : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (copper sulfate, zinc oxide) |
| IMDG | : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (copper sulfate, zinc oxide, copper sulfate, zinc oxide) |
| IATA | : | Environmentally hazardous substance, solid, n.o.s. (copper sulfate, zinc oxide) |

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 | : | (-) |
| 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 Dangerous Goods |
| IATA (Passenger) | | |
| Packing instruction (passen- | : | 956 |

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN REARER (7cc) 202 MAXIBAN V7

TUB8684018

Version 1.1

Revision Date 15.11.2017

Date of last issue: 23.06.2017

ger aircraft)
Packing instruction (LQ) : Y956
Packing group : III
Labels : Miscellaneous Dangerous Goods

14.5 Environmental hazards

ADN
Environmentally hazardous : yes

ADR
Environmentally hazardous : yes

RID
Environmentally hazardous : yes

IMDG
Marine pollutant : yes

IATA (Passenger)
Marine pollutant : yes

IATA (Cargo)
Marine pollutant : yes

14.6 Special precautions for user

Not applicable

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

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

15.2 Chemical safety assessment

Not applicable

SECTION 16: Other information

Full text of H-Statements

H300 : Fatal if swallowed.
H302 : Harmful if swallowed.
H315 : Causes skin irritation.
H318 : Causes serious eye damage.
H319 : Causes serious eye irritation.
H330 : Fatal if inhaled.
H372 : Causes damage to organs through prolonged or repeated exposure.
H400 : Very toxic to aquatic life.
H410 : Very toxic to aquatic life with long lasting effects.
H411 : Toxic to aquatic life with long lasting effects.

Full text of other abbreviations

Acute Tox. : Acute toxicity
Aquatic Acute : Acute aquatic toxicity
Aquatic Chronic : Chronic aquatic toxicity
Eye Dam. : Serious eye damage
Eye Irrit. : Eye irritation
Skin Irrit. : Skin irritation
STOT RE : Specific target organ toxicity - repeated exposure

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



CROWN REARER (7cc) 202 MAXIBAN V7

TUB8684018

Version 1.1

Revision Date 15.11.2017

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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

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GB / EN

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

As of the revision date above, this (M)SDS meets the regulations in the United Kingdom & Ireland.

PRODUCT

Product Name: ESSO DIESEL
Product Description: Hydrocarbons and Additives
Product Code: 708110-60
Intended Use: Diesel engine fuel

COMPANY IDENTIFICATION

Supplier: Esso Petroleum Company, Limited
ExxonMobil House
Ermyn Way
KT22 8UX Leatherhead, Surrey
United Kingdom

24 Hour Environmental / Health Emergency Telephone e-mail

01372 222 000 (UK) / +44 1372 222 000 (Ireland)

SDS-UK@EXXONMOBIL.COM

SECTION 2 HAZARDS IDENTIFICATION

This material is dangerous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION: | Carc. Cat. 3; R40 | Xn; R65 | R66 | N; R51/53 |

PHYSICAL / CHEMICAL HAZARDS

Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

HEALTH HAZARDS

Limited evidence of a carcinogenic effect. Harmful: may cause lung damage if swallowed. Repeated exposure may cause skin dryness or cracking. Under conditions of poor personal hygiene and prolonged repeated contact, some polycyclic aromatic compounds (PACs) have been suspected as a cause of skin cancer in humans. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. High-pressure injection under skin may cause serious damage.

ENVIRONMENTAL HAZARDS

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Note: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is regulated as a preparation.

Reportable Hazardous Substance(s) or Complex Substance(s)

| Name | CAS# | EINECS / ELINCS | Concentration * | Symbols/Risk Phrases |
|----------------------|------------|-----------------|-----------------|--|
| Fuels, diesel, no. 2 | 68476-34-6 | 270-676-1 | > 94% | Xn;Carc. Cat. 3;R40, Xn;R65, R66, N;R51/53 |

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Note: Composition may contain up to 0.5% performance additives and / or dyes. FAME (fatty acid methyl ester) may be present up to 5% - the maximum permitted by European Standard EN 590

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Hydrocarbon Solvents/Petroleum Hydrocarbons- Skin contact may aggravate an existing dermatitis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

Product Name: ESSO DIESEL
Revision Date: 18Dec2007
Page 3 of 10

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Aldehydes, Sulphur Oxides, Smoke, Fume, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >56C (133F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0
Autoignition Temperature: >250°C (482°F)

| | |
|------------------|------------------------------------|
| SECTION 6 | ACCIDENTAL RELEASE MEASURES |
|------------------|------------------------------------|

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

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| SECTION 7 | HANDLING AND STORAGE |
|------------------|-----------------------------|

HANDLING

Avoid all personal contact. Use proper bonding and/or earthing procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Do not siphon by mouth. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Drums must be earthed and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

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| SECTION 8 | EXPOSURE CONTROLS / PERSONAL PROTECTION |
|------------------|--|

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

| Substance Name | Form | Limit/Standard | | | Note | Source | Year |
|----------------------|-----------------|----------------|-----------|--|------|------------|------|
| Fuels, diesel, no. 2 | Stable Aerosol. | TWA | 5 mg/m3 | | | ExxonMobil | 2007 |
| Fuels, diesel, no. 2 | Vapour. | TWA | 200 mg/m3 | | | ExxonMobil | 2007 |

Note: Information about recommended monitoring procedures can be obtained from the relevant agency(ies)/institute(s):

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
 Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode.

Product Name: ESSO DIESEL

Revision Date: 18Dec2007

Page 5 of 10

Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly affect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves. CEN standards EN 420 and EN 374 provide general requirements and lists of glove types.

Eye Protection: If contact with material is likely, chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9

PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Colour: Light Colored
Odour: Petroleum/solvent
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.85
Flash Point [Method]: >56C (133F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: > 180C (356F)
Vapour Density (Air = 1): > 2 at 101 kPa
Vapour Pressure: < 0.04 kPa (0.3 mm Hg) at 20°C
Evaporation Rate (N-Butyl Acetate = 1): N/D
pH: N/D
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 2 cSt (2 mm²/sec) at 40°C - 4 cSt (4 mm²/sec) at 40°C
Oxidising properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D

Product Name: ESSO DIESEL
 Revision Date: 18Dec2007
 Page 6 of 10

Melting Point: N/A

| | |
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| SECTION 10 | STABILITY AND REACTIVITY |
|-------------------|---------------------------------|

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Open flames and high energy ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Strong Bases, Strong oxidisers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

| | |
|-------------------|----------------------------------|
| SECTION 11 | TOXICOLOGICAL INFORMATION |
|-------------------|----------------------------------|

Acute Toxicity

| <u>Route of Exposure</u> | <u>Conclusion / Remarks</u> |
|-----------------------------|---|
| INHALATION | |
| Toxicity: LC50 > 5000 mg/m3 | Minimally Toxic. Based on test data for structurally similar materials. |
| Irritation: Data available. | Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on test data for structurally similar materials. |
| INGESTION | |
| Toxicity: LD50 > 2000 mg/kg | Minimally Toxic. Based on test data for structurally similar materials. |
| Skin | |
| Toxicity: LD50 > 2000 mg/kg | Minimally Toxic. Based on test data for structurally similar materials. |
| Irritation: Data available. | May dry the skin leading to discomfort and dermatitis. Based on test data for structurally similar materials. |
| Eye | |
| Irritation: Data available. | May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. |

CHRONIC/OTHER EFFECTS

For the product itself:

Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Diesel fuel: Carcinogenic in animal tests. Caused mutations in-vitro. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function. Diesel exhaust fumes: Carcinogenic in animal tests. Inhalation exposures to exhaust for 2 years in test animals resulted in lung tumours and lymphoma. Extract of particulate produced skin tumours in test animals. Caused mutations in-vitro.

Product Name: ESSO DIESEL

Revision Date: 18Dec2007

Page 7 of 10

Additional information is available by request.

| | |
|-------------------|-------------------------------|
| SECTION 12 | ECOLOGICAL INFORMATION |
|-------------------|-------------------------------|

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

High molecular wt. component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

| | |
|-------------------|--------------------------------|
| SECTION 13 | DISPOSAL CONSIDERATIONS |
|-------------------|--------------------------------|

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

European Waste Code: 13 07 01

NOTE: These codes are assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste producers need to assess the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code(s).

This material is considered as hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken

Product Name: ESSO DIESEL

Revision Date: 18Dec2007

Page 8 of 10

for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

| | |
|-------------------|------------------------------|
| SECTION 14 | TRANSPORT INFORMATION |
|-------------------|------------------------------|

LAND (ADR/RID)

Proper Shipping Name: GAS OIL
Proper Shipping Name Suffix: Special Provision 640L
Hazard Class: 3
Classification Code: F1
UN Number: 1202
Packing Group: III
Label(s) / Mark(s): 3
Hazard ID Number: 30
CEFIC Tremcard: 30S1202
Hazchem EAC: 3Y
Transport Document Name: UN1202, GAS OIL, 3, PG III

INLAND WATERWAYS (ADNR)

Proper Shipping Name: GAS OIL
Hazard Class: 3
Hazard ID Number: 30
UN or ID Number: 1202
Packing Group: III
Label(s) / Mark(s): 3
Transport Document Name: UN1202, GAS OIL, 3, PG III

SEA (IMDG)

Proper Shipping Name: GAS OIL
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Label(s): 3
EMS Number: F-E, S-E
Transport Document Name: UN1202, GAS OIL, 3, PG III, (56°C c.c.)

AIR (IATA)

Proper Shipping Name: GAS OIL
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Label(s): 3
Transport Document Name: UN1202, GAS OIL, 3, PG III

| | |
|-------------------|-------------------------------|
| SECTION 15 | REGULATORY INFORMATION |
|-------------------|-------------------------------|

Material is dangerous as defined by the EU Dangerous Substances/Preparations Directives.

CLASSIFICATION: Category 3 Carcinogen. Harmful. Dangerous for the environment.

Product Name: ESSO DIESEL
Revision Date: 18Dec2007
Page 9 of 10

EU LABELING:

Symbol: Xn, N



Harmful.



Dangerous for
the environment.

Nature of Special Risk: R40; Limited evidence of a carcinogenic effect. R65; Harmful: may cause lung damage if swallowed. R66; Repeated exposure may cause skin dryness or cracking. R51/53; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Advice: S2; Keep out of the reach of children. S36/37; Wear suitable protective clothing and gloves. S61; Avoid release to the environment. Refer to special instructions/safety data sheets. S62; If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

Contains: Fuels, diesel, no. 2

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Complies with the following national/regional chemical inventory requirements: EINECS, TSCA, ENCS

Applicable EU Directives and Regulations:

EU Directive:

92/85/EEC [...pregnant workers...recently given birth or...breastfeeding directive]
94/33/EC [...on the protection of young people at work]

SECTION 16

OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE RISK CODES CONTAINED IN SECTION 2 AND 3 OF THIS DOCUMENT (for information only):

R40; Limited evidence of a carcinogenic effect.

R51/53; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R65; Harmful: may cause lung damage if swallowed.

R66; Repeated exposure may cause skin dryness or cracking.

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

No revision information is available.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to

Product Name: ESSO DIESEL

Revision Date: 18Dec2007

Page 10 of 10

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Internal Use Only

MHC: 1A, 0, 0, 0, 1, 1

PPEC: C

DGN: 7081439XGB (1012120)

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

1.1. Product identifier

Product name: S125 HPH

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

Use of substance / mixture: Boiler water treatment.

1.3. Details of the supplier of the safety data sheet

Company name: Freston Water Treatment
Unit 1, Lulworth Business Centre
Nutwood Way
Calmore Industrial Estate
Totton, Southampton
SO40 3WW
Tel: 023 80 669713
Fax: 023 80 663825
Email: Info@freston.co.uk

1.4. Emergency telephone number

Emergency tel: 023 80 669713
(office hours only)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CLP: Acute Tox. 4: H312; Acute Tox. 4: H302

Most important adverse effects: Harmful in contact with skin. Harmful if swallowed.

2.2. Label elements

Label elements:

Hazard statements: H312: Harmful in contact with skin.
H302: Harmful if swallowed.

Hazard pictograms: GHS07: Exclamation mark



Signal words: Warning

Precautionary statements: P262: Do not get in eyes, on skin, or on clothing.
P270: Do not eat, drink or smoke when using this product.

SAFETY DATA SHEET

S125 HPH

Page: 2

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor.

P330: Rinse mouth.

P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing.

Rinse skin with water .

P352: Wash with plenty of water.

2.3. Other hazards

PBT: This product is not identified as a PBT/vPvB substance.

Section 3: Composition/information on ingredients

3.2. Mixtures

Hazardous ingredients:

SODIUM SULPHITE ANHYDROUS - REACH registered number(s): 01-2119537420-49-XXXX

| EINECS | CAS | PBT / WEL | CLP Classification | Percent |
|-----------|----------|-----------|-------------------------------|---------|
| 231-821-4 | 775-83-7 | - | Acute Tox. 4: H302; -: EUH031 | 10-30% |

POTASSIUM HYDROXIDE - REACH registered number(s): 01-2119487136-33-XXXX

| | | | | |
|-----------|-----------|---|---|-------|
| 215-181-3 | 1310-58-3 | - | Acute Tox. 4: H302; Skin Corr. 1A: H314 | 1-10% |
|-----------|-----------|---|---|-------|

MALEIC ACID COPOLYMER

| | | | | |
|--------|-------------|---|---|-------|
| Exempt | 113221-69-5 | - | Eye Irrit. 2: H319; Met. Corr. 1: H290; Skin Irrit. 2: H315 | 1-10% |
|--------|-------------|---|---|-------|

Section 4: First aid measures

4.1. Description of first aid measures

Skin contact: Remove all contaminated clothes and footwear immediately unless stuck to skin. Wash immediately with plenty of soap and water.

Eye contact: Bathe the eye with running water for 15 minutes. Consult a doctor.

Ingestion: Wash out mouth with water. Consult a doctor.

Inhalation: Remove casualty from exposure ensuring one's own safety whilst doing so. Consult a doctor.

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

Skin contact: There may be irritation and redness at the site of contact.

Eye contact: There may be irritation and redness. The eyes may water profusely.

Ingestion: There may be soreness and redness of the mouth and throat.

Inhalation: There may be irritation of the throat with a feeling of tightness in the chest. Exposure may cause coughing or wheezing.

Delayed / immediate effects: Immediate effects can be expected after short-term exposure.

[cont...]

SAFETY DATA SHEET

S125 HPH

Page: 3

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

Immediate / special treatment: Not applicable.

Section 5: Fire-fighting measures

5.1. Extinguishing media

Extinguishing media: Suitable extinguishing media for the surrounding fire should be used. Use water spray to cool containers.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: In combustion emits toxic fumes.

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Refer to section 8 of SDS for personal protection details. If outside do not approach from downwind. If outside keep bystanders upwind and away from danger point. Mark out the contaminated area with signs and prevent access to unauthorised personnel. Turn leaking containers leak-side up to prevent the escape of liquid.

6.2. Environmental precautions

Environmental precautions: Do not discharge into drains or rivers. Contain the spillage using bunding.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Absorb into dry earth or sand. Transfer to a closable, labelled salvage container for disposal by an appropriate method.

6.4. Reference to other sections

Reference to other sections: Refer to section 8 of SDS.

Section 7: Handling and storage

7.1. Precautions for safe handling

Handling requirements: Avoid direct contact with the substance. Ensure there is sufficient ventilation of the area. Do not handle in a confined space. Avoid the formation or spread of mists in the air.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well ventilated area. Keep container tightly closed.

7.3. Specific end use(s)

Specific end use(s): No data available.

[cont...]

SAFETY DATA SHEET

S125 HPH

Page: 4

Section 8: Exposure controls/personal protection

8.1. Control parameters

Hazardous ingredients:

POTASSIUM HYDROXIDE

Workplace exposure limits:

Respirable dust

| State | 8 hour TWA | 15 min. STEL | 8 hour TWA | 15 min. STEL |
|-------|------------|---------------------|------------|--------------|
| UK | - | 2 mg/m ³ | - | - |

DNEL/PNEC Values

DNEL / PNEC No data available.

8.2. Exposure controls

Engineering measures: Ensure there is sufficient ventilation of the area.

Respiratory protection: Self-contained breathing apparatus must be available in case of emergency.

Hand protection: Rubber gloves. Breakthrough time of the glove material > 1 hour. Chemical resistant protective gloves (EN 374)

Eye protection: When handling this product, the use of safety glasses with side shields is recommended. The applicable European Standard can be found in EN 166. Ensure eye bath is to hand.

Skin protection: Protective clothing.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Liquid

Colour: Brown

Odour: Barely perceptible odour

Solubility in water: Soluble

Relative density: 1.18

pH: 10-12

9.2. Other Information

Other information: No data available.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions.

[cont...]

SAFETY DATA SHEET

S125 HPH

Page: 5

10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions.
Decomposition may occur on exposure to conditions or materials listed below.

10.4. Conditions to avoid

Conditions to avoid: Heat.

10.5. Incompatible materials

Materials to avoid: Strong oxidising agents. Strong acids.

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes.

Section 11: Toxicological information

11.1. Information on toxicological effects

Hazardous ingredients:

SODIUM SULPHITE ANHYDROUS

| | | | | |
|-----|-----|------|-----|-------|
| IPR | MUS | LD50 | 950 | mg/kg |
| IVN | RAT | LD50 | 175 | mg/kg |
| ORL | MUS | LD50 | 820 | mg/kg |

POTASSIUM HYDROXIDE

| | | | | |
|-----|-----|------|-----|-------|
| ORL | RAT | LD50 | 273 | mg/kg |
|-----|-----|------|-----|-------|

MALEIC ACID COPOLYMER

| | | | | |
|------|-----|------|----------|-------|
| Eyes | - | - | Irritant | - |
| ORL | RAT | LD50 | 3874 | mg/kg |

Relevant hazards for product:

| Hazard | Route | Basis |
|-----------------------------|---------|-----------------------|
| Acute toxicity (ac. tox. 4) | DRM ING | Hazardous: calculated |

Symptoms / routes of exposure

Skin contact: There may be irritation and redness at the site of contact.

Eye contact: There may be irritation and redness. The eyes may water profusely.

Ingestion: There may be soreness and redness of the mouth and throat.

Inhalation: There may be irritation of the throat with a feeling of tightness in the chest. Exposure may cause coughing or wheezing.

Delayed / Immediate effects: Immediate effects can be expected after short-term exposure.

[cont...]

SAFETY DATA SHEET

S125 HPH

Page: 6

Section 12: Ecological information

12.1. Toxicity

Hazardous ingredients:

SODIUM SULPHITE ANHYDROUS

| | | | |
|------|----------|-----|------|
| FISH | 96H LC50 | 460 | mg/l |
|------|----------|-----|------|

MALEIC ACID COPOLYMER

| | | | |
|-------|----------|-------|--------|
| ALGAE | 72H IC50 | 380 | mg/l |
| FISH | 96H LC50 | >1000 | mg/l |
| - | - | 1114 | mgO2/g |

12.2. Persistence and degradability

Persistence and degradability: Biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential: No bioaccumulation potential.

12.4. Mobility in soil

Mobility: Readily absorbed into soil.

12.5. Results of PBT and vPvB assessment

PBT identification: This product is not identified as a PBT/vPvB substance.

12.6. Other adverse effects

Other adverse effects: Negligible ecotoxicity.

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal operations: Transfer to a suitable container and arrange for collection by specialised disposal company. Do not allow entry to drains or waterways.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

Section 14: Transport information

Transport class: This product does not require a classification for transport.

Section 15: Regulatory information

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

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

[cont...]

SAFETY DATA SHEET

S125 HPH

Page: 7

Section 16: Other information

Other Information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No 2015/830.

* indicates text in the SDS which has changed since the last revision.

Phrases used in s.2 and s.3: EUH031: Contact with acids liberates toxic gas.

H290: May be corrosive to metals.

H302: Harmful if swallowed.

H312: Harmful in contact with skin.

H314: Causes severe skin burns and eye damage.

H315: Causes skin irritation.

H319: Causes serious eye irritation.

Legal disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any damage resulting from handling or from contact with the above product.

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

1.1. Product identifier

Trade name or designation of the mixture: Hemicell L
 Registration number: -
 Synonyms: Hemicell Liquid
 Substance ID: AG1308
 Issue date: 11-April-2013
 Version number: 01

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

Identified uses: Feed Enzyme; zootechnical feed additive.
 Uses advised against: None known.

1.3. Details of the supplier of the safety data sheet

Supplier

Company name: Elanco Animal Health
 Address: 2500 Innovation Way
 Greenfield, IN 46140
 United States
 Division: Eli Lilly and Company
 Telephone: Phone: 1-317-276-2000
 e-mail: lilly_msds@lilly.com
 Contact person: Not available.

1.4. Emergency telephone number: CHEMTREC: 00+1+703-527-3887 (24 hours)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The mixture has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

Health hazards

Respiratory sensitisation Category 1

H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Classification according to Directive 67/548/EEC or 1999/45/EC as amended

Classification: R42

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Hazard pictograms



Signal word: Danger

Hazard statements

H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Precautionary statements

Prevention

P261: Avoid breathing mist or vapour.
 P285: In case of inadequate ventilation wear respiratory protection.

