Product Guide for Ludger Permethylation Kit™ with Methyl Iodide (MeI)

Product # LT-PERMET-96
Ludger Document # lt-permet-96-guide-v2.0

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## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents</td>
<td>2</td>
</tr>
<tr>
<td>Specifications for LT-PERMET-96</td>
<td>3</td>
</tr>
<tr>
<td>Kit Contents</td>
<td>4</td>
</tr>
<tr>
<td>Additional Reagents and Equipment Required</td>
<td>4</td>
</tr>
<tr>
<td>Safety and Handling</td>
<td>5</td>
</tr>
<tr>
<td>Time Line for Procedure</td>
<td>5</td>
</tr>
<tr>
<td>Method Part 1: Permethylation of glycans</td>
<td>5</td>
</tr>
<tr>
<td>Method Part 2: Extraction of permethylated glycans</td>
<td>6</td>
</tr>
<tr>
<td>Warranties and liabilities</td>
<td>8</td>
</tr>
<tr>
<td>Document Revision Number</td>
<td>8</td>
</tr>
<tr>
<td>References</td>
<td>8</td>
</tr>
<tr>
<td>Appendix</td>
<td>9</td>
</tr>
</tbody>
</table>
## Specifications for LT-PERMET-96

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application</strong></td>
<td>This kit is used for the permethylation of glycans. Permethylation stabilizes glycan sialic acids for MALDI mass spectrometry analysis, and aids linkage analysis studies. The kit can be used with glycans released from glycoproteins.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>This kit contains reagents for the permethylation of glycans.</td>
</tr>
<tr>
<td><strong>Number of Samples</strong></td>
<td>Sufficient for up to 96 samples.</td>
</tr>
<tr>
<td><strong>Amount of Sample</strong></td>
<td>Up to 1 µg of released glycans.</td>
</tr>
<tr>
<td><strong>Suitable Samples</strong></td>
<td>Any unlabelled purified glycans, released from glycoprotein by either PNGaseF, PNGase A, beta-elimination or hydrazinolysis.</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>Store at 2-8°C.</td>
</tr>
<tr>
<td><strong>Shipping</strong></td>
<td>The product should be shipped between 2-8°C.</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>For research use only. Not for human or drug use. Please read the Safety Data Sheet (SDS’s) for all chemicals used. All processes involved permethylation reagents should be performed using appropriate personal safety protection – eyeglasses, chemically resistant gloves and where appropriate in a laboratory fume cupboard.</td>
</tr>
</tbody>
</table>
Kit Contents

The kit contains the following items:

<table>
<thead>
<tr>
<th>Catalogue Id.</th>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT-PERMET-PLATE-96</td>
<td>96 well Permethylation plate</td>
<td>1 Plate</td>
</tr>
<tr>
<td>LT-PERMET-Mel-96</td>
<td>Methyl Iodide (Mel)</td>
<td>10.0 ml</td>
</tr>
<tr>
<td>LT-PERMET-DMSO-96</td>
<td>Dimethyl sulfoxide (DMSO)</td>
<td>40.0 ml</td>
</tr>
<tr>
<td>LT-PERMET-DCM-96</td>
<td>Dichloromethane (DCM)</td>
<td>60.0 ml</td>
</tr>
<tr>
<td>LT-BALANCE-PLATE</td>
<td>96 well Balance Plate</td>
<td>1 Plate</td>
</tr>
<tr>
<td>LT-PERMET-LID-96</td>
<td>96 well Plate Lid</td>
<td>1 Lid / Mat</td>
</tr>
</tbody>
</table>

*Note: The kit can be used to process 1-96 samples. The plate is scalable and can be used for any number of samples between 1 and 96. Store the unused kit reagents and the unused plate wells in the recommended storage conditions to enable their use for further sample preparation at a later date. Please use within the expiry date.*

Additional Reagents and Equipment Required

- Pure water: resistivity above 18 MΩ-cm, particle free (>0.22 µm), TOC <10 ppb.
- Plate shaker
- Reaction Eppendorf vials (1.5 or 2.0 ml) for final transfer of extracted sample. (Vials need to be chloroform or dichloromethane resistant otherwise use glass vials).
- pH indicator strips
- Centrifugal evaporator (e.g. Savant, HETO or similar).
- 70% Methanol (MeOH)
- Dichloromethane (DCM) (Used to add to the balance plate)
Safety and Handling

Ensure that any glass, plastic ware or solvents used with this item are free of carbohydrates. Use powder-free gloves for all sample handling procedures and avoid contamination with environmental carbohydrate.

