SECTION 1: Identification of the hazardous chemical and of the supplier

1.1 Product identifiers
Product name: Chloral hydrate EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP
Product Number: 1.02425
Catalogue No.: 102425
Brand: Millipore
CAS-No.: 302-17-0

1.2 Other means of identification
No data available

1.3 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Pharmaceutical production and analysis

1.4 Details of the supplier of the safety data sheet
Co. No: 178145
No. 4, Jalan U1/26, Section U1, 40150 HICOM GLENMARIE INDUSTRIAL PARK, SHAH ALAM, MALAYSIA
Telephone: +60 (0)3-74943688
Fax: +60 (0)3-74910850

1.5 Emergency telephone
Emergency Phone #: 1-800-815-308 (CHEMTREC) * + 62 0800
140 1253 (Customer Call Centre)

Section 2: Hazard identification

2.1 GHS Classification
Classification according to CLASS regulations 2013
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 1), H330
Skin corrosion/irritation (Category 2), H315
Serious eye damage/eye irritation (Category 2), H319
Specific target organ toxicity - repeated exposure, Inhalation (Category 2), Lungs, Adrenal gland, H373

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

2.2 GHS Label elements, including precautionary statements
Labelling according to CLASS regulations 2013
Pictogram
Signal Word: Danger

Hazard statement(s)
- H301: Toxic if swallowed.
- H315: Causes skin irritation.
- H319: Causes serious eye irritation.
- H330: Fatal if inhaled.
- H373: May cause damage to organs (Lungs, Adrenal gland) through prolonged or repeated exposure if inhaled.

Precautionary statement(s)

Prevention
- P260: Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
- P264: Wash skin thoroughly after handling.
- P280: Wear protective gloves/ eye protection/ face protection.

Response
- P301 + P310 + P330: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
- P304 + P340 + P310: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

Storage
- P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

2.3 Other hazards - none

SECTION 3: Composition and information of the ingredients of the hazardous chemical

Substance / Mixture: Substance

3.1 Substances
- Formula: C2H3Cl3O2
- Molecular weight: 165.4 g/mol
- CAS-No.: 302-17-0
- EC-No.: 206-117-5
- Index-No.: 605-014-00-6

Hazardous ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>chloral, monohydrate</td>
<td>Acute Tox. 3; Skin Corr./Irrit. 2; Eye Dam./Irrit. 2; H301, H315, H319</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

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

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.
**If inhaled**
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

**If swallowed**
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 – 40 g in a 10% slurry) and consult a doctor as quickly as possible.

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

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

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**SECTION 5: Firefighting measures**

5.1 **Extinguishing media**

**Unsuitable extinguishing media**
For this substance/mixture no limitations of extinguishing agents are given.

5.2 **Special hazards arising from the substance or mixture**
Carbon oxides
Hydrogen chloride gas
Not combustible.
Fire may cause evolution of:
Hydrogen chloride gas, Phosgene
Ambient fire may liberate hazardous vapours.

5.3 **Advice for firefighters**
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 **Further information**
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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**SECTION 6: Accidental release measures**

6.1 **Personal precautions, protective equipment and emergency procedures**
Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 **Environmental precautions**
Do not let product enter drains.
6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.
Recommended storage temperature see product label.

Storage class
Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

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

SECTION 8: Exposure controls and personal protection

8.1 Control parameters
Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls
Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L

**Body Protection**
protective clothing

**Respiratory protection**
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains.

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**SECTION 9: Physical and chemical properties**

9.1 **Information on basic physical and chemical properties**

- **a)** Physical state: solid
- **b)** Color: white
- **c)** Odor: No data available
- **d)** Melting point/freezing point: 55.3 °C at 973.8 hPa - OECD Test Guideline 102
- **e)** Initial boiling point and boiling range: 100.66 °C at 973.8 hPa - OECD Test Guideline 103
- **f)** Flammability (solid, gas): No data available
- **g)** Upper/lower flammability or explosive limits: No data available
- **h)** Flash point: Not applicable
- **i)** Autoignition temperature: No data available
- **j)** Decomposition temperature: No data available
k) pH 3.5 - 4.4 at 100 g/l

l) Viscosity
   Viscosity, kinematic: No data available
   Viscosity, dynamic: No data available