Response

P304 + P341

IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

P342 + P311

If experiencing respiratory symptoms: Call a POISON CENTRE or doctor/physician.

Storage

Not available.

Disposal

P501

Dispose of contents/container in accordance with local/regional/national/international regulations.

Supplemental label information

Not applicable.

2.3. Other hazards

No Chemical Safety Assessment has been carried out.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

General information

| Chemical name | % | CAS-No. / EC No. | REACH Registration No. | INDEX No. | Notes |
|---------------|---|------------------|------------------------|-----------|-------|
|---------------|---|------------------|------------------------|-----------|-------|

| | | | | | |
|-----------------|---|------------------------|---|---|--|
| Sodium chloride | 8 | 7647-14-5 231-598-3 | - | - | |
|-----------------|---|------------------------|---|---|--|

Classification: DSD: Xi;R36
CLP: -

| | | | | | |
|---------------|---|-------------------------|---|---|--|
| B-D-Mannanase | 2 | 37288-54-3 253-446-5 | - | - | |
|---------------|---|-------------------------|---|---|--|

Classification: DSD: R42
CLP: Resp. Sens. 1;H334

| | | | | | |
|----------------------|-----|------------------------|---|---|--|
| Liquid (water-based) | >50 | 7732-18-5 231-791-2 | - | - | |
|----------------------|-----|------------------------|---|---|--|

Classification: DSD: -
CLP: -

Other components are non-hazardous and/or below reporting levels. 38,9

Composition comments

The full text for all R- and H-phrases is displayed in section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation Move to fresh air. Oxygen or artificial respiration if needed. Get medical attention immediately.

Skin contact Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if irritation develops and persists. Wash contaminated clothing before reuse.

Eye contact In case of eye contact, remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Ingestion Seek medical advice.

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

May cause allergic respiratory reaction.

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

Not available.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media Water. Carbon dioxide (CO2). Dry chemical.

Unsuitable extinguishing media None known.

5.2. Special hazards arising from the substance or mixture

Hazardous decomposition products formed under fire conditions.

5.3. Advice for firefighters

Special protective equipment for firefighters

Wear self-contained breathing apparatus and protective clothing.

Special fire fighting procedures

Not available.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Wear suitable protective clothing, gloves and eye/face protection. Avoid inhalation of vapours or mists. See Section 8 for personal protective equipment.

For emergency responders

Use personal protection recommended in Section 8 of the MSDS.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Prevent spilled material from flowing onto adjacent land or into streams, ponds, or lakes.

6.3. Methods and material for containment and cleaning up

Small Spillages:

Use absorbent/adsorbent material to solidify liquids. Clean up promptly by sweeping or vacuum.

Large Spillages:

Prevent further migration into the environment. Use absorbent/adsorbent material to solidify liquids. Collect in a non-combustible container for prompt disposal. Local authorities should be advised if significant spillages cannot be contained.

6.4. Reference to other sections

Refer to Sections 8, 11, 12 and 13 for more information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Wear personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment.

7.2. Conditions for safe storage, including any incompatibilities

Keep container tightly closed. Store in a cool, dry place with adequate ventilation. Keep away from incompatible materials, open flames and high temperatures. Avoid contact with oxidising agents. Do not store in open or unlabelled containers.

7.3. Specific end use(s)

Not available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

Latvia. OELs. Occupational exposure limit values of chemical substances in work environment

| Components | Type | Value |
|---------------------------------|------|---------------------|
| Sodium chloride (CAS 7647-14-5) | TWA | 5 mg/m ³ |

Lithuania. OELs. Limit Values for Chemical Substances, General Requirements

| Components | Type | Value |
|---------------------------------|------|---------------------|
| Sodium chloride (CAS 7647-14-5) | TWA | 5 mg/m ³ |

Biological limit values

No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures

Lilly Interim Exposure Guideline: <100 micrograms/m³ TWA 12 hour (B-D-Mannanase)

Derived no-effect level (DNEL)

Not available.

Predicted no effect concentrations (PNECs)

Not available.

Exposure guidelines

Lilly Interim Exposure Guideline: <100 micrograms/m³ TWA 12 hour (B-D-Mannanase)

8.2. Exposure controls

Appropriate engineering controls

Laboratory fume hood or local exhaust ventilation.

Individual protection measures, such as personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN 166.

Skin protection

| | |
|--|---|
| - Hand protection | Chemical-resistant gloves and impermeable body covering to minimize skin contact. Protective gloves complying with EN 374. |
| - Other | Not available. |
| Respiratory protection | In case of insufficient ventilation, wear suitable respiratory equipment. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). |
| Thermal hazards | Not available. |
| Hygiene measures | In a manufacturing setting, wear chemical-resistant gloves and body covering to minimize skin contact. If handled in a ventilated enclosure, as in a laboratory setting, respirator and goggles or face shield may not be required. Safety glasses are always required. Under normal use and handling conditions, wear goggles to protect eyes and wear impermeable gloves and protective equipment to avoid direct contact with skin. Wash thoroughly with soap and water after handling. |
| Environmental exposure controls | Not available. |

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

| | |
|--|--|
| Physical state | Liquid. |
| Form | Liquid. |
| Colour | Light brown. |
| Odour | Slight fermentation |
| Odour threshold | No data available. |
| pH | 7 - 7,4 |
| Melting point/freezing point | No data available. |
| Initial boiling point and boiling range | No data available. |
| Flash point | No data available. |
| Evaporation rate | No data available. |
| Flammability (solid, gas) | This product is a nonflammable aqueous solution. |

Upper/lower flammability or explosive limits

| | |
|--|--|
| Flammability limit - lower (%) | No data available. |
| Flammability limit - upper (%) | No data available. |
| Explosive limit - lower (%) | No data available. |
| Explosive limit - upper (%) | No data available. |
| Vapour pressure | No data available. |
| Vapour density | No data available. |
| Relative density | No data available. |
| Solubility(ies) | Soluble |
| Partition coefficient (n-octanol/water) | No data available. |
| Auto-ignition temperature | No data available. |
| Decomposition temperature | No data available. |
| Viscosity | No data available. |
| Explosive properties | Not explosive |
| Oxidizing properties | The substance or mixture is not classified as oxidizing. |

9.2. Other information

| | |
|----------------|-------------------------------|
| Density | 1,23 - 1,25 g/cm ³ |
|----------------|-------------------------------|

| | |
|-------------------------------------|--------------------|
| Potential for dust explosion | No data available. |
| Specific gravity | 1,23 - 1,25 |

SECTION 10: Stability and reactivity

| | |
|---|---|
| 10.1. Reactivity | The product is stable and non reactive under normal conditions of use, storage and transport. |
| 10.2. Chemical stability | Material is stable under normal conditions. |
| 10.3. Possibility of hazardous reactions | Hazardous polymerisation does not occur. |
| 10.4. Conditions to avoid | None known. |
| 10.5. Incompatible materials | Strong oxidizing agents. |
| 10.6. Hazardous decomposition products | Hazardous decomposition products formed under fire conditions |

SECTION 11: Toxicological information

General information May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Information on likely routes of exposure

| | |
|---------------------|--|
| Ingestion | Do not ingest. |
| Inhalation | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| Skin contact | Slightly irritating. |
| Eye contact | Mild eye irritation. |

Symptoms Sensitisation. Coughing. Wheezing. Shortness of breath.

11.1. Information on toxicological effects

Acute toxicity Based on available data, the classification criteria are not met.

| Components | Species | Test results |
|---------------------------------|---------|---|
| B-D-Mannanase (CAS 37288-54-3) | | |
| Chronic | | |
| <i>Oral</i> | | |
| NOAEL | Rat | 75 mg/kg, 90 days, (equivalent to >1000X commercial dose) |
| Sodium chloride (CAS 7647-14-5) | | |
| Acute | | |
| <i>Oral</i> | | |
| LD50 | Rat | 3000 mg/kg |

Skin corrosion/irritation Rabbit: Slight irritation. (B-D-Mannanase)
Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation Rabbit: Mild eye irritation. (B-D-Mannanase)
Based on available data, the classification criteria are not met.

Respiratory sensitisation May cause sensitisation by inhalation.

Skin sensitisation Not a skin sensitiser.
Based on available data, the classification criteria are not met.

Germ cell mutagenicity Results in genetic toxicity assays (in vitro): Negative (B-D-Mannanase)
Based on available data, the classification criteria are not met.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
Based on available data, the classification criteria are not met.

Reproductive toxicity Due to lack of data the classification is not possible.

Specific target organ toxicity - single exposure No significant target organ toxicity reported.
Based on available data, the classification criteria are not met.

Specific target organ toxicity - repeated exposure No significant target organ toxicity reported.
Based on available data, the classification criteria are not met.

Aspiration hazard Due to lack of data the classification is not possible.

Mixture versus substance information Not available.

Other information Not available.

SECTION 12: Ecological information

| | |
|---|--|
| 12.1. Toxicity | Not expected to be harmful to aquatic organisms. |
| 12.2. Persistence and degradability | The active ingredient, an enzyme, does not persist but is naturally broken down into smaller compounds and excreted. |
| 12.3. Bioaccumulative potential | The product does not contain any substances expected to be bioaccumulating. |
| Bioconcentration factor (BCF) | Not available. |
| 12.4. Mobility in soil | No data available. |
| 12.5. Results of PBT and vPvB assessment | A Chemical Safety Assessment is not required. |
| 12.6. Other adverse effects | Not available. |

SECTION 13: Disposal considerations

13.1. Waste treatment methods

| | |
|-------------------------------------|---|
| Residual waste | Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Avoid discharge into water courses or onto the ground. |
| Contaminated packaging | Since emptied containers may retain product residue, follow label warnings even after container is emptied. |
| EU waste code | The Waste code should be assigned in discussion between the user, the producer and the waste disposal company. Waste codes should be assigned by the user based on the application for which the product was used. |
| Disposal methods/information | Dispose of contents/container in accordance with local/regional/national/international regulations. |

SECTION 14: Transport information

ADR

Not regulated as dangerous goods.

RID

Not regulated as dangerous goods.

ADN

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

| | |
|--|---|
| 14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code | This substance/mixture is not intended to be transported in bulk. |
|--|---|

SECTION 15: Regulatory information

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

EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I

Not listed.

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex II

Not listed.

Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1 as amended

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2 as amended

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3 as amended

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V as amended
Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry
Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(1) Candidate List as currently published by ECHA
Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended
Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Not listed.

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work

Not regulated.

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breastfeeding

Not regulated.

Other EU regulations

Directive 96/82/EC (Seveso II) on the control of major-accident hazards involving dangerous substances
Not regulated.

Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

Not regulated.

Directive 94/33/EC on the protection of young people at work

Not regulated.

Other regulations

The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended and respective national laws implementing EC directives.

National regulations

Not available.

15.2. Chemical safety assessment

A Chemical Safety Assessment is not required.

SECTION 16: Other information

List of abbreviations

NOAEL = No Observed Adverse Effect Level

References

Not available.

Information on evaluation method leading to the classification of mixture

Not available.

Lilly Lab Code

Health: 1
Fire: 1
Reactivity: 0
Special 1: A

Full text of any statements or R-phrases and H-statements under Sections 2 to 15

R36 Irritating to eyes.
R42 May cause sensitisation by inhalation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Revision information

Product and Company Identification: Synonyms
Composition / Information on Ingredients: Undisclosed Ingredient Statement
SECTION 8: Exposure controls/personal protection: Recommended monitoring procedures
Physical & Chemical Properties: Multiple Properties

Training information

Not available.

Disclaimer

As of the date of issuance, we are providing available information relevant to the handling of this material in the workplace. All information contained herein is offered with the good faith belief that it is accurate. THIS MATERIAL SAFETY DATA SHEET SHALL NOT BE DEEMED TO CREATE ANY WARRANTY OF ANY KIND (INCLUDING WARRANTY OF MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE). In the event of an adverse incident associated with this material, this safety data sheet is not intended to be a substitute for consultation with appropriately trained personnel. Nor is this safety data sheet intended to be a substitute for product literature which may accompany the finished product.

For additional information contact:
Elanco Animal Health
00+1+317-276-2000
00+1-800-428-4441

PRODUCT: Hostazym[®] X WSP Premix 5

DATE: June, 2019

PAGE: 1/13

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY /UNDERTAKING**1.1. PRODUCT IDENTIFIER**

Trade name: Hostazym[®] X WSP Premix 5
Common name: Endo-1,4-beta-xylanase.
IUB Number 3.2.1.8.
CAS Number: [9025-57-4].

1.2. RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED

Identified uses: Zootechnical feed additive
(digestibility enhancer; enzyme).
Identification number of the additive: 4a1617.

Uses advised against: None known.

1.3. DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Person responsible for putting the product into circulation in the EU:
Huvepharma N.V., Uitbreidingstraat 80, 2600 Antwerpen, Belgium
Tel. +32 3 288 1849; Fax. +32 3 289 7845;
E-mail: customerservice@huvepharma.com
Identification number: αBE2280

Manufacturer:
BIOVET Joint Stock Company
39, Petar Rakov St.
4550 Peshtera - Bulgaria
Tel.: +359 350 65619; Fax: +359 350 65636
E-mail: biovet@biovet.com
Identification number: α BG 13 1 0069.

1.4 EMERGENCY TELEPHONE NUMBER

+359 887 939420.

PRODUCT: Hostazym[®] X WSP Premix 5

DATE: June, 2019

PAGE: 2/13

2. HAZARDS IDENTIFICATION

2.1. CLASSIFICATION OF THE MIXTURE

This preparation has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Health hazards

Respiratory sensitisation Category 1 H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.

2.2. LABEL ELEMENTS

Labeling according to Regulation (EC) No 1272/2008 of December 2008 as amended

Signal words:



Danger

Hazard statements:

H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Precautionary Statements

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P284 In case of inadequate ventilation wear respiratory protection.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.

2.3 OTHER HAZARDS

None.

PRODUCT: Hostazym[®] X WSP Premix 5

DATE: June, 2019

PAGE: 3/13

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2. MIXTURES

An enzyme preparation of endo-1,4-beta-Xylanase (EC.3.2.1.8), produced by *Trichoderma citrinoviride* Bisset (IM SD135) having a minimum activity of 1 000 000 EPU/g.

General information :

| Chemical Name | Content (%) | CAS No/EC no | REACH registration No | INDEX No | CLP classification |
|------------------------|-------------|--------------|-----------------------|----------|--------------------|
| Endo-1,4-beta-xylanase | > 90 | 9025-57-4 | - | - | H334 |
| Benzoic acid | < 5 | 65-85-0 | - | - | H315, H319, H372 |
| Sodium bicarbonate | < 5 | 144-55-8 | - | - | H319, H334 |

Remaining components are non-hazardous and/or below required reporting limits.

Composition comments:

The full text for H-phrases is displayed in section 16.

4. FIRST AID MEASURES

4.1. DESCRIPTION OF FIRST AID MEASURES

General information

Change soaked clothing.

Remove clothing where dust collected.

After inhalation

When spray fog inhaled, seek medical advice and show the physician the packing or the packing label.

After contact with skin

In case of contact with skin wash off with water.

After contact with eyes

In case of contact with eyes rinse immediately for at least 15 minutes with plenty of water.

After ingestion

No special measures necessary.

Rinse mouth thoroughly with water.

PRODUCT: Hostazym® X WSP Premix 5**DATE:** June, 2019**PAGE:** 4/13

4.2. MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

In sensitive and allergized individuals may cause allergy or asthma symptoms or breathing difficulties if inhaled.

4.3. INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

NDA.

5. FIREFIGHTING MEASURES**5.1. EXTINGUISHING MEDIA**

Water spray or appropriate foam. Use extinguishing media suitable for surrounding fire.

5.2. SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

May emit toxic fumes under fire conditions. They are: carbon monoxide, carbon dioxide, nitrogen oxides, and sulphur oxides.

5.3. ADVICE FOR FIREFIGHTERS

As with all fires, evacuate personnel to save area. Fire fighters should use self-contained breathing equipment and protective clothing.

6. ACCIDENTAL RELEASE MEASURES**6.1. PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES**

Persons with a history of allergies, contact dermatitis, chronic rashes or respiratory problems should use special precautions to avoid skin contact or exposure to dust. Wear suitable protective equipment and a self-contained breathing apparatus.

PRODUCT: Hostazym® X WSP Premix 5

DATE: June, 2019

PAGE: 5/13

6.2. ENVIRONMENTAL PRECAUTIONS

Prevent spilled material from flowing onto adjacent land or into streams, ponds or lakes.

6.3. METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Carefully sweep the powder up and remove. Place material in a dry container and cover. Remove from the area. Flush spill area with water.

6.4. REFERENCE TO OTHER SECTIONS

Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

7. HANDLING AND STORAGE

7.1. PRECAUTIONS FOR SAFE HANDLING

Avoid the formation and deposition of dust.
Provide exhaust ventilation if dust is formed.
Avoid formulation of aerosols.

7.2. CONDITIONS FOR SAFE STORAGE INCLUDING ANY INCOMPATIBILITIES

Take precautionary measures against electrostatic discharging.
Avoid formation of dust.
Observe the general rules of industrial fire protection.

7.3. SPECIFIC USE(S)

For detailed information about the use of Hostazym® X WSP Premix 5 see identified use(s) referred to in Subsection 1.2.

PRODUCT: Hostazym® X WSP Premix 5

DATE: June, 2019

PAGE: 6/13

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. CONTROL PARAMETERS

| | |
|--|--|
| <u>Recommended monitoring procedures:</u> | None. |
| <u>Occupational Exposure Limits:</u> | None. |
| <u>Biological Limit Values:</u> | No biological exposure limits noted for the ingredients. |
| <u>Derived no-effect level (DNEL):</u> | Not available. |
| <u>Predicted no-effect concentrations (PNECs):</u> | Not available. |

8.2. EXPOSURE CONTROLS

| | | |
|---------------------|---------------------|--------------|
| <u>Ventilation:</u> | Local exhaust hood: | Recommended. |
| | General exchange: | Recommended. |

| | |
|---------------------------------------|--|
| <u>Occupational exposure controls</u> | Do not eat, drink and smoke when handling the product. Wash the hands with soap after use. Do not inhale, avoid contact with skin and eyes. In case of accidental ingestion or contact, seek medical advice immediately and show the label to the physician. |
| <u>Respiratory protection</u> | Particle filter half mask, filter P1 |
| <u>Hand protection</u> | Protective gloves. |
| <u>Eye protection</u> | Safety goggles. Do not wear ophthalmic lenses. |
| <u>Skin protection</u> | Suitable clothing to prevent skin contact. |

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|--|
| a) Appearance: | Light beige to beige powder or granules. |
| b) Odour: | Characteristic. |
| c) Odour threshold: | NDA |
| d) pH: | NDA |
| e) Melting point/freezing point: | NDA |
| f) Initial boiling point and boiling range: | NDA |
| g) Flash point: | NDA |
| h) Evaporation rate: | NDA |

PRODUCT: Hostazym[®] X WSP Premix 5

DATE: June, 2019

PAGE: 7/13

| | |
|--|-------------------|
| i) Flammability (solid, gas): | NDA |
| j) Upper/lower flammability or explosive limits: | NDA |
| k) Vapour pressure: | NDA |
| l) Vapour density: | NDA |
| m) Relative density: | NDA |
| n) Solubility: | Soluble in water. |
| o) Partition coefficient n-octanol/water: | NDA |
| p) Auto-ignition temperature: | NDA |
| q) Decomposition temperature: | NDA |
| r) Viscosity: | NDA |
| s) Explosive properties: | NDA |
| t) Oxidising properties: | NDA |

9.2. OTHER INFORMATION

| | |
|---------------------------------------|--------------------------|
| Minimum layer ignition temperature | 300°C |
| Minimum ignition energy | Between 30 mJ and 100 mJ |
| Minimum cloud ignition temperature | 470°C |
| Maximum explosion pressure: | 6.3 bar-g |
| Maximum rate of pressure rise (20 l): | 194 bar/s |
| Rate of pressure rise (Kst): | 53 bar-m/s |
| Dust explosion class: | St 1. |

10. STABILITY AND REACTIVITY

10.1. REACTIVITY

Hostazym[®] X WSP Premix 5 is a non-reactive dry product.

10.2. CHEMICAL STABILITY

Hostazym[®] X WSP Premix 5 is a stable dry product.

10.3. POSSIBILITY OF HAZARDOUS REACTIONS

NDA.

10.4. CONDITIONS TO AVOID

Elevated moisture and temperatures, direct sunlight.

PRODUCT: Hostazym[®] X WSP Premix 5**DATE:** June, 2019**PAGE:** 8/13**10.5. INCOMPATIBLE MATERIALS**

NDA.

10.6. HAZARDOUS DECOMPOSITION PRODUCTS

NDA.

