1. PRODUCT AND COMPANY IDENTIFICATION

Product Name  1-Chlorobutane
Cat No.        AC154630000; AC154630010; AC154630025; AC154630100
Synonyms      n-Butyl chloride
Recommended Use Laboratory chemicals

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

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

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview
Flammable liquid and vapor. May cause skin, eye, and respiratory tract irritation. May be harmful by inhalation, in contact with skin and if swallowed.

Appearance  Colorless  Physical State  Liquid  odor  No information available

Target Organs  None known.
Potential Health Effects
Acute Effects

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Principle Routes of Exposure

Eyes
May cause irritation.

Skin
May cause irritation. May be harmful in contact with skin.

Inhalation
May cause irritation of respiratory tract. May be harmful if inhaled.

Ingestion
May be harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic Effects
Experiments have shown reproductive toxicity effects on laboratory animals. Teratogenic effects have occurred in experimental animals. Tumorigenic effects have been reported in experimental animals.

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions
No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Haz/Non-haz</th>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Butyl chloride</td>
<td>109-69-3</td>
<td>&gt;95</td>
</tr>
</tbody>
</table>

4. 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 plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation
Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur.

Ingestion
Do not induce vomiting. Obtain medical attention.

Notes to Physician
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point
-12°C / 10.4°F

Method
No information available.

Autoignition Temperature
460°C / 860°F

Explosion Limits
Upper
10.1 vol %

Lower
1.0 vol %

Suitable Extinguishing Media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media
No information available.

Hazardous Combustion Products
No information available.
Sensitivity to mechanical impact  No information available.
Sensitivity to static discharge  No information available.

Specific Hazards Arising from the Chemical
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

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

NFPA Health 1 Flammability 3 Instability 0 Physical hazards N/A

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions
Should not be released into the environment.

Methods for Containment and Clean Up
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE

Handling
Wear personal protective equipment. Keep away from open flames, hot surfaces and sources of ignition. Ensure adequate ventilation. Take precautionary measures against static discharges. Use only non-sparking tools. Use explosion-proof equipment. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat and sources of ignition.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures
Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment.

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

NIOSH IDLH: Immediately Dangerous to Life or Health

Personal Protective Equipment
Eye/face Protection
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA’s eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

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.
9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Colorless</td>
</tr>
<tr>
<td>odor</td>
<td>No information available</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>108 mbar @ 20 °C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>3.19 (Air = 1.0)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>0.45 mPa.s (20°C)</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>77 - 78°C / 170.6 - 172.4°F @ 760 mmHg</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>-123°C / -189.4°F</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Flash Point</td>
<td>-12°C / 10.4°F</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.880</td>
</tr>
<tr>
<td>Solubility</td>
<td>Insoluble in water</td>
</tr>
<tr>
<td>log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>92.57</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>C4 H9 Cl</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability
- Stable under normal conditions.

Conditions to Avoid

Incompatible Materials
- Strong oxidizing agents, Strong bases

Hazardous Decomposition Products
- Carbon monoxide (CO), Carbon dioxide (CO₂), Hydrogen chloride gas

Hazardous Polymerization
- Hazardous polymerization does not occur.

Hazardous Reactions
- None under normal processing.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information
- See actual entry in RTECS for complete information.

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation (Dust)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butyl chloride</td>
<td>2200 mg/kg (Rat)</td>
<td>20000 mg/kg (Rabbit)</td>
<td>8000 ppm (Rat) 4 h</td>
</tr>
</tbody>
</table>

Irritation
- No information available.

Toxicologically Synergistic Products
- No information available.
Chronic Toxicity
Carcinogenicity
There are no known carcinogenic chemicals in this product.

Sensitization
No information available.

Mutagenic Effects
Mutagenic effects have occurred in experimental animals.

Reproductive Effects
Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects
No information available.

Teratogenicity
No information available.

Other Adverse Effects
Tumorigenic effects have been reported in experimental animals. See actual entry in RTECS for complete information.

Endocrine Disruptor Information
No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity
Do not empty into drains.

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butyl chloride</td>
<td>450 mg/L EC50 &gt; 72 h</td>
<td>600 mg/L LC50 48 h</td>
<td>EC50 = 485 mg/L 5 min&lt;br&gt;EC50 = 732 mg/L 30 min</td>
<td>3020 mg/L EC50 = 48 h&lt;br&gt;452 mg/L EC50 = 48 h</td>
</tr>
</tbody>
</table>

Persistence and Degradability
Not readily biodegradable.

Bioaccumulation/ Accumulation
No information available.

Mobility

<table>
<thead>
<tr>
<th>Component</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butyl chloride</td>
<td>2.66</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods
Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. TRANSPORT INFORMATION

DOT
UN-No UN1127
Proper Shipping Name CHLOROBUTANES
14. TRANSPORT INFORMATION

Hazard Class 3
Packing Group II

TDG
UN-No UN1127
Proper Shipping Name CHLOROBUTANES
Hazard Class 3
Packing Group II

IATA
UN-No UN1127
Proper Shipping Name Chlorobutanes
Hazard Class 3
Packing Group II

IMDG/IMO
UN-No UN1127
Proper Shipping Name Chlorobutanes
Hazard Class 3
Packing Group II

15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>CHINA</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butyl chloride</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>203-696-6</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Legend:
- X - Listed
- E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
- F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
- N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
- P - Indicates a commenced PMN substance
- R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
- S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
- T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
- Xu - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).
- Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
- Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable
SARA 313
Not applicable

SARA 311/312 Hazardous Categorization

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Sudden Release of Pressure Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td>No</td>
</tr>
</tbody>
</table>

Clean Water Act
Not applicable

Clean Air Act
Not applicable

OSHA
Not applicable

CERCLA
Not Applicable

California Proposition 65
This product does not contain any Proposition 65 chemicals.

State Right-to-Know

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butyl chloride</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade
Serious risk, Grade 3

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
B2 Flammable liquid
16. OTHER INFORMATION

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date
25-May-2009

Print Date
29-Nov-2012

Revision Summary
“***”, and red text indicates revision

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 MSDS