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

Product Identifier
Product Description: 1,4-Dichlorobutane
Cat No. 216430000; 216430010; 216430050; 216431000; 216435000

Relevant identified uses of the substance or mixture and uses advised against
Recommended Use Laboratory chemicals
Uses advised against No Information available

Details of the supplier of the safety data sheet
Company Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
E-mail address begel.sdsdesk@thermofisher.com

Emergency Telephone Number
For information in the US, call: 001-800-ACROS-01
For information in Europe, call: +32 14 57 52 11

Emergency Number, Europe: +32 14 57 52 99
Emergency Number, US: 001-201-796-7100

CHEMTREC Phone Number, US: 001-800-424-9300
CHEMTREC Phone Number, Europe: 001-703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

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

<table>
<thead>
<tr>
<th>Chronic aquatic toxicity</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquids</td>
<td>Category 3</td>
</tr>
</tbody>
</table>

Classification according to EU Directives 67/548/EEC or 1999/45/EC
For the full text of the R-phrases and H-statements mentioned in this Section, see Section 16

R-phrase(s) R10 - Flammable
Risk Combination Phrases R52/53 - Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment
SECTION 2. HAZARDS IDENTIFICATION

Label Elements

Signal Word Warning
Hazard Statements
H412 - Harmful to aquatic life with long lasting effects
H226 - Flammable liquid and vapor

Precautionary Statements - EU (§28, 1272/2008)
P273 - Avoid release to the environment
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking

Other Hazards
No information available.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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<tr>
<td>1,4-Dichlorobutane 110-56-5</td>
<td>EEC No. 203-778-1</td>
<td>97</td>
<td>110-56-5</td>
<td>R10; R52/53; Aquatic Chronic 3 (H412)</td>
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</tbody>
</table>

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16

SECTION 4. FIRST AID MEASURES

Description of first aid measures

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Ingestion
Clean mouth with water. Get medical attention.
Inhalation
Remove from exposure, lie down. Move to fresh air.

Notes to Physician
Treat symptomatically

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable Extinguishing Media

Extinguishing media which must not be used for safety reasons
No information available.

Special hazards arising from the substance or mixture
Flammable. Vapors may travel to source of ignition and flash back.

Advice for fire-fighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation

Environmental precautions
Prevent further leakage or spillage if safe to do so

Methods and material for containment and cleaning up
Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling
Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Use explosion-proof equipment. Use only non-sparking tools.

Conditions for safe storage, including any incompatibilities
Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition. Flammables area.

Specific End Uses
SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.

Derived No Effect Level (DNEL)
No information available.

Predicted No Effect Concentration (PNEC)
No information available.

Exposure controls

Engineering Measures
Use explosion-proof electrical/ventilating/lighting/equipment

Personal protective equipment
Eye Protection
Goggles

Hand Protection
Protective gloves

Skin and body protection
Wear appropriate protective gloves and clothing to prevent skin exposure

Respiratory Protection
Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice

Environmental exposure controls
No information available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State
Liquid

Appearance
Colorless

pH
6-7 200 g/l aq.sol.

Vapor Pressure
5 hPa @ 20 °C

Viscosity
1.46 mPa s at 20 °C

Boiling Point/Range
161 - 163°C / 321.8 - 325.4°F

Melting Point/Range
-38°C / -36.4°F

Decomposition temperature
120 °C

Flash Point
40°C / 104°F

Autoignition Temperature
220°C / 428°F

Explosion Limits
Lower
1.8

Upper
8.9

Water Solubility
0.24% (20 C)

Specific Gravity
1.160

Molecular Formula
C4 H8 Cl2

Molecular Weight
127.01
SECTION 10. STABILITY AND REACTIVITY

Reactivity

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

Hazardous Polymerization
Hazardous polymerization does not occur.

Hazardous Reactions
No information available.

Conditions to Avoid

Incompatible products.

Incompatible Materials

Strong oxidizing agents, Strong bases.

Hazardous Decomposition Products


SECTION 11. TOXICOLOGICAL INFORMATION

Information on Toxicological Effects

Acute Toxicity

Product Information
No acute toxicity information is available for this product

Component Information

Chronic Toxicity

Carcinogenicity
There are no known carcinogenic chemicals in this product

Sensitization
No information available.

Mutagenic Effects
No information available.

Reproductive Effects
No information available.

Developmental Effects
No information available.

Target Organs
No information available.

Other Adverse Effects
The toxicological properties have not been fully investigated.

Endocrine Disruptor Information
None known
SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Ecotoxicity effects
Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4-Dichlorobutane</td>
<td></td>
<td>47.8-55.6 mg/L LC50 96 h</td>
<td></td>
</tr>
</tbody>
</table>

Persistence and degradability
No information available

Bioaccumulative potential
No information available.

Mobility in soil
No information available.

Results of PBT and vPvB assessment
No information available

Other adverse effects
No information available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from Residues / Unused Products
Dispose of in accordance with local regulations

Contaminated Packaging
Empty containers should be taken to local recyclers for disposal

SECTION 14. TRANSPORT INFORMATION

IMDG/IMO

UN-No              1993
Hazard Class       3
Packing Group      III
Proper Shipping Name Flammable liquid, n.o.s.

ADR
SECTION 14. TRANSPORT INFORMATION

UN-No: 1993
Hazard Class: 3
Packing Group: III
Proper Shipping Name: FLAMMABLE LIQUID, N.O.S.

SECTION 15. REGULATORY INFORMATION

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

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>PICCS</th>
<th>ENCS</th>
<th>CHINA</th>
<th>AICS</th>
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<tbody>
<tr>
<td>1,4-Dichlorobutane</td>
<td>203-778-1</td>
<td>-</td>
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<td>X</td>
<td>-</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
</tbody>
</table>

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
PICCS - Philippines Inventory of Chemicals and Chemical Substances
ENCS - Japan Existing and New Chemical Substances
CHINA - China Inventory of Existing Chemical Substances
AICS - Inventory of Chemical Substances
KECL - Existing and Evaluated Chemical Substances

Chemical Safety Assessment

SECTION 16. OTHER INFORMATION

Full text of R-phrases referred to under sections 2 and 3
R10 - Flammable
R52/53 - Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment
SECTION 16. OTHER INFORMATION

Revision Date 16-Apr-2012

Revision Summary

Reason for revision Not applicable

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

Disclaimer

The information provided on 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 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 Safety Data Sheet