11. TOXICOLOGICAL INFORMATION**11.1. INFORMATION ON TOXICOLOGICAL EFFECTS**

a) acute toxicity:

| Components | | Species | Test results |
|---|-----------------------------------|---------|--|
| Endo-1,4-beta-xylanase (CAS 9025-57-4) | Acute Oral LD ₅₀ | Rat | Could not be determined because the maximum dose that could be administered to rats (4 mL/0.200 kg b.w.) did not cause any signs of intoxication and mortality |
| Benzoic acid (CAS 65-85-0) | Acute Oral LD ₅₀ | Cat | 2 g/kg b.w. |
| | Acute Oral LD ₅₀ | Dog | 2 g/kg b.w. |
| | Acute Oral LD ₅₀ | Mouse | 1.94 g/kg b.w. |
| | Acute Oral LD ₅₀ | Rat | 1.7 g/kg b.w. |
| | Acute IP LD ₅₀ | Mouse | 1.46 g/kg b.w. |
| Sodium bicarbonate (CAS 144-55-8) | Acute Oral LD ₅₀ | Mouse | 3.36 g/kg b.w. |
| | Acute Oral LD ₅₀ | Rat | 4.22 g/kg b.w. |

b) skin corrosion/irritation:

Endo-1,4-beta-xylanase does not cause skin irritation in *in vitro* skin irritation test in human epidermal model EpiDerm[™].

c) serious eye damage/irritation:

Endo-1,4-beta-xylanase does not cause eye irritation or serious eye damage in isolated bovine cornea.

PRODUCT: Hostazym® X WSP Premix 5

DATE: June, 2019

PAGE: 9/13

d) respiratory or skin sensitization:

Endo-1,4-beta-xylanase causes positive skin sensitization response in mice. Enzymes are considered respiratory sensitizers hence adequate labelling is already provided for the products.

e) germ cell mutagenicity:

| | | |
|---|------------------------|----------|
| Bacterial Reverse Mutation Test (Ames) | <i>Salmonella</i> | Negative |
| <i>In Vitro</i> Chromosome Abberation (3 studies) | Human lymphocytes | Negative |
| Mammalian erythrocyte micronucleus test | Rat | Negative |
| <i>In vivo</i> comet assay (3 studies) | Cells from Wistar rats | Negative |

f) carcinogenicity:

| | | | |
|---------|-----|------|--|
| 13-week | Rat | Oral | No toxic effect at doses up to 1000 mg/kg b.w./day |
|---------|-----|------|--|

g) reproductive toxicity:

Based on the experience that the strain is safe and the other toxicological studies did not raise any concern, no reproduction toxicity studies were performed.

h) STOT-single exposure:

NDA

i) STOT-repeated exposure:

NDA

j) aspiration hazard:

NDA

12. ECOLOGICAL INFORMATION

12.1. TOXICITY

Hostazym® X WSP Premix 5 is enzyme which is degraded in the gastro-intestinal tract, and as it is of proteinaceous material any remaining material will further degrade in nature. It has no adverse environmental effects.

12.2. PERSISTENCE AND DEGRADABILITY

Hostazym® X WSP Premix 5 is enzyme which is degraded in the gastro-intestinal tract, and as it is of proteinaceous material any remaining material will further degrade in nature.

12.3. BIOACCUMULATIVE POTENTIAL

Hostazym® X WSP Premix 5 is enzyme which is degraded in the gastro-intestinal tract, and as it is of proteinaceous material any remaining material will further degrade in nature, hence it does not persist in the environment and degrades rapidly through biodegradation.

PRODUCT: Hostazym[®] X WSP Premix 5

DATE: June, 2019

PAGE: 10/13

12.4. MOBILITY IN SOIL

Not applicable.

12.5. RESULTS OF PBT AND VPVB ASSESSMENT

Not applicable.

12.6. OTHER ADVERSE EFFECTS

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this product.

13. DISPOSAL CONSIDERATIONS

13.1. WASTE TREATMENT METHODS

Dispose of contents/container in accordance with local/regional/national/international regulations.

14. TRANSPORT INFORMATION

14.1. UN NUMBER

Not applicable as this product is not regulated by IMDG/IMO, ADR/RID, IATA/ICAO.

14.2. UN PROPER SHIPPING NAME

Not applicable as this product is not regulated by IMDG/IMO, ADR/RID, IATA/ICAO.

14.3. TRANSPORT HAZARD CLASS(ES)

Not applicable as this product is not regulated by IMDG/IMO, ADR/RID, IATA/ICAO.

14.4. PACKING GROUP

Not applicable as this product is not regulated by IMDG/IMO, ADR/RID, IATA/ICAO.

14.5. ENVIRONMENTAL HAZARDS

Not applicable as this product is not regulated by IMDG/IMO, ADR/RID, IATA/ICAO.

PRODUCT: Hostazym[®] X WSP Premix 5

DATE: June, 2019

PAGE: 11/13

14.6. SPECIAL PRECAUTIONS FOR USER

Not applicable as this product is not regulated by IMDG/IMO, ADR/RID, IATA/ICAO.

14.7. TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL73/78 AND THE IBC CODE

Not applicable as this product is not regulated by IMDG/IMO, ADR/RID, IATA/ICAO.

15. REGULATORY INFORMATION**15.1. SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE****EU regulations**

- **Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I**
Not listed.
- **Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex II**
Not listed.
- **Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended**
Not listed.
- **Regulation (EC) No. 1907/2006, REACH Article 59(1) Candidate List as currently published by ECHA**
Not listed.

Authorisations

- **Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended**
Not listed.

Restrictions on use

- **Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended**
Not listed.
- **Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work**
Not listed.

Other EU regulations

- **Directive 96/82/EC (Seveso II) on the control of major-accident hazards involving dangerous substances**
Not listed.

PRODUCT: Hostazym[®] X WSP Premix 5

DATE: June, 2019

PAGE: 12/13

- **Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work**
Not listed.

Other regulations

- The product is classified and labelled in accordance with EC directives or respective national laws.
- This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006.

National regulations

- Young people under 18 years old are not allowed to work with this product according to the EU Directive 94/33/EC on the protection of young people at work.

15.2. CHEMICAL SAFETY ASSESSMENT

A chemical safety assessment according to REACH-regulation has not been carried out.

16. OTHER INFORMATION

The data and information reported in this Safety Data Sheet are based on information and studies made by HUVEPHARMA with Hostazym[®] X WSP Premix 5 and endo-1,4-beta-xylanase, and are only a guide for the user. They respect the actual level of the scientific and technical state of the art. In any case they cannot involve a responsibility of HUVEPHARMA if they are not respected, in particular for the aspects not considered.

PRODUCT: Hostazym® X WSP Premix 5**DATE:** June, 2019**PAGE:** 13/13

LIST OF ABBREVIATIONS USED IN THE SDS

| | |
|------------------------|--|
| ADR | International Carriage of Dangerous Goods by Road; |
| CAS Number | Chemical Abstract Service Registry Number; |
| EU | European Union; |
| ICAO/IATA | International Civil Aviation Organization/International Air Transport Association; |
| IMDG | International Maritime Dangerous Goods; |
| IUB Number | Identification Number in the International Union of Biochemistry |
| LD₅₀ | Lethal dose 50; |
| NA | Not applicable; |
| NDA | No Data Available; |
| RID | International Carriage of Dangerous Goods by Rail. |

FULL TEXT OF H STATEMENTS UNDER SECTION 3

| | |
|-------|--|
| H315: | Causes skin irritation. |
| H319: | Causes serious eye irritation. |
| H334: | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H372: | Causes damage to organs through prolonged or repeated exposure. |



SAFETY DATA SHEET – KEROSENE

Issued: 11/03/2016
Ref: WFS / WFS/ KEROSENE/ 02
Version: 02

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 PRODUCT IDENTIFIER

Chemical Identification: Distillates (petroleum), hydrotreated light
Other names: Kerosene
CAS Number: 64742-47-8.
EC Number: 265-149-8.
Index Number: 649-404-00-4.
REACH Registration Number: Not applicable.

1.2 RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST

Product Type and main use: Fuel for use in domestic and commercial heating and lighting, as well as aviation turbine engines.
Uses advised against: This product is not to be used as a solvent or cleaning agent, for lighting or brightening fires, or as a skin cleanser.
Not to be used as a fuel for automotive vehicles.
Not to be used to prevent waxing in diesel fuel.

1.3 DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Supplier: World Fuel Services
Supplier address: Portland House,
Bressenden Place
London
SW1E 5BH
UK
Tel: +44 (0) 207 808 5133
Fax: +44 (0) 151 922 0626
Email: marinetechnical@wfscorp.co.uk
Emergency Telephone (24hr): +44 (0) 333 333 9957

SECTION 2. HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF THE SUBSTANCE ACCORDING TO REGULATION (EC) No. 1272/2008 (CLP)

Classification Flam. Liq. 3; H226
Asp. Tox. 1; H304
Skin Irrit. 2; H315
STOT SE 3: H336
Aquatic Chronic 2; H411

SAFETY DATA SHEET – KEROSENE

2.2 LABEL ELEMENTS ACCORDING TO ACCORDING TO REGULATION (EC) No. 1272/2008 (CLP)



Hazard pictogram(s):

Signal Word:

Danger.

Hazard statement(s):

H226: Flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H411: Toxic to aquatic life with long lasting effects.
 EUH066: Repeated exposure may cause skin dryness or cracking.

Precautionary statement(s):

P102: Keep out of reach of children.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P280: Wear protective gloves/protective clothing/eye protection/face protection.
 P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
 P331: Do NOT induce vomiting.
 P405: Store locked up.
 P501: Dispose of contents/container to approved disposal facility.

2.3 OTHER HAZARDS:

The product does not meet the criteria for PBT or vPvB substances.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 SUBSTANCES

| Chemical Name | CAS Number | EC Number | REACH Registration Number | Classification |
|---|------------|-----------|---------------------------|--|
| Distillates (Petroleum), hydrotreated light | 64742-47-8 | 265-149-8 | 649-422-00-2 | Flam. Liq. 3; H226 Asp. Tox. 1; H304 Skin Irrit. 2; H315 STOT SE 3: H336 Aquatic Chronic 2; H411 |

Please see section 16 for full hazard statements.



SAFETY DATA SHEET – KEROSENE

SECTION 4. FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES

- Inhalation:** Remove person to fresh air and keep comfortable for breathing. Keep warm and at rest. If symptoms persist, obtain medical attention.
- Ingestion:** Obtain medical attention immediately. Do not induce vomiting. Do not give anything by mouth because of risk of material entering the lungs and causing lung damage. If person is drowsy or unconscious and vomiting, place on left side with head down. If possible, do not leave unattended and observe closely for adequacy of breathing.
- Skin contact:** Remove contaminated clothing immediately. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
- Eye contact:** Remove contact lenses if present and easy to do. Wash eyes immediately with plenty of water, making sure to rinse under eyelids. If symptoms persist, obtain medical attention.

Protection of first-aiders: No action shall be taken involving any personal risk or where suitable training has not been provided.

4.2 MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

Skin contact causes irritation, redness and pain. Repeated exposure may cause skin dryness or cracking. Eye contact may cause slight irritation, watering, redness and pain. Inhalation of vapours may cause drowsiness or dizziness. Ingestion may cause irritation of the mouth and digestive tract. If swallowed, aspiration into lungs may result in chemical pneumonia.

4.3 INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

In case of accident or if you feel unwell, seek medical advice immediately. If swallowed, patient should be monitored for signs of breathing difficulty as effects of aspiration may be delayed for up to 48 hours. If breathing is laboured, oxygen should be administered by qualified personnel.

SECTION 5. FIREFIGHTING MEASURES

5.1 EXTINGUISHING MEDIA

Suitable: Foam, CO₂ or dry powder.

Not suitable: Do not use a direct water jet.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

Flammable liquid and vapour: Vapour may form explosive mixture with air. Vapour is heavier than air and may accumulate in confined spaces. Vapours may travel considerable distances to ignition sources where they can ignite, flash back or explode. The product will float on surface water and can reignite. Containers exposed to heat may burst due to increase in pressure.

Hazardous thermal decomposition products:

Combustion may liberate toxic fumes: Carbon monoxide, carbon dioxide, various hydrocarbons, nitrogen oxides, sulphur oxides.



SAFETY DATA SHEET – KEROSENE

5.3 ADVICE FOR FIRE-FIGHTERS

A self-contained breathing apparatus and suitable protective clothing should be worn in fire conditions. Move undamaged containers from fire area if this can be done safely. Keep fire exposed containers cool by spraying with water. Do not allow to enter drains, sewers or watercourses.

Firefighting measures: Isolate the source of the combustible product. If fire cannot be extinguished, allow it to die out in a controlled manner. Use water to cool down equipment and items exposed to fire.

Additional advice: Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

6.1.1 For non-emergency personnel:

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take precautionary measures against static discharge. Use only non-sparking tools. Use explosion-proof electrical, ventilating and lighting equipment. Caution – spillage area may be slippery.

Keep upwind. Ensure adequate ventilation. Avoid inhalation of vapours. Avoid contact with skin and eyes. Wear suitable personal protective equipment. Wear appropriate respirator when ventilation is inadequate. (See Section 8).

6.1.2 For emergency responders:

Keep unnecessary personnel away. Wear suitable protective clothing (See Section 8). Contaminated clothing should be thoroughly cleaned.

6.2 ENVIRONMENTAL PRECAUTIONS

Collect spillage. Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body. If spill occurs on water notify the appropriate authorities and advise shipping of any hazard.

6.3 METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

6.3.1 For containment:

Stop the leak if it is safe to do so. Contain the spillage with sand, earth or any suitable adsorbent material.

6.3.2 For cleaning up:

Use sand, earth or any suitable non-combustible adsorbent material to adsorb spillages. Using non-sparking tools transfer the contaminated adsorbent material into a container for disposal.

For spillages on water, remove use appropriate methods such as skimming, booms or adsorbents. For spillages onto soil, remove contaminated soil for remediation or disposal in accordance with local regulations.



SAFETY DATA SHEET – KEROSENE

Waste containers used should be plastic-lined sealable drums. Containers should be sealed before being disposed of via an authorised waste disposal contractor.

6.3.3 Other Information:

See Section 8 for personal protective equipment. See Section 13 for waste disposal.

SECTION 7. HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical, ventilating and lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge.

Use only outdoors or in a well-ventilated area. Provide adequate ventilation, including local extraction, to ensure occupational exposure limits are not exceeded. Avoid breathing vapours/spray. Avoid contact with skin and eyes. Wear suitable personal protective equipment (See Section 8).

Do not eat, drink or smoke in the vicinity of the product. Wash thoroughly after handling. Take off contaminated clothing and wash it before reuse. Contaminated clothing should be thoroughly cleaned or disposed of as hazardous waste.

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

Keep away from heat and sources of ignition. Keep away from direct sunlight. Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep cool. Empty containers retain product residue and can be hazardous. Keep away from oxidising agents, reducing agents. This product must never be stored in buildings occupied by people. Drums and small containers should be stored in well-ventilated areas, flameproof cabinets or stores. Keep in a bunded area with a sealed floor to provide containment against spillage. Stack drums to a height not exceeding three meters without the use of racking. Seek specialist advice for the design, construction and operation of bulk storage facilities.

7.3 SPECIFIC END USE(S)

Refer to the end uses as identified section 1.2.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 CONTROL PARAMETERS

Workplace exposure limits

Source: EH40/2005, 2nd Ed., 2011.

None assigned.



SAFETY DATA SHEET – KEROSENE

Other exposure limits

Source: American Conference of Governmental Industrial Hygienists (ACGIH)

| Substance | CAS No. | LTEL (8 HR TWA) | | STEL (15 min) | | Comments |
|-----------|------------|-----------------|-------------------|---------------|-------------------|-----------------------------------|
| | | ppm | mg/m ³ | ppm | mg/m ³ | |
| Kerosene | 64742-47-8 | - | 200 | - | - | Can be absorbed through the skin. |

Biological Exposure Index (BEI): No biological limit allocated.

DNELs (Workers)

None assigned.

DNELs (Consumers)

Ingestion: 18.8 mg/kg bw/day.

PNEC related information:

Substance is a hydrocarbon with a complex, unknown or variable composition. Conventional methods of deriving PNECs are not appropriate and it is not possible to identify a single representative PNEC for such substances.

8.2 EXPOSURE CONTROLS

8.2.1 Appropriate engineering controls

Provide adequate ventilation to ensure that occupational exposure limits are not exceeded. Local extraction may be required. Eye wash and quick-drench shower facilities should be available in the work area. Contaminated clothing and shoes should be thoroughly washed before reuse.

8.2.2 Individual protection measures, such as personal protective equipment

| | |
|--------------------------------|---|
| Eye protection: | Goggles or safety glasses with side shields giving complete protection to eyes. (EN 166). Depending on conditions of use, close-fitting eye protection and a face shield may be necessary. |
| Skin protection: | Long sleeve protective clothing. Nitrile, neoprene or PVC apron. Rubber boots |
| Hand protection: | Chemical-resistant gloves. (EN 374). Suitable glove material: nitrile, neoprene or PVC (breakthrough time > 240 minutes). Contact glove supplier to confirm suitable glove material, thickness and breakthrough times. |
| Respiratory protection: | Where airborne levels below the exposure limits cannot be maintained, wear an air-purifying respirator (EN 140) with a Type A/P2 filter or better suitable for organic gases and vapours with a boiling point above 65°C. (EN 14387). |
| Thermal hazards | Wear suitable temperature resistant gloves and protective clothing if the product is heated. |



SAFETY DATA SHEET – KEROSENE

8.2.3 Environmental exposure controls:

Minimise release to the environment. Inform environmental manager of all incidents involving this product. Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an Occupational Exposure Limit and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Information on suitable methods is available on request.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|--|
| Appearance: | Liquid (Light Yellow) |
| Odour: | Characteristic |
| Odour threshold: | Not available. |
| pH: | Not applicable. |
| Melting/freezing point: | <-58oC (-72.4oF) |
| Initial boiling point and boiling range: | 140 – 300°C |
| Flash point: | Open Cup: >38oC (100.40F) |
| Evaporation rate: | Not available. |
| Flammability (solid; gas): | Not applicable |
| Upper/lower flammability or explosive limits: | Lower: 0.7% Upper: 5% |
| Vapour pressure: | 3 kPa (20°C) |
| Vapour density: | > 1 (Air = 1) |
| Relative density: | 0.775 to 0.84 (Water=1) |
| Solubility(ies): | Immiscible in water. Miscible in aromatic solvents. |
| Partition coefficient: n-octanol/water: | Log Kow: 3-6 (approximate) |
| Auto-ignition temperature: | 250°C |
| Decomposition temperature: | Not available. |
| Viscosity: | 1.3 – 2.9 cSt (20°C) |
| Explosive properties: | Not explosive. Vapour may form explosive mixture in air. |
| Oxidising properties: | Not oxidising. |

SECTION 10. STABILITY AND REACTIVITY

10.1 REACTIVITY

Reacts with oxidising agents.

10.2 CHEMICAL STABILITY

The product is stable under normal use conditions

10.3 POSSIBILITY OF HAZARDOUS REACTIONS:

No hazardous reactions expected during normal conditions.

10.4 CONDITIONS TO AVOID

Keep away from sources of ignition, hot surfaces, direct sunlight.
Prevent accumulation of vapours. Contact with strong oxidizing agents e.g. chlorates and ammonium nitrate.



SAFETY DATA SHEET – KEROSENE

10.5 INCOMPATIBLE MATERIALS:

Oxidising agents e.g. chlorates and ammonium nitrate which may be used in agriculture. Reducing agents. Reducing agents.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS

Combustion may liberate toxic fumes: Carbon monoxide, carbon dioxide, various hydrocarbons, nitrogen oxides, sulphur oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Note: All information in this section is for Fuel oil, residual. Information given is based on product data, knowledge of the components and the toxicology of similar products.

11.1. INFORMATION ON TOXICOLOGICAL EFFECTS

Acute Oral Toxicity:

Low toxicity: LD50 > 5000 mg/kg, Rat

Acute Dermal Toxicity:

Low toxicity: LD50 > 2000 mg/kg, Rabbit

Acute Inhalation Toxicity:

Low toxicity: LC50 > 5 mg/l / 4 h, Rat High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death. Irritating to skin.

Skin Corrosion/Irritation:

May cause some eye irritation

Serious Eye Damage/Irritation:

Not classified. Not expected to be a skin sensitiser.

Skin sensitisation

Not classified. Not expected to be a respiratory sensitiser.

Respiratory sensitisation:

Carcinogenicity:

The product does not contain substances classified as carcinogenic above the classification thresholds.

Reproductive Toxicity:

The product does not contain substances classified for reproductive toxicity above the classification thresholds.

Specific target organ toxicity – single exposure:

May cause drowsiness or dizziness

Specific target organ toxicity - repeated exposure:

Based on the available data, the classification criteria are not met. Excessive and prolonged inhalation of mists may cause a chronic inflammatory reaction of the lungs and a form of pulmonary fibrosis.

Aspiration hazard:

May be fatal if swallowed and enters airways. Risk of aspiration into lungs resulting in chemical pneumonia.