Time Line for Procedure

The permethylation procedure for 96 samples takes approximately 5 to 6 hours when performed manually.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1: Permethylation of samples:</strong></td>
<td></td>
</tr>
<tr>
<td>a. Preparation of glycans</td>
<td>As required</td>
</tr>
<tr>
<td>b. Addition of DMSO and sample to permethylation plate</td>
<td>15 minutes</td>
</tr>
<tr>
<td>c. Incubation</td>
<td>15 minutes</td>
</tr>
<tr>
<td>d. Addition of MeI to permethylation plate</td>
<td>15 minutes</td>
</tr>
<tr>
<td>e. Incubation</td>
<td>60 minutes</td>
</tr>
<tr>
<td><strong>Step 2: Extraction of permethylated samples and storage</strong></td>
<td></td>
</tr>
<tr>
<td>a. Extraction of samples</td>
<td>3 - 4 hours</td>
</tr>
<tr>
<td>b. Drying permethylated samples</td>
<td>10 - 30 minutes</td>
</tr>
<tr>
<td>c. Addition of 70% MeOH for storage</td>
<td>10 - 20 minutes</td>
</tr>
</tbody>
</table>

Method Part 1: Permethylation of glycans

a) Preparation of glycans

- Following N-glycan release, we would advise the user to enrich and purify the N-glycans prior to permethylation in order to increase the efficacy of the reaction. We recommend using the LC-PERMET-96 plate for this purpose. If required, this can be purchased separately from Ludger. After enrichment, the glycans need to be dried down before they can be permethylated. It is preferable for the dried glycans to be in 1.5 mL Eppendorf vials or similar. However, if you have used the LC-PERMET-96 plate for the enrichment and eluted the samples into a 96 well collection plate, the samples can be dried down in the collection plate ready for the next step.

b) Addition of DMSO and dried glycan sample to the permethylation plate

*Note: Before you start the experiment please ensure the DMSO is completely defrosted. DMSO is a solid at 19°C.*

- Dissolve each of the glycan samples with 300μl DMSO. Vortex and centrifuge these samples. Peel the clear seal from the permethylation plate and cut the overhang away. Add the first sample in DMSO
to the permethylation plate wells and using the same pipette tip disturb the solid at the bottom of
the well. Repeat this procedure with the remaining samples and record the sample positions.

c) Incubation

- Cover the plate with the 96 well silicone plate lid provided and place the permethylation plate on a
  shaker incubator at ~100-150rpm and incubate for 15 minutes at room temperature.

Cut strips of the silicone 96 well lid / mat to cover the sample wells and cover the sample wells
securely.

- After the 15 minute incubation, spin the plate down along with a balance plate in a centrifuge very
  briefly to avoid cross contamination of samples when you peel the silicone plate lid.

  Note: An empty balance plate (LT-BALANCE-PLATE) has been provided as a part of the kit. Ensure the
  balance plate is appropriately balanced, by adding water (equal weight by volume), in comparison to
  the sample plate containing DMSO.

d) Addition of MeI to permethylation plate

- Carefully remove the plate lid and add 55 µl of MeI to the reaction wells containing samples. Cover
  the reaction wells again with the collection plate lid oriented such that it is positioned to cover the
  same sample spot as before and seal securely.

e) Incubation

- Make sure the silicone lid is tightly sealed to eliminate the loss of volatile MeI.

- Securely position the permethylation plate on a plate shaker at 100-150 rpm, taking care to observe
  that there is no spillage or cross contamination of sample contents across the 1.2 mL permethylation
  plate. Incubate the plate at room temperature for 60 minutes

- After the 60 minute incubation, briefly centrifuge the sample plate to ensure that all the samples are
  at the bottom of the wells of the plate.

