Choline Chloride Dry and Aqueous North American Products ANH MSDS - English

Revised: 20 June 2011
Superseded: 1 June 2011

MATERIAL SAFETY DATA SHEET

[as amended by (EU) No. 453/2010]

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

1.1 Product identifier

Chemical name: Choline Chloride
Product label name:

**Dry Products**
60% Choline Chloride with carrier
70% Choline Chloride with carrier

**Aqueous Products**
70% Choline Chloride – Aqueous
75% Choline Chloride – Aqueous

Other names or synonyms of identification: 2-Hydroxy-N,N,N-trimethylethanaminium chloride
Number of Registration: Feed Registry # not available
C.A.S. Registry number: 67-48-1 (choline chloride)
EINECS number: 200-655-4
EINECS name: Choline Chloride
Molecular weight: 139.6 (choline chloride)
Molecular formula: C₅H₁₉ClNO (choline chloride)

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

Nutritional additive for feed
1.3 Details of the supplier of the safety data sheet

Supplier: Balchem Italia Srl, Balchem Corporation
Address: Via del Porto, snc 52 Sunrise Park Road
28040 Marano Ticino (NO) – Italy New Hampton, NY 10958
Italy USA
Telephone number: 0039 (0)321 9791 +1 (845) 326-5613
Fax: +1 (845) 326-5800
Web: www.balchem.com www.balchem.com
E-mail: sds@balchem.com sds@balchem.com

1.4 Emergency telephone number

An emergency number is not required for this product.

Emergency telephone 24h/24: 001-703-527-3887 – CHEMTREC International
800-424-9300 – CHEMTREC USA
Emergency telephone only during office hours: 0039-(0)321-9791 BALCHEM ITALIA S.r.l.

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification of the substance according to Directive 67/548/EEC
None: material is not hazardous.

Classification of the substance according to (EC) No 1272/2008
None: material is not hazardous.

2.2 Label elements

None: material is not hazardous

Hazard statement:
None: material is not hazardous

2.3 Other hazards

None

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

See Section 3.2
3.2 Mixtures

<table>
<thead>
<tr>
<th>Product</th>
<th>Components</th>
<th>Weight %</th>
<th>CAS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 50% on Silica</td>
<td>C₅H₁₄ClNO</td>
<td>50</td>
<td>67-48-1</td>
</tr>
<tr>
<td></td>
<td>SiO₂ • xH₂O</td>
<td>50</td>
<td>7631-86-9</td>
</tr>
<tr>
<td></td>
<td>H₂O</td>
<td>&lt; 0.5</td>
<td>7732-18-5</td>
</tr>
<tr>
<td>Other Dry Products</td>
<td>C₅H₁₄ClNO</td>
<td>50-70</td>
<td>67-48-1</td>
</tr>
<tr>
<td></td>
<td>Carrier</td>
<td>30-50</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>H₂O</td>
<td>&lt; 0.5</td>
<td>7732-18-5</td>
</tr>
<tr>
<td>Aqueous Products</td>
<td>C₅H₁₄ClNO</td>
<td>70-75</td>
<td>67-48-1</td>
</tr>
<tr>
<td></td>
<td>H₂O</td>
<td>25-30</td>
<td>7732-18-5</td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation: For significant exposure to any nuisance particles (dust or mist), remove to fresh air and, if there is difficulty breathing, get medical attention. Breathing dust from any source may cause respiratory irritation. Breathing large amounts of dust from any source may cause injury.

Skin: No first aid is required. As a precaution, wash with soap and water. Wash contaminated clothing before reuse.

Eye: To prevent mechanical irritation, flush with clean, low-pressure water.

Ingestion: No first aid required for ingesting small amounts.

4.2 Most important symptoms and effects, both acute and delayed

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Acute</th>
<th>Chronic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

4.3 Indication of any immediate medical attention and special treatment needed

There are no adverse effects from exposure to this product.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Water, Foam, CO₂, Dry Chemical.

5.2 Special hazards arising from the substance or mixture

Hazardous Combustion Products: No specific hazards. Combustion will produce compounds of carbon, hydrogen, nitrogen, chlorine and oxygen.

Other Fire and Explosion Hazards: Possible dust explosion. The particle size as produced and the deliquescent nature of the product are expected to limit potential for dust explosion. Aqueous products support combustion only after evaporation of the water content.
5.3 Advice for firefighters
Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source, is a potential dust explosion hazard. This material may present an explosion and deflagration hazard risk when dispersed and ignited in air. Secondary explosions may also pose a risk once an initial explosion occurs with the presence of a combustible dust or powder in the area.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel
Dust should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid dispersal of dust in the air (e.g., avoid clearing dust surfaces with compressed air).