Information on likely routes of exposure

Inhalation

May cause drowsiness or dizziness.

Skin contact

Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Eye contact

May cause slight eye irritation.

Ingestion

May be fatal if swallowed and enters airways. Risk of aspiration into lungs resulting in chemical pneumonia. Ingestion may cause irritation of the mouth and digestive tract.

Symptoms related to the physical, chemical and

Skin contact causes irritation, redness and pain. Repeated exposure



SAFETY DATA SHEET – KEROSENE

toxicological characteristics:

may cause skin dryness or cracking. Eye contact may cause slight irritation, watering, redness and pain. Inhalation of vapours may cause drowsiness or dizziness. Ingestion may cause irritation of the mouth and digestive tract. If swallowed, aspiration into lungs may result in chemical pneumonia.

Other information:

None

SECTION 12. ECOLOGICAL INFORMATION

12.1 TOXICITY

Toxic to aquatic life with long lasting effects. Acute toxicity studies on samples of jet fuel and kerosene streams show acute toxicity values greater than 1 mg/L, typically in the range 1-10 mg/L. Tests were carried out on WAF in closed systems to prevent evaporative loss.

Kerosene (petroleum), hydrodesulfurised:

EL₅₀ (*Daphnia magna*): 1.4 mg/L, 48 h (WAF)

NOEL (*Daphnia magna*): 0.3 mg/L, 48 h (WAF)

NOEL (*Daphnia magna*): 0.48 mg/L, 21 days (WAF)

LOEL (*Daphnia magna*): 1.2 mg/L, 21 days (WAF)

EL₅₀ (*Daphnia magna*): 0.89 mg/L, 21 days (reproduction)(WAF)

EL₅₀ (*Raphidocelis subcapitata*): 1-3 mg/L, 72 h (growth rate) (WAF)

NOEL (*Raphidocelis subcapitata*): 1.0 mg/L, 72 h (growth rate) (WAF)

Kerosenes:

NOEL (*Oncorhynchus mykiss*): 0.098 mg/L, 28 day (estimated using PETROTOX computer model)

NOEL (*Tetrahymena pyriformis*): 677.9 mg/L, 72 h (estimated using PETROTOX computer model)

12.2 PERSISTENCE/DEGRADABILITY:

Oxidises rapidly by photochemical reactions in air. Major components are inherently biodegradable. Persists under anaerobic conditions. The volatile components oxidise rapidly by photochemical reactions in air.

12.3 BIOACCUMULATION POTENTIAL:

The product components have measured or predicted Log Kow values in the range 3 – 6 or above and therefore have potential to bio accumulate. In practice, metabolic processes may reduce bio concentration.

12.4 MOBILITY:

Floats on water. Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. If it enters soil, it will adsorb to soil particles and will not be mobile. Large volumes may penetrate soil and could contaminate groundwater.

12.5 PBT & vPvB ASSESSMENT:

The product does not contain substances assessed to be PBT or vPvB.

12.6 OTHER ADVERSE EFFECTS:

Films formed on water may affect oxygen transfer and damage organisms.



SAFETY DATA SHEET – KEROSENE

12.7 ADDITIONAL INFORMATION: None

SECTION 13. DISPOSAL CONSIDERATIONS

- 13.1 WASTE DISPOSAL:** Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor to deal satisfactorily with this type of product should be established beforehand. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination.
- 13.2 PRODUCT DISPOSAL:** Must be disposed of as Hazardous Waste.
- 13.3 PACKAGING WASTE:** Waste packaging should be recycled wherever possible. Incineration or landfill should only be considered when recycling is not feasible. Care should be taken when handling emptied containers that have not been cleaned out. Vapour from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally.

SECTION 14. TRANSPORT INFORMATION

ADR

- | | | |
|------|----------------------------------|---|
| 14.1 | UN NUMBER | 1223 |
| 14.2 | UN PROPER SHIPPING NAME | KEROSENE |
| 14.3 | TRANSPORT HAZARD CLASS(ES) | 3 |
| 14.4 | PACKING GROUP | III |
| 14.5 | ENVIRONMENTAL HAZARDS | Yes |
| 14.6 | SPECIAL PRECAUTIONS FOR THE USER | Read SDS and supplier instructions on correct use of the product. |

ADN

- | | | |
|------|----------------------------------|---|
| 14.1 | UN NUMBER | 1223 |
| 14.2 | UN PROPER SHIPPING NAME | KEROSENE |
| 14.3 | TRANSPORT HAZARD CLASS(ES) | 3 |
| 14.4 | PACKING GROUP | III |
| 14.5 | ENVIRONMENTAL HAZARDS | Yes |
| 14.6 | SPECIAL PRECAUTIONS FOR THE USER | Read SDS and supplier instructions on correct use of the product. |

RID

- | | | |
|------|----------------------------|----------|
| 14.1 | UN NUMBER | 1223 |
| 14.2 | UN PROPER SHIPPING NAME | KEROSENE |
| 14.3 | TRANSPORT HAZARD CLASS(ES) | 3 |
| 14.4 | PACKING GROUP | III |



SAFETY DATA SHEET – KEROSENE

- 14.5 ENVIRONMENTAL HAZARDS Yes
14.6 SPECIAL PRECAUTIONS FOR THE USER Read SDS and supplier instructions on correct use of the product.

IATA/ICAO

- 14.1 UN NUMBER 1223
14.2 UN PROPER SHIPPING NAME KEROSENE
14.3 TRANSPORT HAZARD CLASS(ES) 3
14.4 PACKING GROUP III
14.5 ENVIRONMENTAL HAZARDS Yes
14.6 SPECIAL PRECAUTIONS FOR THE USER Read SDS and supplier instructions on correct use of the product.

IMDG

- 14.1 UN NUMBER 1223
14.2 UN PROPER SHIPPING NAME KEROSENE
14.3 TRANSPORT HAZARD CLASS(ES) 3
14.4 PACKING GROUP III
14.5 ENVIRONMENTAL HAZARDS Marine pollutant.
14.6 SPECIAL PRECAUTIONS FOR THE USER Read SDS and supplier instructions on correct use of the product.
14.7 TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL 73/78 AND THE IBC CODE The product is not intended to be transported in bulk.

SECTION 15. REGULATORY INFORMATION

15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE

This Safety Data Sheet was prepared in accordance with EC Regulation (EC) No. 1907/2006 as amended. The product has been classified in accordance with Regulation (EC) No. 1272/2008 (CLP), Directive 67/548/EEC & Directive 1999/45/EC.

15.2 CHEMICAL SAFETY ASSESSMENT

A chemical safety assessment has been carried out.

SECTION 16. OTHER INFORMATION

Full text of relevant Hazard statements and Precautionary statements:

- Hazard Statement(s):
H226: Flammable liquid and vapour.
H304: May be fatal if swallowed and enters airways.
H315: Causes skin irritation.
H336: May cause drowsiness or dizziness.
H411: Toxic to aquatic life with long lasting effects.



SAFETY DATA SHEET – KEROSENE

Abbreviations:

| | |
|--------------------|--|
| CAS: | Chemical Abstracts Service; |
| EC ₅₀ : | Effective Concentration 50% |
| EL ₅₀ : | Effective Loading rate 50% |
| LC ₅₀ : | Lethal Concentration 50% |
| LD ₅₀ : | Lethal Dose 50% |
| LOEL: | Lowest Observed Effect Level |
| NOEL: | No Observed Effect Level |
| PBT: | Persistent, Bioaccumulative and Toxic. |
| vPvB: | Very Persistent and Very Bioaccumulative |
| WAF: | Water Accommodated Fraction |
| LTEL: | Long term exposure limit |
| STEL: | Short term exposure limit |
| TWA: | Time weighted average |
| DNEL: | Derived no effect level |
| PNEC: | Predicted no effect concentration |

History:

Version 01 Issued 16/03/2012; First Release
Version 02 Issued 11/03/2016; Updated for CLP, Sections 1-16 changed.

Disclaimer:

The above information is based on our current knowledge of the product. The purpose of this data sheet is to describe the product in terms of its safety and environmental requirements. It is the user's responsibility to satisfy themselves as to the application of this information and/or recommendations for their own use. This safety data sheet contains important information to ensure the safe storage, handling and use of this product, it does not however constitute an assessment of workplace risks.

Further information:

Users are advised to refer to relevant legislation, approved codes of practice and guidance available from the Health & Safety Executive (website: <http://www.hse.gov.uk>) and to the IP Codes of Practice available from the Energy Institute (website: <http://www.energyinst.org.uk>)

Product: Maxi-Mil A Liquid
Company Anitox Ltd
Version: 1

Page: 1 of 11

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

**1. IDENTIFICATION OF SUBSTANCE/PREPERATION AND THE COMPANY/
UNDERTAKING**

Identification of the substance/preparation:

Maxi-Mil A Liquid

Use of the substance/preparation:

Maxi-Mil A Liquid is a premixture of feed additives designed to help control mould in compound animal feed for all species

Company identification:

Company responsible for placing preparation on market in EU:

Anitox Limited
Anitox House
80 Main Road
Earls Barton
Northants NN6 OHJ
United Kingdom

Telephone: +44 (0) 1604 811 228
Email: adam.smith@anitox.co.uk
Technical contact point: Dr A. Smith

Emergency Contact Europe (24 Hour): +1 703 527 3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

Classification: Corrosive [C]

R phrases:

20 Harmful by inhalation
21 Harmful in contact with skin
22 Harmful if swallowed
34 Causes burns

Health/physical effects: Contact with the respiratory system, eyes and skin will cause burns and may cause skin sensitisation.

Product: Maxi-Mil A Liquid

Page: 2 of 11

Company Anitox Ltd

Version: 1

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

3. COMPOSITION /INFORMATION ON INGREDIENTS

Composition/information on hazardous constituents whose concentration in the preparation reaches or exceeds the limits defined in article 3 of Directive 1999/45/EC:

| | |
|-----------------|---------------|
| EINECS name: | Acetic Acid % |
| IUPAC name: | Acetic Acid |
| CAS No: | 64-19-7 |
| EINECS No: | 200-580-7 |
| R phrases*: | 10,35 |
| Classification: | Corrosive [C] |
| Concentration: | ≥25% and <90% |

| | |
|-----------------|--------------------|
| EINECS name: | n - Butyric Acid % |
| IUPAC name: | Butanoic Acid |
| CAS No: | 107-92-6 |
| EINECS No: | 203-532-3 |
| R phrases*: | 34 |
| Classification: | Corrosive [C] |
| Concentration: | ≥10% |

* see section 16 for full description of relevant R phrases

4. FIRST AID MEASURES

Following eye contact: Rinse immediately with plenty of water for at least 15 minutes. Keep eyelids open and avoid contamination of unaffected eye. Obtain immediate medical attention.

Following skin contact: Remove contaminated clothing, avoiding contamination of unaffected areas. Wash affected skin with soap and water. If irritation persists, seek medical attention.

Following ingestion: Rinse mouth. Do not induce vomiting. Obtain immediate medical attention.

Product: Maxi-Mil A Liquid

Page: 3 of 11

Company Anitox Ltd

Version: 1

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

Following inhalation:

Remove patient to fresh air, provide rest and keep warm. If recovery does not occur, seek medical attention.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Foam, water spray, dry powder or carbon dioxide.

Unsuitable extinguishing media: None

Special exposure hazards: Will burn if involved in a fire and give off irritating or toxic fumes (carbon oxides)

Special protective equipment for fire fighters:

Self contained breathing apparatus and protective clothing

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Observe any warning labels on the container (see sections 14 and 15). Wear full protective equipment - Respirator, face protection, chemical goggles and gloves (see section 8).

Environmental precautions: Prevent from entering sewers or the immediate environment. In case of large spill, inform local police, water authority and environment agency.

Methods for cleaning up: Contain all spillages and prevent entry into surface drains. Where possible direct spill to an identified self contained foul drain. Where possible, use a containment kit or absorbent material (sand, earth, sawdust) around the edge of the spill to prevent further spread. Neutralisation can be carried out with dilute ammonia solution or lime. Place additional absorbent material in the body of the liquid.

Product: Maxi-Mil A Liquid
Company Anitox Ltd
Version: 1

Page: 4 of 11

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

Dispose of contaminated absorbent material in accordance with section 13. Contact the ChemTrec emergency response number (Section 1) or your local environmental agency for a substantial spillage in public place quoting UN 3265.

7. HANDLING AND STORAGE

Information on safe handling:

Avoid contact with skin and eyes. Use with adequate ventilation. Wash thoroughly after handling.

Product should be applied by way of purpose built equipment calibrated and maintained by the product manufacturer.

Application should be in the batch mixer or other suitable area of containment. Where feasible application of product will be controlled remotely through a process control computer.

Information on fire and explosion protection:

Store away from heat and spark sources

Requirements concerning storage rooms and containers:

Store in a cool, well ventilated area. Keep container closed. Replace lid after use.

Notes on joint storage:

Store away from oxidising agent

Specific use:

Maxi-Mil A is a premixture of feed additives designed to help control mould in compound animal feed for all species. Application rate is 0.5

Product: Maxi-Mil A Liquid

Page: 5 of 11

Company Anitox Ltd

Version: 1

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

- 1kg/tonne of animal feed. Refer to technical data sheet, available on request from the manufacturer for further information on handling and use.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT

Occupational Exposure Limit Values in UK are:

Acetic acid: 10ppm (OEL 8h TWA); 15ppm (15 min STEL)

Butyric Acid: Value not established

Other countries may have different regulations in relation to occupational exposures.

Occupational exposure controls:

Local exhaust ventilation is recommended as an engineering control at sources of addition or where exposure may occur.

Additional information on the design of technical facilities:

See section 7

Personal Protection:

If there is a risk of exposure to the product, or where it is likely that the Occupational Exposure Limit (OEL) may be reached, the following Personal Protective Equipment should be worn:

Respiratory protective equipment: A full face respirator that conforms to EN141, type A with organic vapour filter

Hand Protection: Butyl rubber, Nitrile, Viton gloves (suitable for corrosive substances CE0086). Change gloves regularly.

Eye Protection: Chemical goggles/safety glasses

Product: Maxi-Mil A Liquid

Page: 6 of 11

Company Anitox Ltd

Version: 1

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|-------------------------|----------------------------|
| Appearance: | Clear to dark amber liquid |
| Odour: | Strong clinging odour |
| pH: | 2.2 |
| Boiling Point: | 99.0°C |
| Flash point: | >99.0°C |
| Vapour pressure: | ca. 25mm Hg |
| Freezing point: | <-27°C |
| Solubility: | Water – completely soluble |
| Viscosity: | 17.5 cps (25°C) |
| Vapour density: | >1 (air = 1) |

10. STABILITY AND REACTIVITY

| | |
|--|--|
| Stability: | Stable under ordinary conditions of storage and use |
| Conditions to avoid: | Heat, sparks and flame |
| Materials to avoid: | Strong oxidising agents, alkalis and acids. For example, caustic soda, soda ash, sodium, potassium and other alkali metals, amines, oxygen, hydrogen peroxide, alcohols, non metallic halides, other common metals |
| Hazardous decomposition products: | Carbon oxides on burning/ heating to decomposition |
| Hazardous polymerization: | Will not occur under normal conditions. |

Product: Maxi-Mil A Liquid
Company Anitox Ltd
Version: 1

Page: 7 of 11

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

11. TOXICOLOGICAL INFORMATION

Toxicological studies:

Studies on the toxicity of the product Maxi-Mil A liquid have not been carried out. Substances of concern in Maxi-Mil A are acetic acid and butyric acid. The following data is for acetic and butyric acid.

Acute Toxicity

Eyes: Contact can cause severe irritation with permanent damage.

Skin: Acetic Acid - LD₅₀ (dermal, rabbit): 1060mg/kg; Butyric Acid – LD₅₀ (dermal, rabbit): 530mg/kg

Ingestion: Acetic Acid - LD₅₀ (oral, rats): 3310mg/kg; Butyric Acid – LD₅₀ (Oral, rats): 2940mg/kg

Inhalation: Acetic Acid – LC₅₀ (inhalation, rat) 11.4mg/l/4h; Butyric Acid - (inhalation, rat) 0.4mg/l/1.4h

Chronic toxicity:

Skin: May cause burns on contact with skin.

Eyes: Highly irritating and may cause irreversible damage.

Inhalation: Highly irritating to nose and throat

12. ECOLOGICAL INFORMATION

Data provided is for acetic acid and butyric acid as substances of concern in Maxi-Mil A.

Aquatic toxicity:

Acetic Acid:

| | |
|---|-----|
| LC ₅₀ Pimephales promelas, 96h (mg/l) | 88 |
| LC ₅₀ Lepomis macro chirus, 96h (mg/l) | 75 |
| LC ₅₀ Gambosia affinis, 96h (mg/l) | 251 |
| EC ₅₀ Daphnia magna, 24h (mg/l) | 95 |

Butyric Acid:

| | |
|--|------|
| LC ₅₀ Leuciscus Idus, 48h (mg/l) | 250 |
| LC ₅₀ Oryzias latipes, 48h (mg/l) | 200 |
| EC ₅₀ Daphnia magna, 24h (mg/l) | 61.7 |

Product: Maxi-Mil A Liquid
Company Anitox Ltd
Version: 1

Page: 8 of 11

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

Environmental effects:

Biodegradable in soil and water and not bio cumulative.

13. DISPOSAL CONSIDERATIONS

Disposal of the product:

Users should acquaint themselves with local regulations.

Slightly contaminated (< 1% product) absorbent material can be disposed of as non-hazardous waste. Dispose of any heavily contaminated (\geq 1%) absorbent materials in

accordance with local and statutory requirements using a registered waste disposal contractor.

Disposal of the packaging

Contaminated packaging should be disposed of in accordance with local and statutory requirements using a registered waste disposal contractor.

14. TRANSPORT INFORMATION

Land transport

ADR

Shipping name of goods:

Corrosive Liquid Acidic, Organic (contains acetic and butyric acids)

Classification:

C3 - Corrosive Organic liquid

UN No:

3265

Packing group No:

II

Class:

8

Symbol:



Product: Maxi-Mil A Liquid

Page: 9 of 11

Company Anitox Ltd

Version: 1

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

Maxi-Mil A liquid may be carried in a transport chain including maritime or air cargo in accordance with ADR 1.1.4.2.1. in the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) 2009

Exemptions and restrictions:

Exemption limit related to quantities carried per transport unit is 333 kg, Transport Category 2 in accordance with ADR 1.1.3.6.3

Limited quantity (Code LQ 22) ADR 3.4.6

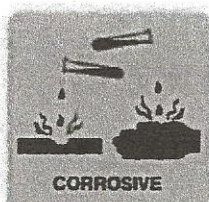
Maximum net quantity per inner packaging 1 litre for combination packagings, maximum gross mass shall not exceed 30 kg

Maximum net quantity for inner packagings 500 ml placed in shrink wrapped or stretch wrapped trays, maximum gross mass shall not exceed 20 kg.

15. REGULATORY INFORMATION

Symbol letter and hazard description:

Corrosive [C]



R phrases:

- 20 Harmful by inhalation
- 21 Harmful if swallowed
- 22 Harmful if swallowed
- 34 Causes burns

S phrases:

- 23 Do not breath fumes
- 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

Product: Maxi-Mil A Liquid

Page: 10 of 11

Company Anitox Ltd

Version: 1

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

36/37/39 Wear suitable protective clothing, gloves and eye/face protection

45 In case of accident or if you feel unwell, seek medical advice immediately (show data sheet or label where possible)

51 Use only in well ventilated areas

Special labelling of certain preparations:

Maxi-Mil A liquid is a premixture of feed additives as described by EC regulation 1831/2003.

It contains the following hazardous substances with identification and concentrations as follows:

| | |
|----------------|---------------|
| EINECS name: | Acetic Acid % |
| IUPAC name: | Acetic Acid |
| CAS No: | 64-19-7 |
| EINECS No: | 200-580-7 |
| Concentration: | ≥25% and <90% |

| | |
|----------------|--------------------|
| EINECS name: | n - Butyric Acid % |
| IUPAC name: | Butanoic Acid |
| CAS No: | 107-92-6 |
| EINECS No: | 203-532-3 |
| Concentration: | ≥10% |

Notes of labelling:

None.

16. OTHER INFORMATION

Inventories:

Acetic and butyric acids are listed in TSCA (USA), EINECS (EU), DSL/NDSL (Canada), AICS (Australia); KECL (Korea), IECSC (China), ENCS/MITI (Japan) and all other national inventories

Product: Maxi-Mil A Liquid
Company Anitox Ltd
Version: 1

Page: 11 of 11

Person responsible for last update: Dr Adam Smith

Date Issued: 30/09/2009

Sources of key data:

Safety Data Sheet Directive 91/155/EC (as amended by 93/112/EC and 2001/58/EC)
Classification, Packaging and Labelling of Dangerous Substances Directive 67/548/EEC
Classification, Packaging and Labelling of Dangerous Preparations Directive 1999/45/EC
Biocidal Products Directive 98/8/EC
The Chemical (Hazard and Packaging for Supply) Regulations 2002
CHIP (fifth edition)
The Carriage of Dangerous Goods Regulations 2009
The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) 2009
The Chemicals (Hazard Information and Packaging for Supply) (Amendment) Regulations 2008
The United Nations Document, Recommendations on Transport of Dangerous Goods – 15th Edition, 2007
UN Transport of Dangerous Goods – Manual of Tests and Criteria (4th Revised Edition)

R Phrases used in this document:

| | |
|-----|------------------------------|
| R20 | Harmful by inhalation |
| R21 | Harmful in contact with skin |
| R22 | Harmful if swallowed |
| R34 | Causes burns |
| R35 | Causes severe burns |

| | |
|--------------------|------------|
| Version Number | 1 |
| Date prepared | 30/09/2009 |
| Supersedes version | N/A |

END OF DOCUMENT

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended.