  Note: An empty balance plate (LT-BALANCE-PLATE) has been provided as a part of the kit. Ensure the
  balance plate is appropriately balanced by adding water (equal weight in volume), in comparison to
  the sample plate containing DMSO and MeI.

Method Part 2: Extraction of permethylated glycans

a) Extraction of permethylated glycans

- Remove the silicon plate lid and add 450 µL of DCM followed by ~500 µL of water to each sample
  well in the permethylation plate.

- For the ease of the extraction steps, transfer the entire contents of each well containing sample
  (DMSO, DCM and water) to labelled 1.5/2.0 mL Eppendorf vials or glass vials.
• Once the samples are transferred, mix both the organic DCM layer and the aqueous layer by vortexing each sample. Place the vials in a rack and allow the two layers to separate.
• Discard the top aqueous layer into a chlorinated waste container.
• Add 800 µL of water to each sample to wash the organic layer again. Vortex each sample to ensure good solvent mixing and allow the two layers to separate.
• Discard the top aqueous layer into a chlorinated waste container.
• Repeat the water wash step with further 800 µL amounts of water and test with pH paper until the aqueous layer is no longer basic (if > 7, repeat with further water washes until the aqueous layer has a pH ≤ 7).

b) Dry the permethylated glycans

• Make sure to completely remove the top aqueous layer that is present in each sample vial and discard into a chlorinated waste container. The permethylated glycans are present in the organic, DCM layer. Dry the organic solvent containing the permethylated samples in a centrifugal evaporator.

Note: If the liquid-liquid extraction was performed in a 96-well plate format, use the empty balance plate provided for balancing the centrifugal evaporator. Ensure the balance plate is appropriately balanced, by adding DCM or chloroform (equal weight in volume), in comparison to the sample plate containing permethylated glycans in DCM.

Note: Once the sample plate and balance plate are placed in the centrifugal evaporator, spin the plates for 2 minutes without vacuum to allow the DCM to settle. After 2 minutes, the vacuum pump can be switched on to dry the permethylated glycans.

c) Store the samples

• Add 10 µL of 70% MeOH to each sample vial with the dried down permethylated glycan and mix by vortexing. The samples may be stored at temperatures of –20°C before mass spectrometric analysis.
Warranties and liabilities

Ludger warrants that the above product conforms to the attached analytical documents. Should the product fail for reasons other than through misuse Ludger will, at its option, replace free of charge or refund the purchase price. This warranty is exclusive and Ludger makes no other warrants, expressed or implied, including any implied conditions or warranties of merchantability or fitness for any particular purpose. Ludger shall not be liable for any incidental, consequential or contingent damages.

This product is intended for in vitro research only.

Document Revision Number

Document # LT-PERMET-96-guide, version v2.0

References

Appendix
Safety data sheet - Sodium hydroxide

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

Product Name: 96 well permethylation plate containing sodium hydroxide
Product Catalogue Name: LT-PERMET-PLATE-96
CAS-No.: 1310-73-2
Company: Ludger Ltd
Culham Science Centre
Abingdon
Oxfordshire
OX14 3EB
Telephone: 01865 408554
Emergency Telephone: 01865 408554
Email: info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
Corrosive to metals (Category 1), H290 Skin corrosion (Category 1A), H314
For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Signal Word: Danger

Hazard Statement(s)
Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
Precautionary statement(s)
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing.
Rinse skin with water/shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements none

Precautionary Statement(s)
None

2.3 Other hazard information:
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
Synonyms: caustic soda
Formula: NaOH
Molecular Weight: 40.00 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>sodium hydroxide</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>1310-73-2</td>
</tr>
<tr>
<td>EC-No.</td>
<td>215-185-5</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice
Consult a physician if exposure causes ill effects and if in any doubt. Show this safety data sheet to the physician/first responder in attendance.

