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

1.1 Product identifiers

<table>
<thead>
<tr>
<th>Product name</th>
<th>Chlora hydrate EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Number</td>
<td>1.02425</td>
</tr>
<tr>
<td>Catalogue No.</td>
<td>102425</td>
</tr>
<tr>
<td>Brand</td>
<td>Millipore</td>
</tr>
<tr>
<td>Index-No.</td>
<td>605-014-00-6</td>
</tr>
<tr>
<td>REACH No.</td>
<td>01-2120117773-57-XXXX</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>302-17-0</td>
</tr>
</tbody>
</table>

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

Identified uses: Pharmaceutical production and analysis

1.3 Details of the supplier of the safety data sheet

Company: Merck KGaA
Frankfurter Str. 250
D-64271 DARMSTADT

Telephone: +49 (0)6151 72-0
Fax: +49 6151 727780
E-mail address: TechnicalService@merckgroup.com

1.4 Emergency telephone

Emergency Phone #: +(44)-870-8200418 (CHEMTREC (GB))
+(353)-19014670 (CHEMTREC Ireland)
001-803-017-9114 (CHEMTREC India)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 1), H330
Skin irritation (Category 2), H315
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 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

<table>
<thead>
<tr>
<th>Signal Word</th>
<th>Danger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard statement(s)</td>
<td>Toxic if swallowed.</td>
</tr>
<tr>
<td>H301</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>H315</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>H330</td>
<td>Fatal if inhaled.</td>
</tr>
<tr>
<td>H373</td>
<td>May cause damage to organs (Lungs, Adrenal gland) through prolonged or repeated exposure if inhaled.</td>
</tr>
</tbody>
</table>

Precautionary statement(s)

P260  Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264  Wash skin thoroughly after handling.
P302 + P352  IF ON SKIN: Wash with plenty of water.
P304 + P340 + P310  IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314  Get medical advice/ attention if you feel unwell.

Supplemental Hazard Statements

none

Reduced Labeling (<= 125 ml)

Pictogram

<table>
<thead>
<tr>
<th>Signal Word</th>
<th>Danger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard statement(s)</td>
<td>Toxic if swallowed.</td>
</tr>
<tr>
<td>H301</td>
<td>Fatal if inhaled.</td>
</tr>
</tbody>
</table>

Precautionary statement(s)

P260  Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264  Wash skin thoroughly after handling.
P304 + P340 + P310  IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.

Supplemental Hazard Statements

none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances
The life science business of Merck operates as MilliporeSigma in the US and Canada.

Formula : C2H3Cl3O2
Molecular weight : 165,4 g/mol
CAS-No. : 302-17-0
EC-No. : 206-117-5
Index-No. : 605-014-00-6

<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 Irrit. 2;</td>
<td>&lt;= 100 %</td>
</tr>
<tr>
<td></td>
<td>Eye Irrit. 2; H301, H315, H319</td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>302-17-0</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>206-117-5</td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>605-014-00-6</td>
<td></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

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.

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/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

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

- **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.
Recommended Filter type: Filter type P3

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

**Control of environmental exposure**
Do not let product enter drains.
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.
o) Vapor pressure: 20 hPa at 25 °C
p) Density: 0.947 g/cm³ at 28.9 °C - OECD Test Guideline 109
Relative density: No data available
q) Relative vapor density: No data available
r) Particle characteristics
   Particle Size: D50 = 150 µm
   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)
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

Endocrine disrupting properties

Product:
Assessment: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

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

Toxicity to fish: static test LC50 - Danio rerio (zebra fish) - > 100 mg/l - 96 h (OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna (Water flea) - 500 mg/l - 48 h

Toxicity to algae: IC50 - Scenedesmus quadricauda (Green algae) - 2,8 mg/l - 168 h

Toxicity to bacteria: - Bacteria - 1,6 mg/l - 16 h
- Protozoa - 79 mg/l - 72 h

12.2 Persistence and degradability
12.3 **Biodegradability**

Exposure: aerobic - Exposure time 28 d

Result: 44.04% - Not inherently biodegradable.

*(OECD Test Guideline 301F)*

12.4 **Mobility in soil**

No data available

12.5 **Results of PBT and vPvB assessment**

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 **Endocrine disrupting properties**

**Product:**

Assessment: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 **Other adverse effects**

No data available

**SECTION 13: Disposal considerations**

13.1 **Waste treatment methods**

**Product**

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

**SECTION 14: Transport information**

14.1 **UN number**

ADR/RID: 2811  
IMDG: 2811  
IATA: 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: Toxic solid, organic, n.o.s. (chloral, monohydrate)

14.3 **Transport hazard class(es)**

ADR/RID: 6.1  
IMDG: 6.1  
IATA: 6.1

14.4 **Packaging group**

ADR/RID: III  
IMDG: III  
IATA: III

14.5 **Environmental hazards**

ADR/RID: no  
IMDG Marine pollutant: no  
IATA: no

14.6 **Special precautions for user**

No data available
SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

National legislation

Other regulations
Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

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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