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

1.1 Product identifier

Product name:

MetAMINO®
DL-Methionine Feed Grade 99%

Chemical name:

DL-Methionine, Feed Grade 99%

Additional identification

| | |
|-------------------------------|---------------|
| Chemical name: | DL-Methionine |
| Chemical formula: | - |
| INDEX No. | - |
| CAS-No. | 59-51-8 |
| EC No. | 200-432-1 |
| REACH Registration No. | - |

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

Identified uses: Feed additive

Uses advised against:

1.3 Details of the supplier of the safety data sheet

Company Name : Evonik Nutrition & Care GmbH
Rodenbacher Chaussee 4
D-63457 Hanau-Wolfgang

Telephone : +49 6181 59 3086

E-mail : sds-info@evonik.com

1.4 Emergency telephone number:

24-Hour Health : +49 2365 49 2232

Emergency

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The product has not been classified as hazardous according to the legislation in force.

Classification according to Regulation (EC) No 1272/2008 as amended.

Not classified

2.2 Label Elements Not applicable

2.3 Other hazards No data available.



| | |
|--|---|
| Suitable extinguishing media: | Water. Foam. Water fog. |
| Unsuitable extinguishing media: | Carbon Dioxide. |
| 5.2 Special hazards arising from the substance or mixture: | May be released in case of fire: hydrocyanic acid, flammable smouldering gases, NOX. Oxides of Sulfur. Carbon Monoxide. Carbon Dioxide. |
| 5.3 Advice for firefighters Special fire fighting procedures: | Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations. |
| Special protective equipment for fire-fighters: | In the event of fire, wear self-contained breathing apparatus. |

SECTION 6: Accidental release measures

| | |
|---|---|
| 6.1 Personal precautions, protective equipment and emergency procedures: | Use personal protective equipment. Keep unauthorized personnel away. |
| 6.1.1 For non-emergency personnel: | No data available. |
| 6.1.2 For emergency responders: | No data available. |
| 6.2 Environmental Precautions: | Do not allow the product into the following compartments: groundwater |
| 6.3 Methods and material for containment and cleaning up: | Absorb mechanically avoiding production of dust. |
| 6.4 Reference to other sections: | Wear personal protective equipment; see section 8. |

SECTION 7: Handling and storage:

| | |
|--|--|
| 7.1 Precautions for safe handling: | Handle in accordance with good industrial hygiene and safety practice. If there is the possibility of skin/eye contact, the indicated hand/eye/body protection should be used. |
| 7.2 Conditions for safe storage, including any incompatibilities: | Store in a cool and shaded area. Keep containers dry and tightly closed to avoid moisture absorption and contamination. COMBUSTIBLE. Keep away from sources of ignition –No smoking. Avoid dust formation. VDI 2263 "Dust fires and dust explosions; dangers, evaluation, preventive measures." Ensure there are sufficient retaining facilities for water used to extinguish fire. |
| 7.3 Specific end use(s): | For processing and handling instructions refer to product information. |

SECTION 8: Exposure controls/personal protection

| | |
|--|---|
| 8.1 Control Parameters Occupational Exposure Limits | None of the components have assigned exposure limits. |
|--|---|

| | |
|---|--|
| Solubility in Water: | 33.5 g/l (25 °C) literature |
| Solubility (other): | No data available. |
| Partition coefficient (n-octanol/water): | -1.87 literature |
| Self Ignition Temperature: | > 150 °C (VDI 2263-1) in 8l wire basket |
| Decomposition Temperature: | 215 °C (TG (thermal gravimetric analysis)) |
| Kinematic viscosity: | No data available. |
| Dynamic viscosity: | Not applicable |

9.2 Other information

| | |
|---|---|
| Explosive properties: | The product is susceptible to dust explosion. |
| Oxidizing properties: | Not to be expected in view of the structure |
| Dust Explosion Description Number Kst: | 85 m.b_/s |
| Minimum ignition energy: | > 10 mJ (VDI Guideline 2263 sheet 1) sieve fraction without inductance |
| Minimum ignition temperature: | 330 °C (VDI Guideline 2263 sheet 1) (BAM-furnace) Standard commercial product with characteristic grain size distribution is normally flammable. |
| Dust explosion properties: | St1 |
| Burning Rate: | 1,200 s |
| Minimum Exposable Concentration (MEC): | 30 g/m ³ |
| Burning Number: | Burning Number: 5 VDI 2263 |

SECTION 10: Stability and reactivity

| | |
|---|--|
| 10.1 Reactivity: | No data available. |
| 10.2 Chemical Stability: | Stable under recommended storage conditions. |
| 10.3 Possibility of hazardous reactions: | Dust can form an explosive mixture in air. |
| 10.4 Conditions to avoid: | See chapter Conditions for safe storage, including any incompatibilities |
| 10.5 Incompatible Materials: | No further information available |
| 10.6 Hazardous Decomposition Products: | No further information available |

SECTION 11: Toxicological information

| | |
|---|--|
| General information: | gastro-intestinal symptoms: nausea, vomiting Side-effects were observed in the event of higher dosage (10 g) |
| Information on likely routes of exposure | |
| Inhalation: | Relevant route of exposure. Information on effects are given below. |
| Skin Contact: | Relevant route of exposure. Information on effects are given below. |
| Eye contact: | Relevant route of exposure. Information on effects are given below. |
| Ingestion: | If handled correctly, not a relevant route of exposure. Information on effects are given below. |

11.1 Information on toxicological effects

Acute toxicity



| | |
|---|--------------------|
| Carcinogenicity | |
| Product: | No data available. |
| Components: | |
| DL-Methionine | No data available. |
| Reproductive toxicity | |
| Product: | No data available. |
| Components: | |
| DL-Methionine | No data available. |
| Specific Target Organ Toxicity - Single Exposure | |
| Product: | No data available. |
| Components: | |
| DL-Methionine | No data available. |
| Specific Target Organ Toxicity - Repeated Exposure | |
| Product: | No data available. |
| Components: | |
| DL-Methionine | No data available. |
| Aspiration Hazard | |
| Product: | No data available. |
| Components: | |
| DL-Methionine | No data available. |

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity

Fish

Product: LC 50 (Brachydanio rerio (zebrafish), 96 h): > 3,200 mg/l (OECD Test Guideline 203)
NOEC (Brachydanio rerio (zebrafish), 96 h): 3,200 mg/l (OECD Test Guideline 203)

Components
DL-Methionine

LC 50 (Brachydanio rerio (zebrafish), 96 h): > 3,200 mg/l (OECD Test Guideline 203)
NOEC (Brachydanio rerio (zebrafish), 96 h): 3,200 mg/l (OECD Test Guideline 203)

Aquatic Invertebrates
Product:

EC 50 (Daphnia magna (Water flea), 48 h): 324 mg/l (OECD TG 202)
NOEC (Daphnia magna (Water flea), 48 h): 220 mg/l (OECD TG 202)

Components
DL-Methionine

EC 50 (Daphnia magna (Water flea), 48 h): 324 mg/l (OECD Test Guideline 202)
NOEC (Daphnia magna (Water flea), 48 h): 220 mg/l (OECD Test Guideline 202)

13.1 Waste treatment methods

- General information:** No data available.
- Disposal methods:** Disposal according to local authority regulations. Pack and label wastes like the pure substance. Do not detach label from the delivery containers prior to disposal. Offer rinsed packaging material to local recycling facilities. The waste key number must be determined as per the European Waste Types List (decision on EU Waste Types List 2000/532/EC) in cooperation with the disposal firm / producing firm / official authority. No waste key number as per the European Waste Types List can be assigned to this product, since such classification is based on the (as yet undetermined) use.
- Contaminated Packaging:** Do not reuse empty containers and dispose of in accordance with the regulations issued by the appropriate local authorities.

SECTION 14: Transport information

- 14.1 UN number**
Not regulated as a dangerous good
- 14.2 UN proper shipping name**
Not regulated as a dangerous good
- 14.3 Transport hazard class(es)**
Not regulated as a dangerous good
- 14.4 Packing group**
Not regulated as a dangerous good
- 14.5 Environmental hazards**
Not regulated as a dangerous good
- 14.6 Special precautions for user**
Not applicable
- 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**
Not applicable for product as supplied.

SECTION 15: Regulatory information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:****EU Regulations**

Regulation (EC) No. 2037/2000 Substances that deplete the ozone layer: none

Regulation (EC) No. 850/2004 on persistent organic pollutants: none

Regulation (EC) No. 689/2008 Import and export of dangerous chemicals: none

EU. REACH Candidate List of Substances of Very High Concern for Authorization (SVHC): none

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use: none

Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work.: none

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breast feeding.: none

Key literature references and sources for data: No data available.

Wording of the H-statements in section 2 and 3: none

Training information: No data available.

SDS No.:

Revision Information: Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Disclaimer: This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.



PRODUCT: OptiPhos[®] WSP

DATE: July 2014

PAGE: 1/10

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY /UNDERTAKING

1.1. PRODUCT IDENTIFIER

| | |
|---------------------|---------------------------|
| <i>Trade name:</i> | OptiPhos [®] WSP |
| <i>Common name:</i> | 6-phytase. |
| <i>IUB Number</i> | 3.1.3.26. |
| <i>CAS Number:</i> | [9001-89-2]. |

1.2. RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED

Feed additive classified under category 4 “zootechnical additives”, functional group (a) “digestibility enhancers”, subclassification “enzymes”.

It is used in poultry and pigs as digestibility enhancer, which, when fed to animals, increases the digestibility of the diet, through action on target feed materials.

1.3. DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Person responsible for putting the product into circulation in the EU:

Huvepharma N.V., Uitbreidingstraat 80, 2600 Antwerpen, Belgium

Certification number: αBE2280

Tel. +32 3 288 1849; Fax. +32 3 289 7845;

E-mail: customerservice@huvepharma.com

Manufacturer:

BIOVET Joint Stock Company

39, Petar Rakov St.

4550 Peshtera - Bulgaria

Tel.: +359 350 65619; Fax: +359 350 65636

E-mail: biovet@biovet.com

Identification No α BG 13 1 0069.

1.4 EMERGENCY TELEPHONE NUMBER

+359 887 939420

PRODUCT: OptiPhos[®] WSP

DATE: July 2014

PAGE: 2/10

2. HAZARDS IDENTIFICATION

2.1. CLASSIFICATION OF THE SUBSTANCE

This preparation is not classified as dangerous according to Regulation (EC) No 1272/2008.

2.2. LABEL ELEMENTS

Classification according to Regulation (EC) No 1272/2008 of December 2008

Signal words



Danger

Hazard statements:

- H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H315: Causes skin irritation.
H319: Causes serious eye irritation.

Precautionary Statements – Prevention

- P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P285: In case of inadequate ventilation wear respiratory protection.
P270: Do not eat, drink or smoke when using this product.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary Statements - Response

- P304 + P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P362: Take off contaminated clothing and wash before reuse.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.

2.3. OTHER HAZARDS

None.

PRODUCT: OptiPhos[®] WSP**DATE:** July 2014**PAGE:** 3/10

3. COMPOSITION/INFORMATION ON INGREDIENTS

Each one gram of OptiPhos[®] WSP contains not less than 350 000 OTU of 6-phytase.

4. FIRST AID MEASURES

General information

Change soaked clothing.

Remove clothing where dust collected.

After inhalation

When spray fog inhaled, seek medical advice and show the physician the packing or the packing label.

After contact with skin

In case of contact with skin wash off with water.

After contact with eyes

In case of contact with eyes rinse immediately for at least 15 minutes with plenty of water.

After ingestion

No special measures necessary. Rinse mouth thoroughly with water.

5. FIRE-FIGHTING MEASURES

Extinguishing media:

Water spray or foam are appropriate for surrounding fire and materials.

Special fire fighting procedure:

As with all fires, evacuate personnel to a safe area. Fire fighters should use self-contained breathing equipment and protective clothing.

Usual fire and explosion hazards: As with all dry powders, take precautionary measures against static discharges by grounding mechanical equipment in contact with dry material to dissipate the potential build-up of static electricity.

PRODUCT: OptiPhos® WSP

DATE: July 2014

PAGE: 4/10

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid dust formulation.
Use personal protective clothing.

Methods for cleaning up/taking up

Clean equipment with a vacuum cleaner.
Avoid raising dust.
Clean contaminated floors and objects thoroughly, observing environmental regulations.
When picked up, treat material as prescribed under heading "Disposal".

7. HANDLING AND STORAGE

7.1. PRECAUTIONS FOR SAFE HANDLING

7.1. PRECAUTIONS FOR SAFE HANDLING

Wear suitable protective equipment while handling the product.
The use of local exhaust hood and general exchange in the premise is recommended.

7.2. CONDITIONS FOR SAFE STORAGE INCLUDING ANY INCOMPATIBILITIES

Protect from moisture and heat.

7.3. SPECIFIC USE(S)

OptiPhos® WSP is an enzyme feed additive used in poultry and pigs as digestibility enhancer, which, when fed to animals, increases the digestibility of the diet, through action on target feed materials.

PRODUCT: OptiPhos® WSP

DATE: July 2014

PAGE: 5/10

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal exposure controls

General protective measures:

- Do not inhale dust/mist.
- Do not inhale aerosols.
- Avoid contact with eyes and skin.

Hygienic measures:

- Do not eat, drink or smoke during work time.
- Keep away from foodstuffs and beverages.
- After worktime and during work intervals the affected skin areas must be thoroughly cleaned.

- | | |
|-------------------------|--|
| Respiratory protection: | Particle filter half mask, filter P1 |
| Hand protection: | Rubber gloves |
| Eye protection: | Safety glasses with side protective shield |
| Skin protection: | Protective clothing |

Environmental exposure controls

Do not empty into drains. This material and its container must be disposed of in a safe way in respect of local laws.

Additional exposure precautions

Not intended for human consumption.

PRODUCT: OptiPhos[®] WSP

DATE: July 2014

PAGE: 6/10

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES**

| | |
|---|----------------------------------|
| Appearance: | Powder or fine granules |
| Physical state: | Solid |
| Color: | Beige to yellow |
| Boiling point: | No applicable information found. |
| Melting point: | No applicable information found. |
| Vapour pressure: | No applicable information found. |
| Boiling point: | No applicable information found. |
| Maximum exposure pressure: | 6.6 bar-g |
| Rate of pressure rise: | 142 bar/s |
| Maximum rate of pressure rise (Kst): | 39 bar-m/s |
| Explosible concentration of combustible dusts (MEC): | 400 g/m ³ |
| Minimum ignition energy of a dust cloud in air (MIE): | 21 mJ |
| Minimum ignition temperature of dust clouds (Tc): | 455°C. |
| Surface ignition temperature of dust layers (Ts): | Material melted. |
| Explosion severity: | 0.46 |
| Ignition sensitivity: | 1.09 |
| Dust classification: | Class II combustible. |
| Solubility in water: | Soluble. |

9.2. OTHER INFORMATION

Not available.

PRODUCT: OptiPhos® WSP

DATE: July 2014

PAGE: 7/10

10. STABILITY AND REACTIVITY

Stable at normal temperatures, pressures and humidity.

10.1. CONDITIONS TO AVOID

Elevated temperatures and humidity and direct sunlight.

10.2. INCOMPATIBILITY

NAD.

10.3. MATERIALS TO AVOID

Water and acidic conditions (hydrochloric acid) combined with elevated temperature.

10.4. HAZARDOUS DECOMPOSITION PRODUCTS

NAD.

PRODUCT: OptiPhos[®] WSP**DATE:** July 2014**PAGE:** 8/10

11. TOXICOLOGICAL INFORMATION

11.1. INFORMATION ON TOXICOLOGICAL EFFECTS

11.1.1. Acute toxicity

Sub-acute toxicity studies performed in rats for 90 days revealed no abnormalities related to treatment with purified 6-phytase.

11.1.2. Subchronic/chronic toxicity

Subchronic toxicity:

90-day administration at doses of 100 mg/kg, 500 mg/kg and 1000 mg/kg was safe and well tolerated (revealed no abnormalities related to the treatment).

Effects on the respiratory system:

Enzymes are considered respiratory sensitizers. Adequate labelling is provided for the present product (see under item 2.2).

Skin and eye sensitization:

Enzymes are considered skin and eye sensitizers. Adequate labelling is provided for the present product (see under item 2.2).

Genotoxicity including mutagenicity:

The additive cannot be considered as a potential mutagenic additive as the results from three mutagenicity tests performed with the purified fermentation product were all negative: Bacterial reverse mutation test; In-vitro Mammalian Chromosomal Aberration Test; Mammalian erythrocyte micronucleus test.

Other types of toxicity

Based on the experience that the strain is safe and the other toxicological studies did not raise any concern, no chronic oral toxicity (including carcinogenicity), reproduction toxicity, teratogenicity studies were performed.

PRODUCT: OptiPhos® WSP**DATE:** July 2014**PAGE:** 9/10

12. ECOLOGICAL INFORMATION

The enzyme is degraded in the gastro-intestinal tract, and as it is of proteinaceous material any remaining material will further degrade in nature. No accumulation will take place.

13. DISPOSAL CONSIDERATIONS

Do not empty into drains. This material and its container must be disposed of in a safe way in compliance with all the State and local regulations.

14. TRANSPORT INFORMATION

| | |
|----------------------------|-------------------------|
| <i>IMDG (by sea):</i> | In dry closed premises. |
| <i>ADR (by road):</i> | Use closed vehicles. |
| <i>RID (by rail):</i> | Use closed cars. |
| <i>ICAO/IATA (by air):</i> | No limits. |

15. REGULATORY INFORMATION

15.1. SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE

None.

15.2. CHEMICAL SAFETY ASSESSMENT

A chemical safety assessment according to REACH-regulation has not been carried out for OptiPhos® WSP as it is a feed additive. Regulation 1272/2008 does not apply to substances and mixtures, which are in the finished state, intended for the final user as food or feeding stuffs as defined in Regulation (EC) No 178/ 2002 including when they are used as an additive in feeding stuffs within the scope of Regulation (EC) No 1831/2003.

PRODUCT: OptiPhos[®] WSP**DATE:** July 2014
10/10**PAGE:****16. OTHER INFORMATION**

The data and information reported in this Material Safety Data Sheet are based on information and studies made by HUVEPHARMA with OptiPhos[®] WSP and 6-phytase purified product, and are only a guide for the user. They respect the actual level of the scientific and technical state of the art. In any case they cannot involve a responsibility of HUVEPHARMA if they are not respected, in particular for the aspects not considered.