If Ingested
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

If skin is exposed
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

If eyes are exposed
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

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 immediate medical attention and special treatment needed
No data available.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
5.2 Special hazards arising from the substance or mixture
Sodium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection see section 8.

6.2 Environmental Precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and material for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Storage class (TRGS 510): Non-combustible, corrosive hazardous materials

7.3 Specific end uses
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

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>ValueForm of exposure</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium hydroxide</td>
<td>1310-73-2</td>
<td>STEL</td>
<td>2 mg/m3</td>
<td>UK. EH40 WEL - Workplace Exposure Limits</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal Protective Equipment
**Eye / face protection**
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Thermal hazards**
No information available.

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**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Form: liquid, Colour: colourless</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing/Melting Point</td>
<td>-12-10°C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>105 - 140 °C</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour Pressure, Pa at temperature degree C</td>
<td>&lt; 24 hPa at 20 °C</td>
</tr>
<tr>
<td>Relative Density</td>
<td>1.515 g/mL at 25 °C</td>
</tr>
<tr>
<td>Solubility in water and solvents (mg/l)</td>
<td>completely miscible, soluble</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>No data available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
</tbody>
</table>
9.2 Other information
Relative vapour density  1.38 - (Air = 1.0)

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to Avoid
No data available

10.5 Incompatible materials
Water, acids, Organic materials, Chlorinated solvents, Aluminium, Phosphorus, Tin/tin oxides, Zinc.

10.6 Hazardous decomposition products
Other decomposition products - No data available In the event of fire: see section 5

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Reproductive toxicity
No data available

STOT-single exposure
No data available

STOT-repeated exposure
No data available

Aspiration hazard.
No data available

Potential Health Hazards
Corrosive and causes severe burns.

**Signs and symptoms of exposure**
Burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

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**SECTION 12. ECOLOGICAL INFORMATION**

12.1 Toxicity
Toxicity to fish LC50 Gambusia affinis (Mosquito fish) - 125 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates Immobilization EC50 - Daphnia - 40.38 mg/l - 48 h

12.2 Persistence and degradability
No data available

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. Other adverse effects
Harmful to aquatic life.

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**SECTION 13. DISPOSAL CONSIDERATIONS**

13.1 Waste treatment methods
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

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**SECTION 14. TRANSPORT INFORMATION**

14.1 UN Number
ADR/RID: 1824 IMDG: - IATA: 1824

14.2 UN Proper Shipping Name
ADR/RID: sodium hydroxide solid
IMDG: sodium hydroxide solid
IATA: sodium hydroxide solid

14.3 Transport hazard class(es)
ADR/RID: 8 IMDG: 8 IATA: 8

14.4 Packing group
ADR/RID: II IMDG: II IATA:I

14.5 Environmental hazards
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
No data available.

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.
H290      May be corrosive to metals.
H314      Causes severe skin burns and eye damage.
Met. Corr.  Corrosive to metals
Skin Corr.  Skin corrosion

The advice offered is derived from the current available information on the hazardous materials in this product and it component(s). Consideration has been made regarding the quantities offered in the pre dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.
SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Name: iodomethane/methyl iodide
Product Catalogue Name: LT-PERMET-Mel-96
CAS-No.: 74-88-4
Company: Ludger Ltd
Culham Science Centre
Abingdon
Oxfordshire
OX14 3EB
Telephone: 01865 408554
Emergency Telephone: 01865 408554
Email: info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No. 1272/2008 [EU-GHS-CLP]
Carcinogenicity (Category 2), H351
Acute toxicity, Dermal (Category 4), H312
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Oral (Category 3), H301
Specific target organ toxicity - single exposure (Category 3), H335
Skin irritation (Category 2), H315
For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

T  Toxic  R40/R23/25
Xn  Harmful  R21
Xi  Irritant  R37/38

For the full text of the R-phrases mentioned in this Section, see Section 1

2.2 Label elements

Signal Word: Danger

Hazard Statement(s)
H301  Toxic if swallowed.
H312 Harmful in contact with skin.
H315 Causes skin irritation.
H331 Toxic if inhaled.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Precautionary statement(s)
P261 Avoid breathing vapours.
P280 Wear protective gloves/protective clothing.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P311 Call a POISON CENTER or doctor/physician.