m) Water solubility 443.69 g/l at 25 °C - completely soluble

n) Partition coefficient: log Pow: 1.092 at 25 °C - Bioaccumulation is not expected.
   n-octanol/water

o) Vapor pressure 20 hPa at 25 °C

p) Density
   Relative density No data available

q) Relative vapor density No data available

r) Particle characteristics
   Particle Size D50 = 150 µm
   Distribution Type of distribution: mass distribution

s) Explosive properties No data available

t) Oxidizing properties none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
Violent reactions possible with:
   Strong oxidizing agents
   permanganates
   Alcohols
   Bases
   Alkali metals
   Alkaline earth metals
   tannin

10.4 Conditions to avoid
Air
Light.
no information available

10.5 Incompatible materials
   iron/iron-containing compounds, various plastics
   Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5
SECTION 11: Toxicological information

11.1 Information on toxicological effects

**Acute toxicity**
Acute toxicity estimate Oral - 100.1 mg/kg
(Expert Judgment)
Inhalation: No data available
LD50 Dermal - Rat - 3,030 mg/kg
Remarks: (ECHA)

**Skin corrosion/irritation**
Skin - Guinea pig
Result: Skin irritation
Remarks: (ECHA)

**Serious eye damage/eye irritation**
No data available

**Respiratory or skin sensitization**
Maximization Test - Guinea pig
Result: negative
Remarks: (ECHA)

**Germ cell mutagenicity**
Test Type: Ames test
Test system: S. typhimurium
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: in vivo assay
Species: Mouse
Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: negative

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

11.2 Additional Information
Cough, Shortness of breath, Headache, Nausea, Vomiting, Drowsiness, Confusion, Amnesia.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
SECTION 12: Ecological information

12.1 Toxicity

<table>
<thead>
<tr>
<th>Toxicity to fish</th>
<th>static test LC50 - Danio rerio (zebra fish) - &gt; 100 mg/l - 96 h (OECD Test Guideline 203)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td>EC50 - Daphnia magna (Water flea) - 500 mg/l - 48 h</td>
</tr>
<tr>
<td>Toxicity to algae</td>
<td>IC50 - Scenedesmus quadricauda (Green algae) - 2.8 mg/l - 168 h</td>
</tr>
<tr>
<td>Toxicity to bacteria</td>
<td>- Bacteria - 1.6 mg/l - 16 h</td>
</tr>
<tr>
<td></td>
<td>- Protozoa - 79 mg/l - 72 h</td>
</tr>
</tbody>
</table>

12.2 Persistence and degradability

<table>
<thead>
<tr>
<th>Biodegradability</th>
<th>aerobic - Exposure time 28 d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Result: 44.04 % - Not inherently biodegradable. (OECD Test Guideline 301F)</td>
</tr>
</tbody>
</table>

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal information

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions. According to Quality Environment Regulation (Scheduled Waste) 2005, waste need to be sent to designated premise for recycle, treatment or disposal. Please contact Kualiti Alam for waste classification and correct disposal method.

SECTION 14: Transportation information

14.1 UN number

ADR/RID: 2811  IMDG: 2811  IATA-DGR: 2811

14.2 UN proper shipping name

ADR/RID:  TOXIC SOLID, ORGANIC, N.O.S. (chloral, monohydrate)
IMDG:  TOXIC SOLID, ORGANIC, N.O.S. (chloral, monohydrate)
IATA-DGR: Toxic solid, organic, n.o.s. (chloral, monohydrate)

14.3 Transport hazard class(es)
ADR/RID: 6.1  IMDG: 6.1  IATA-DGR: 6.1

14.4 Packaging group
ADR/RID: III  IMDG: III  IATA-DGR: III

14.5 Environmental hazards
ADR/RID: no  IMDG Marine pollutant: no  IATA-DGR: no

14.6 Special precautions for user
None

14.7 Incompatible materials
iron/iron-containing compounds, various plastics
Strong oxidizing agents

Other regulations
Hazchem Code : 2X

SECTION 15: Regulatory information

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

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.
H301  Toxic if swallowed.
H315  Causes skin irritation.
H319  Causes serious eye irritation.
H330  Fatal if inhaled.
H373  May cause damage to organs through prolonged or repeated exposure if inhaled.

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

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