LIST OF ABBREVIATIONS USED IN THE MSDS

| | |
|------------------------|--|
| ADR | International Carriage of Dangerous Goods by Road; |
| CAS Number | Chemical Abstract Service Registry Number; |
| EC Number | European Community Identification Number; |
| EC | European Community; |
| EINECS | European Inventory of Existing Commercial Substances; |
| ICAO/IATA | International Civil Aviation Organization/International Air Transport Association; |
| IMDG | International Maritime Dangerous Goods; |
| IUB Number | Identification Number in the International Union of Biochemistry |
| LD₅₀ | Lethal dose 50; |
| NAD | No Available Data; |
| RID | International Carriage of Dangerous Goods by Rail. |



Registered Office: Twyford, Banbury, Oxon, OX17 3AA
Telephone: (01295) 811441 Fax: (01295) 811228

Safety Data Sheet - Pura LM

| | |
|------------------------------------|--|
| PRODUCT ID | A heat treated blend of Field Beans or Peas and Rapeseed in meal form. |
| MANUFACTURER | Cherwell Valley Silos Ltd |
| HAZARDOUS CONSTITUENTS | None |
| PHYSICAL PROPERTIES | |
| Appearance | Green/Yellow and black coloured meal |
| Bulk Density | 600 Kilograms per cubic metre |
| Moisture (Typical Value) | 9.50% |
| Solubility in Water | Negligible |
| pH of 10% extract | 5.5 |
| Particle size | 90% over 500 microns Less than 0.5% under 150 microns |
| HEALTH & SAFETY DATA | Effects of Over Exposure |
| Skin & eyes | Skin and eye contact may cause temporary discomfort. Remarks/Emergency First Aid Procedure:- Wash with plenty of water |
| Inhalation | May cause non-specific irritation if inhaled. Remarks/Emergency First Aid Procedure:- Remove from dust. Seek medical advice if symptoms persist. |
| Ingestion | None |
| REACTIVITY DATA | |
| Stable/Unstable | Stable |
| Incompatibility | None |
| Chemical Properties | Inert |
| Combustion Products | Carbon dioxide and water if combustion is complete. Incomplete combustion could lead to production of carbon monoxide. |
| HEALTH & HAZARD DATA | Heat treatment destroys toxic proteins present naturally. Material is therefore non-toxic typically or by inhalation or ingestion. In the unlikely event that under-processed material was supplied, it could contain active toxic proteins. On skin or inhalation, contact, these could cause allergy. On ingestion, they could cause sickness, diarrhoea and transient abdominal pain. No positive tests for aflatoxin have been obtained up to the present. It can theoretically occur in mouldy meal. It can cause liver cancer. Inhalation of mouldy meal can also cause an allergic response and/or infection. Heat treatment has destroyed moulds so these could arise only from re-infection as a result of poor storage. |
| FIRE & EXPLOSION | |
| Fire Risk | Only a risk if incorrectly stored. Self-heating can occur. |
| Explosion Risk | Slight. The product will not normally produce significant amounts of dust. Dust of any organic material, if sufficiently fine, can form an explosive mixture with air. Extraction facilities should be sufficient to prevent excessive dust levels. |
| Flash Point | Chars at 500° C and ignites at about 550°C. |
| Extinguishing Media | Water Spray |
| Fire Fighting Procedures | Normal |
| PROTECTIVE EQUIPMENT | Overalls and face mask recommended |
| HANDLING & STORAGE | No smoking. Avoid excessive temperatures (above 40°C) and humid conditions for storage. Store in open, well ventilated, areas out of direct sunlight. Do not allow moisture to fall below 5% by storage in excessive dry heat, in case spontaneous combustion occurs. Do not allow moisture to rise high enough to enable mould and bacterial growth as this could lead to spontaneous combustion. |
| Bagged Product (shelf life) | Allow for 4 weeks May/Sept (from date of supply) Allow for 6 weeks Oct/April (from date of supply) |
| TRANSPORT PRECAUTIONS | Keep dry. If damp enough to ferment, self-heating could occur. |
| SPILLAGE OR LEAK PROCEDURES | Contain spillage. Try to keep it dry to assist cleaning operations. Use a vacuum suction unit to remove spillage or shovel into bags or skip. Avoid contamination of water courses and drains. |
| Neutralising Chemicals | Not applicable. |
| Disposal | Can be land-filled at Approved Waste Tip. |



SAFETY DATA SHEET

(REACH regulation (EC) n° 1907/2006 - n° 2015/830)

SECTION 1 : IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product name : RHODIMET® AT 88

Product code : ADI004.

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

Additive for animal feed.

Synthesis intermediate.

1.3. Details of the supplier of the safety data sheet

Registered company name : Adisseo France S.A.S

Address : Immeuble Antony Parc II - 10, Place du Général de Gaulle 92160 Antony France

Telephone : +33 (0)1 46 74 70 00. Fax: +33 (0)1 40 96 96 96. Telex: -.

Email: fds@adisseo.com

<http://www.adisseo.com>

1.4. Emergency telephone number : +33 (0)1 45 42 59 59.

Association/Organisation : INRS / ORFILA <http://www.centres-antipoison.net>.

Other emergency numbers

CareChem (24h/24): + 44 (0) 1235 239 670

SECTION 2 : HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

In compliance with EC regulation No. 1272/2008 and its amendments.

Serious eye damage, Category 1 (Eye Dam. 1, H318).

This substance does not present a physical hazard. Refer to the recommendations regarding the other products present on the site.

This substance does not present an environmental hazard. No known or foreseeable environmental damage under standard conditions of use.

2.2. Label elements

In compliance with EC regulation No. 1272/2008 and its amendments.

Hazard pictograms :



GHS05

Signal Word :

DANGER

Product identifiers :

EC 209-523-0

DL -2-HYDROXY-4-(METHYLTHIO)BUTYRIC ACID

Hazard statements :

H318

Causes serious eye damage.

Precautionary statements - Prevention :

P280

Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statements - Response :

P305 + P351 + P338

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310

Immediately call a POISON CENTER/doctor.

Other information :

For user safety: safety glasses and gloves should be worn during handling.

2.3. Other hazards

The substance does not satisfy the PBT or vPvP criteria in accordance with annexe XIII of the REACH regulations EC 1907/2006.

SECTION 3 : COMPOSITION/INFORMATION ON INGREDIENTS**3.1. Substances****Composition :**

| Identification | (EC) 1272/2008 | Note | % |
|---|----------------------------------|------|----------------|
| CAS: 583-91-5 EC: 209-523-0 | GHS05 Dgr Eye Dam. 1, H318 | | 50 ≤ x % < 100 |
| DL -2-HYDROXY-4-(METHYLTHIO)BUTYRI C ACID | | | |

SECTION 4 : FIRST AID MEASURES

As a general rule, in case of doubt or if symptoms persist, always call a doctor.
NEVER induce swallowing by an unconscious person.

4.1. Description of first aid measures**In the event of exposure by inhalation :**

If inhaled, move the patient into the fresh air and keep warm and at rest.

In the event of splashes or contact with eyes :

Wash thoroughly with fresh, clean water for 15 minutes holding the eyelids open.
Regardless of the initial state, refer the patient to an ophthalmologist and show him the label.

In the event of splashes or contact with skin :

Wash skin immediately and thoroughly with soap and water.

In the event of swallowing :

Seek medical attention, showing the label.
Do not force vomiting.

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

No data available.

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

No data available.

SECTION 5 : FIREFIGHTING MEASURES

Non-flammable.

Keep packages near the fire cool, to prevent pressurised containers from bursting.

5.1. Extinguishing media**Suitable methods of extinction**

In the event of a fire, use :
- sprayed water or water mist
- carbon dioxide (CO₂)
- foam

Unsuitable methods of extinction

In the event of a fire, do not use :
- water jet

5.2. Special hazards arising from the substance or mixture

A fire will often produce a thick black smoke. Exposure to decomposition products may be hazardous to health.
Do not breathe in smoke.

In the event of a fire, the following may be formed :

- carbon monoxide (CO)
- carbon dioxide (CO₂)
- sulphur dioxide (SO₂)

5.3. Advice for firefighters

Due to the toxicity of the gas emitted on thermal decomposition of the products, fire-fighting personnel are to be equipped with autonomous insulating breathing apparatus.

SECTION 6 : ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Consult the safety measures listed under headings 7 and 8.

For non first aid worker

Avoid any contact with the skin and eyes.

For first aid worker

First aid workers will be equipped with suitable personal protective equipment (See section 8).

6.2. Environmental precautions

Contain and control the leaks or spills with non-combustible absorbent materials such as sand, earth, vermiculite, diatomaceous earth in drums for waste disposal.

Prevent any material from entering drains or waterways.

6.3. Methods and material for containment and cleaning up

Clean preferably with a detergent, do not use solvents.

Pump the product into a suitably-labelled non-metal, sealed, plastic, salvage receptacle.

Neutralise surplus carefully; use lime or sodium carbonate.

Wash the ground thoroughly with running water.

Wash non-retrievable surplus thoroughly with running water.

6.4. Reference to other sections

No data available.

SECTION 7 : HANDLING AND STORAGE

Requirements relating to storage premises apply to all facilities where the substance is handled.

7.1. Precautions for safe handling

Always wash hands after handling.

Remove and wash contaminated clothing before re-using.

Provide emergency showers and eye wash stations will be required in facilities where the substance is handled constantly.

When deliveries are made in drums or IBC, only use fork-lift trucks or pallet trucks for unloading vans and containers as well as for moving products.

Fire prevention :

Prevent access by unauthorised personnel.

Recommended equipment and procedures :

For personal protection, see section 8.

Observe precautions stated on label and also industrial safety regulations.

Avoid eye contact with this substance at all times.

Prohibited equipment and procedures :

No smoking, eating or drinking in areas where the substance is used.

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, dry and well-ventilated area.

Stack at ambient temperature in the original receptacle.

Store the receptacle tightly closed.

Packaging

Always keep in packaging made of an identical material to the original.

Suitable packaging materials :

- Polyethylene
- Stainless steel

7.3. Specific end use(s)

No data available.

SECTION 8 : EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

No data available.

8.2. Exposure controls

Personal protection measures, such as personal protective equipment

Pictogram(s) indicating the obligation of wearing personal protective equipment (PPE) :



Use personal protective equipment that is clean and has been properly maintained.

Store personal protective equipment in a clean place, away from the work area.

Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using. Ensure that there is adequate ventilation, especially in confined areas.

- Eye / face protection

Avoid contact with eyes.

Use eye protectors designed to protect against liquid splashes

Before handling, wear safety goggles with protective sides accordance with standard EN166.

In the event of high danger, protect the face with a face shield.

Prescription glasses are not considered as protection.

Individuals wearing contact lenses should wear prescription glasses during work where they may be exposed to irritant vapours.

Provide eyewash stations in facilities where the product is handled constantly.

- Hand protection

Wear suitable protective gloves in the event of prolonged or repeated skin contact.

Use suitable protective gloves that are resistant to chemical agents in accordance with standard EN374.

Gloves must be selected according to the application and duration of use at the workstation.

Protective gloves need to be selected according to their suitability for the workstation in question : other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required.

Type of gloves recommended :

- PVC (polyvinyl chloride)

- Butyl Rubber (Isobutylene-isoprene copolymer)

Recommended properties :

- Impervious gloves in accordance with standard EN374

Wear gloves sealed to acids.

- Body protection

Work clothing worn by personnel shall be laundered regularly.

After contact with the product, all parts of the body that have been soiled must be washed.

- Respiratory protection

If ventilation is insufficient to maintain fume concentrations below maximum exposure values, wear respiratory devices.

SECTION 9 : PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

General information :

| | |
|---------------------|-----------------|
| Physical state : | Viscous liquid. |
| Colour: | Brown. |
| Odour: | Characteristic. |
| Empirical formula : | C5H10O3S |
| Molecular weight: | 150.19 |

Important health, safety and environmental information

| | |
|---------------------------------|--|
| pH : | Not relevant. |
| pH (aqueous solution) : | 2.4 +/-0.1 (10 g/l H2O) |
| Boiling point/boiling range : | 120 °C. |
| Flash point interval : | Not relevant. |
| Vapour pressure (50°C) : | Not relevant. |
| Density : | 1.23 |
| Water solubility : | Soluble. |
| Viscosity : | 105 cSt (25°C) |
| Solubility in organic solvents: | Insoluble or partially soluble in standard solvents. |
| pKA : | 3.4 +/-0.1 |

9.2. Other information

| | |
|---|-------|
| Crystallization point/crystallization range : | -40°C |
|---|-------|

SECTION 10 : STABILITY AND REACTIVITY

10.1. Reactivity

No data available.

10.2. Chemical stability

This substance is stable under the recommended handling and storage conditions in section 7.

10.3. Possibility of hazardous reactions

No data available.

10.4. Conditions to avoid

No data available.

10.5. Incompatible materials

Keep away from :

- strong oxidising agents
- strong bases

10.6. Hazardous decomposition products

The thermal decomposition may release/form :

- carbon monoxide (CO)
- carbon dioxide (CO₂)
- sulphur dioxide (SO₂)

SECTION 11 : TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

May have irreversible effects on the eyes, such as tissue damage in the eye, or serious physical decay of sight, which is not fully reversible by the end of observation at 21 days.

Serious eye damage is typified by the destruction of cornea, persistent corneal opacity and iritis.

11.1.1. Substances

Acute toxicity :

DL -2-HYDROXY-4-(METHYLTHIO)BUTYRIC ACID (CAS: 583-91-5)

Oral route : LD50 > 5000 mg/kg

Skin corrosion/skin irritation :

No skin irritation.

Other information

Mutagenic effects: Non mutagenous in the AMES test.

SECTION 12 : ECOLOGICAL INFORMATION

12.1. Toxicity

12.1.1. Substances

DL -2-HYDROXY-4-(METHYLTHIO)BUTYRIC ACID (CAS: 583-91-5)

Fish toxicity : LC50 = 386 mg/l
Species : Brachydanio rerio
Duration of exposure : 96 h

Crustacean toxicity : EC50 = 222 mg/l
Species : Daphnia magna
Duration of exposure : 48 h

Algae toxicity : ECr50 = 82 mg/l
Species : Scenedesmus subspicatus
Duration of exposure : 72 h

12.2. Persistence and degradability

Easily biodegradable.

12.2.1. Substances

DL -2-HYDROXY-4-(METHYLTHIO)BUTYRIC ACID (CAS: 583-91-5)

Biodegradability : no degradability data is available, the substance is considered as not degrading quickly.

12.3. Bioaccumulative potential

No data available.

12.4. Mobility in soil

Adsorption/desorption: product infiltrates easily into soils.
Product's target compartment: water

12.5. Results of PBT and vPvB assessment

No data available.

12.6. Other adverse effects

No data available.

German regulations concerning the classification of hazards for water (WGK) :

WGK 1 (VwVwS vom 27/07/2005, KBws) : Slightly hazardous for water.

SECTION 13 : DISPOSAL CONSIDERATIONS

Proper waste management of the substance and/or its container must be determined in accordance with Directive 2008/98/EC.

13.1. Waste treatment methods

Do not pour into drains or waterways.

Waste :

Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.

Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector or company.

Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled packaging :

Empty container completely. Keep label(s) on container.

Give to a certified disposal contractor.

SECTION 14 : TRANSPORT INFORMATION

Exempt from transport classification and labelling.

14.1. UN number

-

14.2. UN proper shipping name

-

14.3. Transport hazard class(es)

-

14.4. Packing group

-

14.5. Environmental hazards

-

14.6. Special precautions for user

-

SECTION 15 : REGULATORY INFORMATION

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

- Classification and labelling information included in section 2:

The following regulations have been used:

- EU Regulation No. 1272/2008 amended by EU Regulation No. 487/2013.
- EU Regulation No. 1272/2008 amended by EU Regulation No. 758/2013.
- EU Regulation No. 1272/2008 amended by EU Regulation No. 944/2013.
- EU Regulation No. 1272/2008 amended by EU Regulation No. 605/2014.
- EU Regulation No. 1272/2008 amended by EU Regulation No. 1297/2014.

- Container information:

No data available.

- Particular provisions :

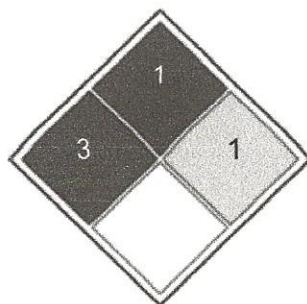
No data available.

- German regulations concerning the classification of hazards for water (WGK) :

WGK 1 (VwVwS vom 27/07/2005, KBws) : Slightly hazardous for water.

- Standardised American system for the identification of hazards presented by the product in view of emergency procedures (NFPA 704) :

NFPA 704, Labelling: Health=3 Inflammability=1 Instability/Reactivity=1 Specific Risk=none



15.2. Chemical safety assessment

No data available.

SECTION 16 : OTHER INFORMATION

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on national and community regulations.

It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations.

The information in this safety data sheet must be regarded as a description of the safety requirements relating to the substance and not as a guarantee of the properties thereof.

Wording of the phrases mentioned in section 3 :

| | |
|------|----------------------------|
| H318 | Causes serious eye damage. |
|------|----------------------------|

Abbreviations :

ADR : European agreement concerning the international carriage of dangerous goods by Road.

IMDG : International Maritime Dangerous Goods.

IATA : International Air Transport Association.

ICAO : International Civil Aviation Organisation

RID : Regulations concerning the International carriage of Dangerous goods by rail.

WGK : Wassergefährdungsklasse (Water Hazard Class).

GHS05 : Corrosion

PBT: Persistent, bioaccumulable and toxic.

vPvB : Very persistent, very bioaccumulable.

SVHC : Substances of very high concern.

SDS (SAFETY DATA SHEET)

November 1, 2015

| | |
|--------------|--------------------------------|
| PRODUCT | Sewon L-Lysine Liquid 50% Feed |
| HS CODE | 2922.41 |
| MANUFACTURER | DAESANG Corporation |

1. Substance/preparation and company identification

Product:

Sewon L-Lysine Liquid 50% Feed

Company:

Daesang Corporation.
26, Cheonho-daero, Dongdaemun-gu, Seoul, Korea
Tel: +82 2 2657 5371 & Fax: +82 2 2657 5333
Email: bio@daesang.com

Emergency information:

+1 201 488 4010 for USA & Canada
+31 20 640 6080 for Europe
+82 2 2657 5337 for the rest countries

2. Composition/information on ingredients

Chemical nature

L-Lysine

CAS Number: 56-87-1 / EG-Number: 211-519-9

Approx. 50% solution

3. Possible hazard

Advice on critical hazards to man and the environment : None

4. First-aid measures

No special measures necessary.

5. Fire-fighting measures

Suitable extinguishing media: Water, carbon dioxide (CO₂), foam, dry extinguishing media.
The following can be given off in a fire: CO_x, NO_x, HCl
Special protective equipment: In case of fire, wear a self contained breathing apparatus.

Further information: Dispose of fire debris and contaminated extinguishing water in accordance with local regulations.

6. Accidental release measures

Environmental precautions: Do not let product enter drains.
Methods for cleaning up: Sweep/shovel up.

7. Handling and storage

Handling

Protection against fire and explosion: Handle in accordance with good industrial hygiene and safety practice. Take precautionary measures against static discharges.

Storage

Keep tightly closed in a dry and cool place.

8. Exposure controls and personal protection

Additional information on the lay-out of technical plant : See 7

Components with workplace control parameters : none

Personal protective equipment

Hand protection: Protective gloves.

Eye protection: Safety glasses with side-shields.

General safety and hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Form: liquid
Colour: dark brown
Odour: odourless

pH value: approx. 10.0 – 11.0

Change in physical state

Boiling point/boiling range: ca. 105 °C

10. Stability and reactivity

Conditions to avoid: heat
Hazardous reactions: none

11. Toxicological information

Acute toxicity (*)

LD50/oral/rat: 10 130 mg/kg

Can irritate the eyes (**)

Can have an irritant effect on the skin (**)

(*) The product was not tested. The statement was derived from products of a similar structure and composition.

(**) pH value

12. Ecological information

Elimination information :

No data available

Behaviour and environmental fate :

No data available

Ecotoxic effects :

No data available

Further ecological information

No negative ecological effects are expected according to the present state of knowledge.

13. Disposal considerations

Product: Must be disposed of by special means, e.g. suitable incineration, in accordance with local regulations.

14. Transport information

Not classified as hazardous under transport regulations.

15. Regulatory information

Labelling according to EEC Directives :
Not subject to labelling.

National legislation/regulations :
Water hazard class: non water hazardous

16. Other information

The information contained herein is based on the present state of our knowledge and does not therefore guarantee certain properties. Recipients of our product must take responsibility for observing existing laws and regulations.



Material Safety Data Sheet

| NFPA | WHMIS | Personal Protective Equipment | Transport Symbol |
|------|-------|-------------------------------|------------------|
| | | | |

Preparation Date 23-Dec-2008

Revision Date 26-Jan-2009

Revision Number 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Kaysoy Industrial Flours

Product Code: SI-KSOY

Use of the Substance / Preparation:
For industrial use only.

Contact Manufacturer:
Archer Daniels Midland Company
4666 Faries Parkway
Decatur, IL 62526, USA
Telephone Number: 217 424-5200

Emergency Telephone Number:
Chemtrec 1-800-424-9300

2. HAZARDS IDENTIFICATION

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health

Appearance Off-white Light brown

Physical State Solid Powder

Odor No information available

Potential Health Effects

Principle Routes of Exposure

Acute Effects

Eyes

Skin

Inhalation

Ingestion

Eye contact, Inhalation, Ingestion, Skin contact.

May cause slight irritation

Substance may cause slight skin irritation

May cause irritation of respiratory tract

Ingestion may produce an allergic reaction. Product may contain up to 40 ppm of SO₂ which may elicit sulfite sensitivity.

Chronic Effects

Aggravated Medical Conditions

Potential Environmental Effects

Toxicological information

Repeated contact may cause allergic reactions in very susceptible persons

No information available

See Section 12 for additional ecological information.