6.1.2 For emergency responders
No specific protective equipment is required.

6.2 Environmental precautions
None.

6.3 Methods and material for containment and cleaning up
Vacuum or sweep material and place in a disposal container.

6.4 Reference to other sections
See Section 8: Exposure Controls/Personal Protection and Section 13: Disposal Considerations

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid breathing dust.

7.2. Conditions for safe storage, including any incompatibilities
Choline chloride is deliquescent (will absorb moisture from air to form a liquid). Ensure containers are properly secured before moving. Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precaution, such as electrical grounding and bonding, or inert atmospheres.

7.3. Specific end use(s)
No additional recommendations.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters
Choline Chloride: OSHA Nuisance Dust PELs (29 CFR 1910.1000): Respirable fraction = 5 mg/m³; Total = 15 mg/m³
Silicon dioxide / Precipitated synthetic amorphous silica (Italy): Respirable dust = 2.4 mg/m³; Inhalable dust = 6 mg/m³. Note SiO₂ is a carrier for CC 35% and 50% CC on Silica, and is added as a flow agent to conditioned product only. This silica gel is synthetic amorphous silica not to be confused with crystalline silica. Epidemiological studies indicate low potential for adverse health effects from amorphous silica.

8.2. Exposure controls

Provide ventilation and particulate control to maintain airborne levels below the exposure guidelines. It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Use only appropriately classified electrical equipment and powered industrial trucks.

Eye/Face Protection: If there is a potential for exposure to particles (mist or dust) which would cause mechanical injury to the eye, wear chemical goggles.

Skin Protection: No additional precautions.

Respiratory Protection: In dusty atmospheres, use an approved dust respirator. In confined or poorly ventilated areas or emergency and other conditions where the exposure guidelines may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Product:</th>
<th>Dry Products</th>
<th>Aqueous Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance:</td>
<td>Pale yellow / tan to light brown, dark brown or off-white granule or powder</td>
<td>Clear to light amber / pale yellow</td>
</tr>
<tr>
<td>Physical state:</td>
<td>Solid</td>
<td>Liquid</td>
</tr>
<tr>
<td>Chemical Family:</td>
<td>Aliphatic amines</td>
<td>Aliphatic amines</td>
</tr>
<tr>
<td>Odor:</td>
<td>Odorless to slight grain odor; threshold not determined</td>
<td>Faint amine odor; threshold not determined</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>0.46</td>
<td>1.1</td>
</tr>
<tr>
<td>pH:</td>
<td>Choline chloride: 4.5-7.5 for a 25% wt/vol solution in water</td>
<td>5 - 8 at 10 g/L water @ 20°C</td>
</tr>
<tr>
<td>Melting Point:</td>
<td>Choline chloride: decomposes 247°C (477°F)</td>
<td>-0.4°F (-18°C)</td>
</tr>
<tr>
<td>Boiling Point:</td>
<td>Choline chloride: decomposes &gt;125°C (&gt;257°F)</td>
<td></td>
</tr>
<tr>
<td>Flash Point:</td>
<td>Choline chloride: not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation Rate:</td>
<td>Not available (assumed to be essentially zero)</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability:</td>
<td>Not flammable</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Flammability Limits:</td>
<td>Not flammable</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Vapor Pressure:</td>
<td>Not available (assumed to be essentially zero)</td>
<td>Only water vapor is present.</td>
</tr>
<tr>
<td>Product:</td>
<td>Dry Products</td>
<td>Aqueous Products</td>
</tr>
<tr>
<td>Vapor Density (air=1):</td>
<td>Not available (assumed to be</td>
<td>Not available</td>
</tr>
<tr>
<td>Property</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Bulk Density</td>
<td>450-650 kg/m³ Not applicable</td>
<td></td>
</tr>
<tr>
<td>Solubility</td>
<td>Choline chloride: 370 g/100 mL water @ 50 °F (10 °C) Completely miscible in water</td>
<td></td>
</tr>
<tr>
<td>Octanol/Water Partition Coefficient</td>
<td>Not available Log Pow &lt; 0</td>
<td></td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>Choline chloride: Not available Not available</td>
<td></td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available 26 mPa.s @ 20°C</td>
<td></td>
</tr>
<tr>
<td>Explosive Properties</td>
<td>Based on minimal samples with vegetable carrier, material as produced is 0-2 wt% of particle size 70 microns or less. While not fully evaluated for dust explosion properties, material is expected to be classified as ST2 for dry particles less than 75 micron diameter. Literature reports choline chloride for particles &lt; 63 micron diameter and 2.3 wt% moisture is classified as ST1 dust explosion and has a lower explosion limit of 125 g/m³, overpressure of 3.5 bar, Kst of 4 bar-m/s, a minimum ignition energy (MIE) &gt; 10⁶ mJ and an ignition temperature of 430 °C (806 °F). One sample of 70% choline chloride on vegetable carrier at 0.6 wt% moisture and particle size &lt; 70 micron diameter had the following properties: Layer Ignition Test (LIT): No ignition up to 400 °C (752 °F) of 5 mm dust layer, minimum ignition temperature (MIT) of 300 °C (572 °F), MIE = 30 mJ, Charge Relaxation Time &lt;0.01 seconds yielding classification as quick which implies rapid elimination of charge buildup when grounded / earthed, Powder Volume Resistivity = 2.6 x 10⁴ classified as low implying grounding/earthing is likely effective at preventing charge buildup, Pmax = 6.8 bar, Kst=245 bar-m/s and ST=2 (for dust cloud composed of particle 70 micron or less under high turbulence). One sample of choline chloride on silica 50% had the following properties: minimum ignition temperature 420 °C (cloud), lower ignition limit 250 mg/L</td>
<td></td>
</tr>
<tr>
<td>Oxidizing Properties</td>
<td>Not an oxidizer</td>
<td></td>
</tr>
<tr>
<td>Explosive Properties</td>
<td>Material not tested as mist. Water content must first evaporate before dust formation occurs. Choline chloride for particles &gt; 500 micron diameter and 2.3 wt% moisture is classified as ST1 dust explosion and has a lower explosion limit of 125 g/m³, overpressure of 3.5 bar, Kst of 4 bar-m/s, a minimum ignition energy &gt; 10⁶ mJ and an ignition temperature of 430 °C. For particles &lt; 63 um, choline chloride is classified as ST1 dust explosion.</td>
<td></td>
</tr>
</tbody>
</table>