Supplemental Hazard Statements: none

2.3 Other hazard information:
Vesicant. Rapidly absorbed through skin.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3. 1 Substances
Synonyms: methyl iodide
Formula: CH₃I
Molecular weight: 141.94g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Methyl iodide</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>74-88-4</td>
</tr>
<tr>
<td>EC-No.</td>
<td>200-819-5</td>
</tr>
<tr>
<td>Concentration</td>
<td>( \leq 100% )</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice
Consult a physician if exposure causes ill effects and if in any doubt. Show this safety data sheet to the physician/first responder in attendance.

If Ingested
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

If skin is exposed
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

If eyes are exposed
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
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 immediate medical attention and special treatment needed
No data available

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection see section 8.

6.4 Environmental Precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.5 Methods and material for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. For precautions see section 2.2

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Recommended storage temperature: 2 - 8 °C Light sensitive. Moisture sensitive.

7.3 Specific end uses
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
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

8.3 Exposure controls
**Appropriate engineering controls**  
This is for general advice to the user, i.e. wear PPE, and wash hands, avoid contact with skin.

**Personal Protective Equipment**  
**Eye / face protection**  
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**  
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Body Protection**  
Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**  
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

---

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Form: liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>no data available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>no data available</td>
</tr>
<tr>
<td>pH</td>
<td>no data available</td>
</tr>
<tr>
<td>Freezing/Melting Point</td>
<td>Melting point/range: -64 °C –</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>lit. 41 - 43 °C-lit.</td>
</tr>
<tr>
<td>Flash Point</td>
<td>no data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>no data available</td>
</tr>
<tr>
<td>Flammability</td>
<td>no data available</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits: Upper explosion limit 66% (V) lower explosion limit 8.5% (V)</td>
<td></td>
</tr>
<tr>
<td>Vapour Pressure, Pa at temperature degree C:</td>
<td>544 hPa at 20 °C, 1,660 hPa at 55 °C</td>
</tr>
<tr>
<td>Relative Density</td>
<td>2.28 g/cm3 at 25 °C</td>
</tr>
<tr>
<td>Solubility in water and solvents (mg/l):</td>
<td>14 g/l at 20 °C</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>log Pow: 1.5 at 20 °C</td>
</tr>
<tr>
<td>Autoignition temperature</td>
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</tr>
<tr>
<td>Decomposition temperature</td>
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</tr>
<tr>
<td>Viscosity</td>
<td>no data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>no data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
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</table>

**9.2 Other information**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative vapour density</td>
<td>4.90 - (Air = 1.0)</td>
</tr>
</tbody>
</table>

---

**SECTION 10. STABILITY AND REACTIVITY**
10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions. Contains the following stabiliser(s):
Copper (100 ppm)

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to Avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases, Oxygen

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 76 mg/kg
LC50 Inhalation - rat - 4 h - 1,300 mg/m3
LD50 Dermal - guinea pig - 800 mg/kg

Skin corrosion/irritation
Skin - rabbit
Result: Causes severe burns. (Draize Test)

Serious eye damage/irritation
Eyes - rabbit
Result: Risk of serious damage to eyes. (Draize Test)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.
Limited evidence of carcinogenicity in animal studies
IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Methyl iodide)

Reproductive toxicity
No data available

STOT-single exposure
May cause respiratory irritation.

STOT-repeated exposure
No data available
Aspiration hazard.
No data available

Potential Health Hazards
Nausea, Dizziness, Headache, Blurred vision, Weakness, Drowsiness, Ataxia., Confusion., Convulsions, narcosis, Pulmonary edema. Effects may be delayed., Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis.