See Section 11 for additional toxicological information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Non-hazardous Components

| Chemical Name | CAS-No | Weight % | North American Hazard Indicator |
|------------------------|-------------------------------|----------|---------------------------------|
| Soybean meal, defatted | 68308-36-1 91081-83-3 [EU] | 99-100 | - |

4. FIRST AID MEASURES

| | |
|---------------------------|---|
| Eye Contact | Rinse thoroughly with plenty of water, also under the eyelids |
| Skin Contact | Wash off immediately with soap and plenty of water. |
| Inhalation | Move to fresh air. Call a doctor immediately if allergic signs, particularly in the respiratory tract, are observed. |
| Ingestion | Contains soy and SO ₂ (up to 40 ppm). May produce an allergic reaction. Observe for sulfite sensitivity. Consult a physician if necessary. |
| Notes to Physician | Treat symptomatically |

5. FIRE-FIGHTING MEASURES

| | |
|--|---|
| Flammable Properties | Fine dust dispersed in air may ignite. |
| Suitable Extinguishing Media | Water. Water spray. Dry chemical. Foam. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Unsuitable Extinguishing Media | No information available. |
| Hazardous Combustion Products | Carbon monoxide (CO), Carbon dioxide (CO ₂). |
| Explosion Data | |
| Sensitivity to mechanical impact | No information available. |
| Sensitivity to static discharge | Yes (as dust) |
| Specific Hazards Arising from the Chemical | None known |
| Protective Equipment and Precautions for Firefighters | |
| As in any fire, wear self-contained breathing apparatus pressure-demand, MSH/NIOSH (approved or equivalent) and full protective gear | |

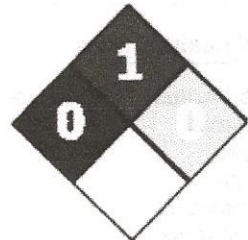
NFPA

Health 0

Stability and Reactivity 0

Flammability 1

Physical hazard -



6. ACCIDENTAL RELEASE MEASURES

| | |
|----------------------------------|--|
| Personal Precautions | Use personal protective equipment. Avoid dust formation. |
| Environmental Precautions | Prevent further leakage or spillage. Local authorities should be advised if significant spillages cannot be contained. |
| Methods for Clean-up | Sweep up and shovel into suitable containers for disposal. |

7. HANDLING AND STORAGE

| | |
|-----------------|---|
| Handling | Ensure adequate ventilation |
| Storage | To maintain product quality, do not store in heat or direct sunlight. Keep at temperatures below 25°C / 75°F. |

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits

This product is not known to contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas

Personal Protective Equipment

| | |
|---------------------------------|--|
| Eye/face Protection | Safety glasses with side-shields. |
| Skin and Body Protection | Long sleeved clothing. Protective gloves. |
| Respiratory Protection | In case of insufficient ventilation wear suitable respiratory equipment. |

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice

9. PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|-----------------------------------|--------------------------|---------------------------------|--------------------------|
| Appearance | Off-white Light brown | Physical State | Solid Powder |
| Odor | No information available | Odor Threshold | No information available |
| Flash Point | No information available | Autoignition Temperature | No information available |
| Boiling point | No information available | Melting/Freezing Point | No information available |
| Flammability Limits in Air | No information available | Explosion Limits | No information available |
| pH | No information available | Vapor Pressure | No information available |
| Water Solubility | Insoluble | Specific Gravity | No information available |
| Evaporation Rate | No information available | Vapor Density | No information available |

10. STABILITY AND REACTIVITY

| | |
|---|--|
| Chemical Stability | Stable under normal conditions |
| Conditions to Avoid | Avoid dust formation. |
| Incompatible Materials | No materials to be especially mentioned |
| Hazardous Decomposition Products | None known. |
| Possibility of Hazardous Reactions | Hazardous polymerization does not occur. |

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

LD50 Oral: Not available
 LD50 Dermal: Not available
 LC50 Inhalation: Not available

Toxicology data for the components

No information available

Chronic Effects

Carcinogenicity

There are no known carcinogenic chemicals in this product.

OSHA: (Occupational Safety & Health Administration)

Not Listed

ACGIH: (American Conference of Governmental Industrial Hygienists)

Not Listed

NTP: (National Toxicity Program)

Not Listed

Mexico: (Official Mexican Norm NOM-010-STPS-1999)

Not Listed

IARC: (International Agency for Research on Cancer)

Not Listed

Subchronic Toxicity No information available.

Corrosivity No information available.

Neurological Effects No information available.

Reproductive Effects No information available.

Teratogenicity No information available.

Irritation No information available.

Sensitization May cause sensitization of susceptible persons.

Mutagenic Effects No information available.

Developmental Effects No information available.

Target Organ Effects No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants

Persistence/Degradability

No information available.

Bioaccumulation/ Accumulation

No information available.

Mobility

No information available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods

Dispose of in compliance with the laws and regulations pertaining to this product in your jurisdiction.

Contaminated Packaging

Empty containers should be taken for local recycling, recovery or waste disposal.

14. TRANSPORT INFORMATION

Domestic transport regulations (USA)

DOT Not regulated

Domestic transport regulations (Canada)

TDG Not regulated

Domestic transport regulations (Mexico)

MEX Not regulated

International transport regulations

ICAO Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

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

| Chemical Name | TSCA | DSL | NDSL | EINECS | ELINCS | AICS | ENCS | CHINA | PICCS | KECL | NZLoC |
|------------------------|------|-----|------|------------------|--------|------|------|-------|-------|------|-------|
| Soybean meal, defatted | Yes | Yes | No | Yes 293-692-0 | No | No | No | Yes | No | No | Yes |

Legend

TSCA - Toxic Substances Control Act, Section 8(b) Inventory (USA). DSL - Domestic Substance List (Canada). NDSL - Non Domestic Substances List (Canada). EINECS - European Inventory of Existing Commercial Chemical Substances (EU). ELINCS - European List of Notified Chemical Substances (EU). AICS - Australian Inventory of Chemical Substances (Australia). ENCS - Existing and New Chemical Substances (Japan). CHINA - Chinese Inventory of Existing Chemical Substances (China). PICCS - Inventory of Chemicals and Chemical Substances (Philippines). KECL - Korean Existing and Evaluated Chemical Substances (Korea). NZLoC - New Zealand Inventory of Chemicals (New Zealand)

USA**Federal Regulations****Ozone Depleting Substances:**

No Class I or Class II material is known to be used in the manufacture of, or contained, in this product.

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product is not known to contain any chemicals which are subject to the reporting requirements of the Act or regulations contained in 40 CFR 372.

SARA 311/312 Hazardous Categorization

| | |
|-----------------------------------|----|
| Acute Health Hazard | No |
| Chronic Health Hazard | No |
| Fire Hazard | No |
| Sudden Release of Pressure Hazard | No |
| Reactive Hazard | No |

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product is not known to contain any HAPs.

State Regulations**California Proposition 65**

This product is not known to contain chemicals listed under Proposition 65.

State Right-to-Know

No known components subject to "Right-To-Know" legislation in the following States:

| Chemical Name | Weight % | Illinois | Massachusetts | New Jersey | Pennsylvania | Rhode Island |
|------------------------|----------|----------|---------------|------------|--------------|--------------|
| Soybean meal, defatted | 99-100 | No | No | No | No | No |

Canada**WHMIS Product Classification**

Not a WHMIS controlled product.

WHMIS Ingredient Disclosure List IDL

No known component is listed on the WHMIS ingredients disclosure list.

(NPRI) Canadian National Pollutant Release Inventory

No known component is listed on NPRI

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.

Mexico**Mexico - Grade**

No information available

16. OTHER INFORMATION

| | |
|------------------|----------------------------|
| Prepared By | Specialty Food Ingredients |
| Preparation Date | 23-Dec-2008 |
| Revision Date | 26-Jan-2009 |
| Revision Summary | Initial MSDS. |

Disclaimer

The information provided on this sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text

End of (M)SDS

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended.

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

1.1 Product identifier

Product name:

ThreAMINO®
L-Threonine Feed Grade 98,5 %

Chemical name:

L-Threonine

Additional identification

| | |
|--------------------------|-------------|
| Chemical name: | L-Threonine |
| Chemical formula: | - |
| INDEX No. | - |
| CAS-No. | 72-19-5 |
| EC No. | 200-774-1 |

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

Identified uses: Feed additive

Uses advised against:

1.3 Details of the supplier of the safety data sheet

Company Name : Evonik Nutrition & Care GmbH
Rodenbacher Chaussee 4
D-63457 Hanau-Wolfgang

Telephone : +49 6181 59 3086

E-mail : sds-info@evonik.com

1.4 Emergency telephone number:

24-Hour Health : +49 2365 49 2232
Emergency

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The product has not been classified as hazardous according to the legislation in force.

Classification according to Regulation (EC) No 1272/2008 as amended.

Not classified

2.2 Label Elements Not applicable

2.3 Other hazards Dust may form explosive mixture in air.

SECTION 3: Composition/information on ingredients

Chemical name:
L-Threonine

3.1 Substances

Chemical name L-Threonine
INDEX No.:
CAS-No.: 72-19-5
EC No.: 200-774-1
REACH Registration No.: 01-2120109031-79 No data available.

| Chemical name | Concentration | CAS-No. | EC No. | REACH Registration No. | M-Factor: | Notes |
|---------------|---------------|---------|-----------|------------------------|--------------------|-------|
| L-Threonine | >=98.5% | 72-19-5 | 200-774-1 | 01-2120109031-79 | No data available. | |

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

This substance has workplace exposure limit(s).

This substance is listed as SVHC

SECTION 4: First aid measures

General:

Pay attention to self-protection. Remove victims from hazardous area. Immediately remove soiled or soaked clothing and remove it to a safe distance. Keep victim warm, in a stabilized position and covered. Do not leave victims unattended. If the casualty is unconscious: Place the victim in the recovery position.

4.1 Description of first aid measures

Inhalation:

Inhalation is possible if aerosols, mists, dusts, or smoke form. Move victims into fresh air. With labored breathing: Provide with oxygen. Consult a doctor. If the casualty is not breathing: Perform mouth-to-mouth resuscitation, notify emergency physician immediately.

Skin Contact:

Wash off affected area immediately with plenty of water for at least 15 minutes. If symptoms persist, consult a physician for treatment.

Eye contact:

With eye held open, thoroughly rinse immediately with plenty of water for at least 10 minutes. In case of persistent discomfort: Consult an ophthalmologist.

Ingestion:

Rinse mouth. Immediately give large quantities of water to drink. Obtain medical attention.

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

None known.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards:

Other dangerous properties can not be excluded.

Treatment:

This substance does not have any noteworthy noxious potential. Damage to health is thus not expected.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: Water, mist foam

Unsuitable extinguishing media: quenching powder Carbon Dioxide.

5.2 Special hazards arising from the substance or mixture: In the case of fire, the following hazardous smoke fumes may be produced: carbon monoxide, carbon dioxide, nitric oxides, hydrocyanic acid. In the event of fire and/or explosion do not breathe fumes.

5.3 Advice for firefighters Special fire fighting procedures: Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations.

Special protective equipment for fire-fighters: In the event of fire, wear self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Keep unauthorized personnel away.

6.1.1 For non-emergency personnel: No data available.

6.1.2 For emergency responders: No data available.

6.2 Environmental Precautions: Do not allow the product into the following compartments: groundwater

6.3 Methods and material for containment and cleaning up: Absorb mechanically avoiding production of dust.

6.4 Reference to other sections: Wear personal protective equipment; see section 8.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling: Handle in accordance with good industrial hygiene and safety practice. If there is the possibility of skin/eye contact, the indicated hand/eye/body protection should be used. Handle in accordance with good industrial hygiene and safety practice.

7.2 Conditions for safe storage, including any incompatibilities: Store in a cool and shaded area. Keep containers dry and tightly closed to avoid moisture absorption and contamination. Avoid formation of dust. Assure effective exhaustion/ventilation at the work site or machinery. Take precautionary measures against static discharges. Keep away from open flames, hot surfaces and sources of ignition. VDI 2263 "Dust fires and dust explosions; dangers, evaluation, preventive measures."

7.3 Specific end use(s): For processing and handling instructions refer to product information.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters Occupational Exposure Limits

| Chemical name | Type | Exposure Limit Values | Source |
|---------------|------|-----------------------|--------|
|---------------|------|-----------------------|--------|

| | | | |
|--|-----|----------------------|---|
| exposure limit for dust – Inhalable dust. | TWA | 10 mg/m ³ | UK. EH40 Workplace Exposure Limits (WELs) (12 2011) |
| exposure limit for dust – Respirable dust. | TWA | 4 mg/m ³ | UK. EH40 Workplace Exposure Limits (WELs) (12 2011) |

DNEL-Values

Remarks: No substance-related safety assessment is necessary / has been conducted for this product.

PNEC-Values

Remarks: No substance-related safety assessment is necessary / has been conducted for this product.

8.2 Exposure controls
Appropriate Engineering Controls:

Ensure suitable suction/aeration at the work place and with operational machinery. Take precautionary measures against static discharges. Earthing of equipment.

Individual protection measures, such as personal protective equipment
Eye/face protection: Safety glasses

Hand Protection: Material: Natural rubber.
 Break-through time: 8 h
 Glove thickness: 0.5 mm
 Guideline: DIN EN 374

 Break-through time: 8 h
 Glove thickness: 0.11 mm
 Guideline: DIN EN 374

Skin and Body Protection: No special protective equipment required.

Respiratory Protection: If dust occurs: dust mask with P1 particle filter

Hygiene measures: Wash face and/or hands before break and end of work. Cleanse and apply cream to skin after work.

Environmental Controls: No data available.

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

| | |
|---------------------------------------|--|
| Physical state: | solid |
| Form: | solid |
| Color: | white to light grey |
| Odor: | Characteristic |
| Odor Threshold: | not determined |
| pH: | 5.0 –6.5 (25 g/l, 25 °C) |
| Melting Point: | 253 °C |
| Boiling Point: | Not applicable |
| Flash Point: | Not applicable solid |
| Evaporation Rate: | No data available. |
| Flammability (solid, gas): | Not classified as a flammability hazard Burning Time |
| Flammability Limit –Upper (%): | No data available. |
| Flammability Limit –Lower (%): | grain size < 63µm |
| Vapor pressure: | Not applicable |
| Vapor density (air=1): | No data available. |

| | |
|---|--|
| Density: | No data available. |
| Relative density: | No data available. |
| Solubility(ies) | |
| Solubility in Water: | 85.7 g/l (20 °C, OECD Test Guideline 105) |
| Solubility (other): | No data available. |
| Partition coefficient (n-octanol/water): | -2.94 pure substance |
| Self Ignition Temperature: | 156 °C (VDI 2263) (in dm ³ wire basket (IMDG code)) |
| Decomposition Temperature: | 253 °C (TG (thermal gravimetric analysis)) |
| Kinematic viscosity: | No data available. |
| Dynamic viscosity: | Not applicable solid |

9.2 Other information

| | |
|---|--|
| Bulk density: | 650 –800 kg/m ³ granular 470 –650 kg/m ³ Powder |
| Sublimation Point: | 200 °C |
| Explosive properties: | The product is susceptible to dust explosion. |
| Oxidizing properties: | Not to be expected in view of the structure |
| Dust Explosion Description Number Kst: | 66 m.b./s |
| Minimum ignition energy: | > 30 mJ (VDI Guideline 2263 sheet 1) sieve fraction with inductance |
| Minimum ignition temperature: | 370 °C (VDI Guideline 2263 sheet 1) (BAM-furnace) for dust whirled up mean grain size 49µm |
| Dust explosion properties: | St1 St1 |
| Burning Number: | Burning Number: 3 Combustibility test in accordance with VDI 2263 |

SECTION 10: Stability and reactivity

| | |
|---|---|
| 10.1 Reactivity: | No dangerous reaction known under conditions of normal use. |
| 10.2 Chemical Stability: | Stable under recommended storage conditions. |
| 10.3 Possibility of hazardous reactions: | Dust can form an explosive mixture in air. |
| 10.4 Conditions to avoid: | No data available. |
| 10.5 Incompatible Materials: | Avoid contact with oxidizing agents. |
| 10.6 Hazardous Decomposition Products: | Carbon Monoxide. Carbon Dioxide. Nitrogen Oxides |

SECTION 11: Toxicological information

Information on likely routes of exposure

| | |
|----------------------|---|
| Inhalation: | Relevant route of exposure. Information on effects are given below. |
| Skin Contact: | Relevant route of exposure. Information on effects are given below. |
| Eye contact: | Relevant route of exposure. Information on effects are given below. |
| Ingestion: | If handled correctly, not a relevant route of exposure. Information on effects are given below. |

11.1 Information on toxicological effects

Acute toxicity

| | |
|---|--|
| Oral | |
| Product: | LD 50 (Rat): > 5,000 mg/kg (OECD Test Guideline 401) |
| Components: | |
| L-Threonine | LD 50 (Rat): > 5,000 mg/kg |
| Dermal | |
| Product: | No data available. |
| Components: | |
| L-Threonine | No data available. |
| Inhalation | |
| Product: | LC0 (Rat, male/female, 4 h) > 5.15 mg/l (OECD Test Guideline 403, Yes) limit test (maximum concentration attainable in experiments) –No deaths occurred. |
| Components: | |
| L-Threonine | LC0 (Rat, male/female, 4 h) > 5.15 mg/l limit test (maximum concentration attainable in experiments) –No deaths occurred. |
| Repeated dose toxicity | |
| Product: | NOAEL (Rat(male), Oral): 900 mg/kg (OECD TG 408) NOAEL (Rat(female), Oral): 1,000 mg/kg (OECD TG 408) NOAEL (Rat(male/female), Oral): > 1,000 mg/kg (OECD 407) |
| NOAEL (Rat(male/female), Oral): | > 1,000 mg/kg |
| Skin Corrosion/Irritation: | |
| Product: | Not irritating OECD Test Guideline 404 (Rabbit): Not irritating |
| Components: | |
| L-Threonine | OECD Test Guideline 404 (Rabbit): Not irritating |
| Serious Eye Damage/Eye Irritation: | |
| Product: | Not irritating OECD Test Guideline 405 (Rabbit): Not irritating |
| Components: | |
| L-Threonine | OECD Test Guideline 405 (Rabbit): Not irritating |
| Respiratory or Skin Sensitization: | |
| Product: | Not a skin sensitizer. Maximisation Test, OECD Test Guideline 406 (Guinea Pig): Not a skin sensitizer. |
| Components: | |
| L-Threonine | Maximisation Test, OECD Test Guideline 406 (Guinea Pig): Not a skin sensitizer. |
| Germ Cell Mutagenicity | |
| In vitro | |
| Product: | Chromosome aberration test in vitro (OECD Test Guideline 473): negative Ames test (OECD Test Guideline 471): negative |
| Components: | |
| L-Threonine | Chromosome aberration test in vitro (OECD Test Guideline 473): negative Ames test (OECD Test Guideline 471): negative |
| In vivo | |
| Product: | No data available. |

Components:
 L-Threonine No data available.

Carcinogenicity Product: No data available.

Components:
 L-Threonine No data available.

Reproductive toxicity Product: No data available.

Components:
 L-Threonine No data available.

Specific Target Organ Toxicity –Single Exposure Product: No data available.

Components:
 L-Threonine No data available.

Specific Target Organ Toxicity –Repeated Exposure Product: No data available.

Components:
 L-Threonine No data available.

Aspiration Hazard Product: No data available.

Components:
 L-Threonine No data available.

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity

Fish

Product: No data available.

Components
 L-Threonine

No data available.

Aquatic Invertebrates

Product: EC 50 (Daphnia magna (Water flea), 48 h): > 1,000 mg/l (OECD Test Guideline 202)

Components
 L-Threonine

EC 50 (Daphnia magna (Water flea), 48 h): > 1,000 mg/l (OECD Test Guideline 202)

Toxicity to Aquatic Plants

Product: No data available.

Components
 L-Threonine

No data available.

| | |
|-----------------------------------|--|
| Toxicity to microorganisms | |
| Product: | EC 80 (nitrobacteria, 69 h): 119 mg/l (literature) |
| Components | |
| L-Threonine | No data available. |
| Chronic Toxicity | |
| Fish | |
| Product: | No data available. |
| Components | |
| L-Threonine | No data available. |
| Aquatic Invertebrates | |
| Product: | No data available. |
| Components | |
| L-Threonine | No data available. |
| Toxicity to Aquatic Plants | |
| Product: | No data available. |
| Components | |

12.2 Persistence and Degradability

| | |
|-----------------------|-----------------------|
| Biodegradation | |
| Product: | Readily biodegradable |
| BOD/COD Ratio | |
| Product | No data available. |
| Components | |
| L-Threonine | No data available. |

12.3 Bioaccumulative potential

Product: No data available.

12.4 Mobility in soil:

No data available.

12.5 Results of PBT and vPvB assessment:

L-Threonine No data available.

12.6 Other adverse effects:

No further information available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: No data available.

Disposal methods: Disposal according to local authority regulations. Offer rinsed packaging material to local recycling facilities. The waste key number must be determined as per the European Waste Types List (decision on EU Waste Types List 2000/532/EC) in cooperation with the disposal firm / producing firm / official authority.

Contaminated Packaging: No data available.

SECTION 14: Transport information

14.1 UN number

Not regulated as a dangerous good

14.2 UN proper shipping name

Not regulated as a dangerous good

14.3 Transport hazard class(es)

Not regulated as a dangerous good

14.4 Packing group

Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

14.6 Special precautions for user

Not applicable

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

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

National Regulations

15.2 Chemical safety assessment:

No Chemical Safety Assessment has been carried out.