Oxidizing Properties: Not an oxidizer
9.2. Other information
No additional information.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity
Not considered reactive.

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
No hazardous reactions expected.

10.4. Conditions to avoid
Do not heat to boiling or decomposition in sealed container.

10.5. Incompatible materials
Avoid contact with strong acids and bases as well as iron, mild steel and galvanized steel.

10.6. Hazardous decomposition products
Compounds of carbon, hydrogen, nitrogen, oxygen, chlorine.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects
100% Choline Chloride:
\[ \text{LD}_{50} \] – 3400 mg/kg oral (rat)
\[ \text{LD}_{50} \] – 450 mg/kg intraperitoneal (rat)
\[ \text{LD}_{50} \] – 3900 mg/kg oral (mouse)
\[ \text{LD}_{50} \] – 320 mg/kg intraperitoneal (mouse)
\[ \text{LD}_{50} \] – 735 mg/kg subcutaneous (mouse)
\[ \text{LD}_{50} \] – 53 mg/kg intravenous (mouse)
\[ \text{LD}_{50} \] – 5 mg/kg intravenous (dog)
\[ \text{LD}_{50} \] – 25 mg/kg intravenous (cat)
\[ \text{LD}_{50} \] – 500 mg/kg intraperitoneal (rabbit)
\[ \text{LD}_{50} \] – 1 g/kg subcutaneous (rabbit)
\[ \text{LD}_{50} \] – 1100 µg/kg intravenous (rabbit)
\[ \text{LD}_{50} \] – 1 g/kg rectal (rabbit)
\[ \text{LD}_{50} \] – 1500 mg/kg (frog)
\[ \text{TD}_{50} \] – 331 mg/kg/14 weeks continuous oral (rat)
\[ \text{TD}_{50} \] – 4950 mg/kg/30 days intermittent intraperitoneal (rat)
\[ \text{TD}_{50} \] – 6250 mg/kg/10 weeks intermittent intraperitoneal (rat)
\[ \text{TD}_{50} \] – 3564 mg/kg/5 weeks intermittent intraperitoneal (rat)
SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

100% Choline Chloride: 10,000 mg/L 24 weeks (mortality) coho salmon, silver salmon.

12.2. Persistence and degradability

Expected to be readily biodegradable.

12.3. Bioaccumulative potential

Not bioaccumulative.

12.4. Mobility in soil

Not determined.

12.5. Results of PBT and vPvB assessment

Not determined.

12.6. Other adverse effects

Not determined.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Product: Not considered a hazardous waste under US Federal Hazardous Waste Regulations (40 CFR 261) or EU Directive 91/689/EEC. Consult local regulations regarding proper disposal as they may be more restrictive or otherwise different from Federal/International regulations.

Packaging: Dispose of packaging contaminated by product in accordance with regulations.

SECTION 14: TRANSPORT INFORMATION

14.1. UN number

Not hazardous.

14.2. UN proper shipping name

Not hazardous.

14.3. Transport hazard class(es)

Not hazardous.

14.4. Packing group

Not hazardous.

14.5. Environmental hazards

Not hazardous.

14.6. Special precautions for user

Not hazardous.
14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not hazardous.

SECTION 15: REGULATORY INFORMATION

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

U.S. Federal Regulations

OSHA: This product is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
PSM: This product is not subject to Process Safety Management (29 CFR 1910.119).
FIFRA: Not applicable
TSCA: On TSCA inventory
CERCLA: Reportable Quantity – None (40 CFR 302.4)

SARA TITLE III: Section 302 Extremely Hazardous Substances – None (40 CFR 355)
  Section 311/312 Hazard Categories – None (40 CFR 370.2)
  Section 313 Toxic Chemicals – None (40 CFR 372.65)

RMP: Not listed under the Risk Management Plan (40 CFR 68).
RCRA: If discarded in purchased form, this product is not a listed or characteristic hazardous waste. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal whether a material containing the product or derived from the product should be classified as a hazardous waste (40 CFR 261.20-24).
CWA: Release into a waterway may require reporting to the National Response Center @ 800-424-8802 (40 CFR 116.4).
FDA/USDA: Follow Good Manufacturing Practice (GMP). Choline chloride is GRAS per 21 CFR 581.52. IFN 7-01-228.

International Regulations

Canadian Domestic Substance List (DSL): Listed (published 5 April 1994)
European Inventory of Existing Commercial Chemical Substances (EINECS):
  No. 200-655-4
EU Regulations:
  Reregistration of Feed Additives: Regulation (EC) 1831/2003 – Feed Registry # not available.
  Safety Data Sheets: Regulation (EU) No 453/2010 does not apply to non-hazardous materials.
  CLP: Regulation (EC) No 1272/2008 Classification, Labeling and Packaging does not apply to non-hazardous materials.
Australian Inventory of Chemical Substances (AICS): Listed
Korean Existing Chemicals List (ECL): No. KE-20909
Japan ENCS: 2-341X; 9-1994X
German Water Class (WKG): 0 (Internal assessment)
**USA State Regulations**
This product is not subject to California Proposition 65. There are no known additional requirements necessary for compliance with state right-to-know regulations.

15.2. Chemical safety assessment
Not completed.

**SECTION 16: OTHER INFORMATION**

**Reason for Issue:** Created separate MSDS listing North American product names and EU product names to prevent customer confusion.

**Risk Phrases Used:** None used

**Hazard Ratings** – The following NFPA hazard ratings are recommended for this product:
Fire - 1; Health – 0; Reactivity – 0; Specific Hazard - None

For safe handling, refer to NFPA 654, *Standard for the prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids*.

The following abbreviations may be used in this document:

- % - percent
- µg/kg - micrograms per kilogram
- g/kg – grams per kilogram
- lb/ft³ – pounds per cubic foot
- mg/kg – milligrams per kilogram
- mg/m³ – milligrams per cubic meter
- mmHg – millimeters of mercury
- ppm – parts per million
- w/w – Weight per weight

ACGIH – American Council of Governmental Industrial Hygienists
AICS – Australian Inventory of Chemical Substances
CAS – Chemical Abstract Service
CERCLA – Comprehensive Environmental Response, Compensation and Liability Act
CFR – Code of Federal Regulations
CWA – Clean Water Act
D.O.T. – Department of Transportation
DSL – Domestic Substance List (Canada)
ECL – Existing Chemicals List (Korea)
EINECS – European Inventory of Existing Commercial Substances
FDA – Food and Drug Administration
FIFRA – Federal Insecticide, Fungicide and Rodenticide Act
IDLH – Immediately Dangerous to Life and Health
LD₅₀ – Lethal dose for 50% mortality of subject species
LD₅₀ – Lethal dose low: the lowest dose of a substance introduced by any route other than inhalation reported to have caused death in humans or animals.
LFL – Lower Flammable Limit
MSHA – Mine Safety Health Administration
NFPA – National Fire Protection Association
NIOSH – National Institute of Occupational Safety and Health
OSHA – Occupational Safety and Health Administration
PEL – Permissible Exposure Limit (default 8-hour day, 40-hour week TWA)
PSM – Process Safety Management
RCRA – Resource Conservation and Recovery Act
REL – Recommended Exposure Limit (default 10-hour day, 40-hour week TWA)
RMP – Risk Management Plan
SARA – Superfund Amendment and Reauthorization Act
STEL – Short Term Exposure Limit (default 15-minute TWA)
TDLO – Lowest dose to which humans or animals have been exposed and reported to produce a toxic effect other than cancer
TSCA – Toxic Substance Control Act
TWA – Time Weighted Average
UFL – Upper Flammable Limit
USDA – United States Department of Agriculture