International regulations

SECTION 16: Other information

Abbreviations and acronyms

ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; **ADN** -European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; **AGW** -Occupational exposure limit; **ASTM** -American Society for Testing and Materials; **AwSV** -Ordinance on facilities for handling substances that are hazardous to water; **BSB** -Biochemical oxygen demand; **c.c.** -closed cup; **CAS** -Chemical Abstract Services; **CESIO** -European Committee of Organic Surfactants and their Intermediates; **CSB** -Chemical oxygen demand; **DMEL** -Derived minimum effect level; **DNEL** -Derived no effect level; **EbC50** -median concentration in terms of reduction of growth; **EC** -Effective concentration; **EINECS** -European Inventory of Existing Commercial Chemical Substances; **EN** -European norm; **ErC50** -median concentration in terms of reduction of growth rate; **GGVSEB** -German ordinance for road, rail and inland waterway transportation of dangerous goods; **GGVSee** -German ordinance for sea transportation of dangerous goods; **GLP** -Good Laboratory Practice; **GMO** -Genetic Modified Organism; **IATA** -International Air Transport Association; **ICAO** -International Civil Aviation Organization; **IMDG** -International Maritime Dangerous Goods; **ISO** -International Organization For Standardization; **LD/LC** -lethal dosis/concentration; **LOAEL** -Lowest observed adverse effect level; **LOEL** -Lowest observed effect level; **M-Factor** -multiplying factor; **NOAEL** -No observed adverse effect level; **NOEC** -no observed effect concentration; **NOEL** -no observed effect level; **o.c.** -open cup; **OECD** -Organisation for Economic Cooperation and Development; **OEL** -Occupational Exposure Limit; **PBT** -Persistent, bioaccumulative, toxic; **PNEC** -Predicted no effect

concentration; REACH - REACH registration; RID - Convention concerning International Carriage by Rail; SVHC - Substances of Very High Concern; TA - Technical Instructions; TRGS - Technical Rules for Hazardous Substances; vPvB - very persistent, very bioaccumulative; WGK - Water Hazard Class

Key literature references and sources for data: No data available.

Wording of the H-statements in section 2 and 3 Training information: No data available.

SDS No.:
Disclaimer:

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation nor does it imply that similar

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 1 / 11 |

1. Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

| | |
|-------------------------|---------------------------------------|
| Trade name | ValAMINO® L-Valine, Feed Grade 98% |
| CAS-No. | 72-18-4 |
| REACH Registration No.: | if available listed in Chapter. 3 |
| EC-No. | 200-773-6 |

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

Relevant applications identified Feed additive

1.3. Details of the supplier of the safety data sheet

| | |
|---------------|--|
| Company | Evonik Nutrition & Care GmbH Animal Nutrition Postfach 1345 D-63403 Hanau |
| Telephone | +49 (0)6181/59-12771 |
| Telefax | +49 (0)6181/59-712771 |
| Email address | FA-MSDS@evonik.com |

1.4. Emergency telephone number

| | |
|-----------------------|-------------------------------------|
| Emergency information | +49 (0)2236/76-2222 (international) |
| Emergency information | +49 (0)2236/76-2026 (fax) |

2. Hazards identification**2.1. Classification of the substance or mixture**

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

Not a hazardous substance according to Regulation (EC) No. 1272/2008.

Classification as per Directive 67/548/EC or Directive 1999/45/EC

In accordance with EC directives or respective national laws, the product does not need to be classified nor labelled.

2.2. Label elements

Labelling as per (EU) 1272/2008

Statutory basis Labelling not required according to EU-CLP Ordinance (1272/2008).

Supplemental hazard / labelling elements (EU):

2.3. Other hazards

Dust can form an explosive mixture in air.

A PBT/vPvB evaluation is not available, since a chemical safety evaluation is not required / has not been carried out.

3. Composition/information on ingredients**3.1. Substances**

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 2 / 11 |

Information on ingredients / Hazardous components as per EU-CLP Regulation (EC) No. 1272/2008

| | | | |
|----------|---|--------|-----------|
| • Valine | >= 98% | | |
| CAS-No. | 72-18-4 | EC-No. | 200-773-6 |
| Remarks | Not a hazardous substance according to Regulation (EC) No. 1272/2008. | | |

Information on ingredients / Hazardous components as per Directive 67/548/EC or Directive 1999/45/EC

| | | | |
|----------|---|--------|-----------|
| • Valine | >= 98% | | |
| CAS-No. | 72-18-4 | EC-No. | 200-773-6 |
| | Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 1999/45/EC. | | |

Texts of H phrases, see in Chapter 16
See chapter 16 for text of risk phrases

3.2. Mixtures

-

4. First aid measures**4.1. Description of first aid measures**

Remove contaminated or saturated clothing.

Inhalation

In case product dust is released:

Possible discomfort: cough, sneezing

Move victims into fresh air.

If symptoms persist, call a physician.

Skin contact

Wash off with soap and plenty of water.

Eye contact

Possible discomfort is due to foreign substance effect.

Rinse thoroughly with plenty of water keeping eyelid open.

In case of persistent discomfort: Consult an ophthalmologist.

Ingestion

Have the mouth rinsed with water.

After absorbing large amounts of substance

Consult a physician.

4.2. Most important symptoms and effects, both acute and delayed**4.3. Indication of any immediate medical attention and special treatment needed**

After absorbing large amounts of substance:

Acceleration of gastrointestinal passage

administration of activated charcoal.

5. Fire-fighting measures**5.1. Extinguishing media**

| | |
|-------------------------------|-----------------------|
| Suitable extinguishing media: | Water mist Foam |
|-------------------------------|-----------------------|

| | |
|---------------------------------|---|
| Unsuitable extinguishing media: | quenching powder Carbon dioxide (CO ₂) |
|---------------------------------|---|

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 3 / 11 |

5.2. Special hazards arising from the substance or mixture

In the case of fire, the following hazardous smoke fumes may be produced: carbon monoxide, carbon dioxide, nitric oxides, hydrocyanic acid.
In the event of fire and/or explosion do not breathe fumes.

5.3. Advice for firefighters

Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities.

Fire residues should be disposed of in accordance with the regulations.
In the event of fire, wear self-contained breathing apparatus.

6. Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Wear personal protective equipment.
Keep unauthorized persons away.

6.2. Environmental precautions

Do not allow the product into the following compartments:
groundwater

6.3. Methods and material for containment and cleaning up

Absorb mechanically avoiding production of dust.

Additional advice

Avoid dust formation.

6.4. Reference to other sections

Wear personal protective equipment; see section 8.

7. Handling and storage**7.1. Precautions for safe handling**

Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities**Advice on protection against fire and explosion**

Keep away from sources of ignition - No smoking.

Avoid dust formation.

VDI 2263 "Dust fires and dust explosions; dangers, evaluation, preventive measures."

Storage

Store in a cool and shaded area.

Keep containers dry and tightly closed to avoid moisture absorption and contamination.

German storage class

Combustible / non-combustible liquids and solids not assigned to other storage classes.

Dust explosion class

St1

Method: VDI Guideline 2263 sheet 1

Maximum rate of pressure rise: 123 bar/s

Standardized max. rate of pressure increase, KSt 119bar·m/s

7.3. Specific end use(s)

We are unaware of any specific end uses which go beyond the data reported in Section 1.

8. Exposure controls/personal protection**8.1. Control parameters**

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 4 / 11 |

Remarks No substance-specific limiting value being known.

DNEL/DMEL values

End Use Workers
 Routes of exposure Inhalation
 Possible health damage Long-term systemic effects
 Value 110,7 mg/m³

End Use Workers
 Routes of exposure Skin contact
 Possible health damage Long-term systemic effects
 Value 157 mg/kg bw/day

PNEC values

Value **Fresh water**
10 mg/l

Value **Marine water**
1 mg/l

Value **water - intermittent releases**
100 mg/l

Value **sewage treatment plant (STP)**
10000 mg/l

Value **Fresh water sediment**
20,391 mg/kg dry weight

Value **Marine sediment**
2,0391 mg/kg dry weight

8.2. Exposure controls**Engineering measures**

Ensure suitable suction/aeration at the work place and with operational machinery.

Earthing of equipment.

Take precautionary measures against static discharges.

Personal protective equipment**Respiratory protection**

When handling for a short time:

If dust occurs: dust mask with P1 particle filter

in the event of prolonged exposure during handling:

In the case of respirable dust, use self-contained breathing apparatus.

Note time limit for wearing respiratory protective equipment.

Hand protection

Applies to handling for brief periods or of small amounts

Glove material Nitrile, for example, Dermatril 740, Kächele-Cama Latex GmbH (KCL), Germany

Material thickness 0,11 mm

Applies to handling for longer periods or of large amounts

Glove material Nitrile/Chloroprene, for example, Nitopren 717, Kächele-Cama Latex GmbH (KCL), Germany

Material thickness 0,65 mm

Eye protection

Safety glasses with side-shields conforming to EN166

or

When handling larger quantities: basket-shaped glasses

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 5 / 11 |

Skin and body protection

Usual lab protective clothing

or:

When handling larger quantities: chemical protective suit, disposable protective suit

Hygiene measures

Remove and wash contaminated clothing before re-use.

Do not eat, drink, smoke, or sniff while at work. Wash your hands and/or face before breaks and before termination of work.

Avoid contact with skin and eyes.

Cleanse and apply cream to skin after work.

Protective measures

Handle in accordance with good industrial hygiene and safety practice.

If there is the possibility of skin/eye contact, the indicated hand/eye/body protection should be used.

The personal protective equipment used must meet the requirements of directive 89/686/EEC and amendments (CE certification).

It should be defined in the work place in the form of a risk analysis according to directive 89/686/EEC and amendments.

9. Physical and chemical properties**9.1. Information on basic physical and chemical properties****Appearance**

| | |
|----------------|-------|
| Colour | white |
| physical state | solid |

| | |
|-------|----------------|
| Odour | characteristic |
|-------|----------------|

| | |
|------------------|----------------|
| Odour threshold: | not determined |
|------------------|----------------|

| | | | |
|----|-----------|----------|---------|
| pH | 5,5 - 7,0 | (25 g/l) | (25 °C) |
|----|-----------|----------|---------|

| | |
|---------------------|---------------|
| Melting point/range | 315 °C |
| | decomposition |

| | |
|---------------------|------------------------------|
| Boiling point/range | Decomposition before boiling |
|---------------------|------------------------------|

| | |
|-------------|----------------|
| Flash point | not applicable |
| | solid |

| | |
|------------------|----------------|
| Evaporation rate | not applicable |
|------------------|----------------|

| | |
|---------------------------|---------------|
| Flammability (solid, gas) | not flammable |
| Method: | UN method N.1 |

| | | | |
|-----------------------|---------|----------------------------|------------|
| Lower explosion limit | dust: | 30 g/m ³ | (45,62 µm) |
| | Method: | VDI Guideline 2263 sheet 1 | |

| | |
|-----------------------|---|
| Upper explosion limit | If dusts develop, explosive dust/air mixtures may form. |
|-----------------------|---|

| | | |
|-----------------|-----------------|---------|
| Vapour pressure | < 0,0000001 hPa | (25 °C) |
| Method: | calculated | |

| | |
|------------------|-------------------|
| Relative density | No data available |
|------------------|-------------------|

| | | |
|-----------------------|----------------|---------|
| Water solubility | 88,5 g/l | (25 °C) |
| Related to substance: | pure substance | |

| | | |
|--------------------------|----------|-------|
| Partition coefficient n- | log Pow: | -2,26 |
|--------------------------|----------|-------|

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 6 / 11 |

| | | |
|-----------------------|---|----------------|
| octanol/water | Related to substance: | pure substance |
| Autoinflammability | The substance or mixture is not classified as pyrophoric. | |
| Thermal decomposition | >= 293 °C (literature value) | |
| Viscosity, dynamic | not applicable solid | |
| Viscosity, kinematic | not applicable | |
| Explosiveness | No data available | |
| Oxidizing properties | Not to be expected in view of the structure | |

9.2. Other information

| | |
|-------------------------------------|---|
| Ignition temperature | 430 °C Method: VDI Guideline 2263 sheet 1 Not to be classified as self-heating substance, division 4.2. |
| glow temperature | > 400 °C Method: VDI Guideline 2263 sheet 1 |
| Minimum ignition energy | > 10 mJ (22 °C) Classification: Normal combustability Method: VDI Guideline 2263 sheet 1 mean grain size: 62 µm with inductance |
| maximum absolute explosive pressure | 8,5 bar Method: VDI Guideline 2263 sheet 1 (with 500 g/m ³) mean grain size 45,62 µm |
| Bulk density | 340 - 520 kg/m ³ |
| Vapour density | No data available |
| Molecular Weight | 117,15 g/Mol |

10. Stability and reactivity**10.1. Reactivity**

No further information available

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions Dust can form an explosive mixture in air.

10.4. Conditions to avoidSee chapter
7.2. Conditions for safe storage, including any incompatibilities**10.5. Incompatible materials**

Strong acids

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 7 / 11 |

10.6. Hazardous decomposition products
No hazardous decomposition products known.

11. Toxicological information

11.1. Information on toxicological effects

The product is an essential, proteinogenic α -amino acid. No quantitative data on product toxicity are available. In our experience, and according to the information we have, the product is not harmful to health if used properly and as intended.

| | |
|---|--|
| Acute oral toxicity | NOEL Rat: 2000 mg/kg Method: OECD TG 423 Test substance: comparable product |
| | LD50 Rat: > 5000 mg/kg Method: OECD TG 423 Test substance: comparable product |
| Acute inhalation toxicity | NOAEL Rat: 5,26 mg/l / 4 h Method: OECD Test Guideline 403 Test substance: comparable product |
| Acute dermal toxicity | no data available |
| Acute toxicity (other routes of administration) | LD50 Rat: 5390 mg/kg / intraperitoneal (i.p.) (literature value) |
| Skin irritation | reconstructed human epidermis (RhE) No skin irritation Method: OECD Test Guideline 439 |
| Eye irritation | Rabbit slightly eye irritation Method: OECD Test Guideline 405 Test substance: comparable product |
| Sensitization | Local Lymphnode Assay : Does not cause skin sensitisation. Method: OECD TG 429 literature |
| Repeated dose toxicity | Oral Rat(male) / 90-day NOAEL: 628 mg/kg Method: OECD TG 408 Test substance: comparable product |
| | Oral Rat(female) / 90-day NOAEL: 666 mg/kg Method: OECD TG 408 Test substance: comparable product |
| Assessment of STOT single exposure | Assessment: The classification criteria are not met based on the available data. |
| Assessment of STOT repeat exposure | Assessment: The classification criteria are not met based on the available data. |
| Risk of aspiration toxicity | no data available |

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 8 / 11 |

Genotoxicity in vitro

Ames test

negative

Method:

OECD TG 471

literature

Mouse lymphoma test

negative

Method:

OECD TG 476

literature

Genotoxicity in vivo

chromosomal aberration Chinese hamster

negative

Method:

OECD TG 473

literature

Carcinogenicity

no data available

Toxicity to reproduction

no data available

Teratogenicity

Rat

NOAEL maternal (No

610 mg/kg

Observed Adverse Effect

Level):

Method:

OECD TG 414

No indication of development toxicity in maternally non-toxic doses.

Human experience

Toxic effects from handling this product are unknown as yet.

Toxicology Assessment

Acute effects

The classification criteria are not met based on the available data.

12. Ecological information**12.1. Toxicity***Ecological injuries are not known or expected under normal use.*

Toxicity to fish

LC50 (Brachydanio rerio): > 10000 mg/l / 96 h

Method:

OECD TG 203

NOEC (Brachydanio rerio): >= 10000 mg/l / 96 h

Method:

OECD TG 203

Toxicity in aquatic
invertebrates

NOEC Daphnia magna: 3200 mg/l / 24 h

Method:

OECD TG 202

EC50 Daphnia magna: > 10000 mg/l / 24 h

Method:

OECD TG 202

Toxicity to bacteria

EC10 Pseudomonas putida: > 9900 mg/l / 16 h

Method:

DEV, DIN 38412, T. 8

12.2. Persistence and degradability

Biodegradability

Result:

rapidly biodegradable

Test substance:

comparable product

Method:

OECD TG 301 B

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | |
|---------------|---------------|--------------|
| Material no. | Version | 3.6 / REG_EU |
| Specification | Revision date | 30.09.2015 |
| 176177 | Print Date | 4/8/2016 |
| VA-Nr | Page | 9 / 11 |

12.3. Bioaccumulative potential

Bioaccumulation No data available

12.4. Mobility in soil

Mobility No data available

12.5. Results of PBT and vPvB assessment

A PBT/vPvB evaluation is not available, since a chemical safety evaluation is not required / has not been carried out.

12.6. Other adverse effects**Ecotoxicology Assessment**

| | |
|--------------------------|---|
| Acute aquatic toxicity | Based on available data, the classification criteria are not met. |
| Chronic aquatic toxicity | Based on available data, the classification criteria are not met. |

13. Disposal considerations**13.1. Waste treatment methods****Product**

Can be disposed of as a solid waste or burned in a suitable installation subject to local regulations.

Uncleaned packaging

Do not reuse empty containers and dispose of in accordance with the regulations issued by the appropriate local authorities.

Waste Key Number

The waste key number must be determined as per the European Waste Types List (decision on EU Waste Types List 2000/532/EC) in cooperation with the disposal firm / producing firm / official authority.

14. Transport information**Not dangerous according to transport regulations.**

| | |
|-------------------------------------|----|
| 14.1. UN number: | -- |
| 14.2. UN proper shipping name: | -- |
| 14.3. Transport hazard class(es): | -- |
| 14.4. Packing group: | -- |
| 14.5. Environmental hazards: | -- |
| 14.6. Special precautions for user: | No |

15. Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****National legislation**

| | |
|-------------------------------------|---|
| Water contaminating class (Germany) | WGK 1 - slightly water endangering identification number: 6704 WGK (DE) Update: 2005 Classification according to VwVwS, supplement 3 |
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Regulations on labour safety: It must be determined whether preventive substance-specific

SAFETY DATA SHEET (EC 1907/2006)**ValAMINO®****L-Valine, Feed Grade 98%**

| | | | |
|---------------|--------|---------------|--------------|
| Material no. | | Version | 3.6 / REG_EU |
| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 10 / 11 |

occupational medical examinations in accordance with national law in each case must be offered / carried out at regular intervals.

employment restriction

Please note Directive 94/33/EC (Protection of Young Workers at the Workplace Directive) and amendments.

registration

Europe (EINECS/ELINCS) listed/registered

15.2. Chemical safety assessment

Chemical safety assessment A substance safety assessment was carried out for this product.

16. Other information**Risk phrase (R phrase) texts****Texts of the H-phrases****Further information**

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

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.

Legend

| | |
|------------------|---|
| ADR | European Agreement concerning the International Carriage of Dangerous Goods by Road |
| ADN | European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways |
| ASTM | American Society for Testing and Materials |
| ATP | Adaptation to Technical Progress |
| BCF | Bioconcentration factor |
| BetrSichV | German Ordinance on Industrial Safety and Health |
| c.c. | closed cup |
| CAS | Chemical Abstract Services |
| CESIO | European Committee of Organic Surfactants and their Intermediates |
| ChemG | German Chemicals Act |
| CMR | carcinogenic-mutagenic-toxic for reproduction |
| DIN | German Institute for Standardization |
| DMEL | Derived minimum effect level |
| DNEL | Derived no effect level |
| EINECS | European Inventory of Existing Commercial Chemical Substances |
| EC50 | half maximal effective concentration |
| GefStoffV | German Ordinance on Hazardous Substances |
| GGVSEB | German ordinance for road, rail and inland waterway transportation of dangerous goods |
| GGVSee | German ordinance for sea transportation of dangerous goods |
| GLP | Good Laboratory Practice |

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| Specification | 176177 | Revision date | 30.09.2015 |
| VA-Nr | | Print Date | 4/8/2016 |
| | | Page | 11 / 11 |

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|--------------|--|
| GMO | Genetic Modified Organism |
| IATA | International Air Transport Association |
| ICAO | International Civil Aviation Organization |
| IMDG | International Maritime Dangerous Goods |
| ISO | International Organization For Standardization |
| LOAEL | Lowest observed adverse effect level |
| LOEL | Lowest observed effect level |
| NOAEL | No observed adverse effect level |
| NOEC | no observed effect concentration |
| NOEL | no observed effect level |
| o. c. | open cup |
| OECD | Organisation for Economic Cooperation and Development |
| OEL | Occupational Exposure Limit |
| PBT | Persistent, bioaccumulative, toxic |
| PEC | Predicted effect concentration |
| PNEC | Predicted no effect concentration |
| REACH | REACH registration |
| RID | Convention concerning International Carriage by Rail |
| STOT | Specific Target Organ Toxicity |
| SVHC | Substances of Very High Concern |
| TA | Technical Instructions |
| TPR | Third Party Representative (Art. 4) |
| TRGS | Technical Rules for Hazardous Substances |
| VCI | German chemical industry association |
| vPvB | very persistent, very bioaccumulative |
| VOC | volatile organic compounds |
| VwVwS | German Administrative Regulation on the Classification of Substances Hazardous to Waters into Water Hazard Classes |
| WGK | Water Hazard Class |
| WHO | World Health Organization |