Signs and symptoms of exposure
Nausea, Dizziness, Headache, Blurred vision, Weakness, Drowsiness, Ataxia, Confusion, Convulsions, narcosis, Pulmonary edema. Effects may be delayed.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
Biodegradability aerobic - Exposure time 28 d
Result: 16 % - Not readily biodegradable. (Closed Bottle test)

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. Other adverse effects
No data available.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
ADR/RID: 2644  IMDG: 2644  IATA: 2644

14.2 UN Proper Shipping Name
ADR/RID: METHYL IODIDE
IMDG: METHYL IODIDE
IATA: METHYL IODIDE

Passenger Aircraft: Not permitted for transport

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

14.4 Packing group
ADR/RID: I  IMDG: I  IATA:-

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
No data available.

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.
Acute Tox.  Acute toxicity
Carc.  Carcinogenicity
H301  Toxic if swallowed.
H301 + H331  Toxic if swallowed or if inhaled H312 Harmful in contact with skin.
H315  Causes skin irritation.
H317  May cause an allergic skin reaction.
H331  Toxic if inhaled.
H334  May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335  May cause respiratory irritation.
H351  Suspected of causing cancer. Resp. Sens. Respiratory sensitisation
Skin Irrit.  Skin irritation
Skin Sens.  Skin sensitisation
STOT SE  Specific target organ toxicity - single exposure

Full text of R-phrases referred to under sections 2 and 3
T  Toxic
R21  Harmful in contact with skin.
R23/25  Toxic by inhalation and if swallowed.
R37/38  Irritating to respiratory system and skin.
R40  Limited evidence of a carcinogenic effect.

The advice offered is derived from the current available information on the hazardous materials in this product and its component(s). Consideration has been made regarding the quantities offered in the pre-dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.
Safety data sheet – dimethyl sulfoxide

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

Product Name: dimethyl sulfoxide
Product Catalogue Name: LT-PERMET-DMSO-96
CAS-No.: 67-68-5
Company: Ludger Ltd
Culham Science Centre
Abingdon
Oxford OX14 3EB
Telephone: 01865 408554
Emergency Telephone: 01865 408554
Email: info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No. 1272/2008 [EU-GHS-CLP]
Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008 [EU-GHS-CLP].

2.2 Label elements
The product does not require to be labelled in accordance with EC directives or respective national laws.

Signal Word: None

Hazard Statement(s)
None

Precautionary Statement(s)
None

2.3 Other hazard information:
None

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Synonyms:
DMSO
methyl sulfoxide
dimethyl sulfoxide

Formula: C₇H₈OS
Molecular Weight: 78.13g/mol

<table>
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<th>Component</th>
<th>Concentration</th>
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<tbody>
<tr>
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<td>Dimethyl Sulfoxide</td>
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<tr>
<td>CAS-No.</td>
<td>67-68-5</td>
</tr>
<tr>
<td>EC-No.</td>
<td>200-664-3</td>
</tr>
</tbody>
</table>
SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice
Consult a physician if exposure causes ill effects and if in any doubt. Show this safety data sheet to the physician/first responder in attendance.

If Ingested
Do NOT induce vomiting. Rinse mouth well with water. Never give anything by mouth to an unconscious person.

If skin is exposed
Wash off with plenty of soap and water.

If eyes are exposed
Flush eyes with plenty of water/eye wash solution as a precaution.

If inhaled
Move effect person to fresh air. If not breathing give artificial respiration.

4.2 Most important symptoms and effects, both acute and delayed
Effects due to ingestion may include: Nausea, Fatigue and Headache.

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Small fires: Use extinguishing media such as “alcohol” foam, dry chemical or carbon dioxide. Large fires: Use extinguishing media such as water, from a far away distance as possible. Use very large quantities of water as mist or spray to flood the fire and the combustible material. Cool all affected containers with large quantities of water.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides

5.3 Advice for fire fighters
Wear self contained breathing apparatus for fire fighting if necessary, to spray cool water on any unopened containers near the fire.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing vapours, gas or mist. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

6.6 Environmental Precautions
Prevent further leakage or spillage if safe to do so, e.g. with spill mats. Do not let the product enter drains.

6.7 Methods and material for containment and cleaning up
Contain the spillage and put the collected material into a suitable container with a secure lid. Wash the area well, do not let run off into the drains, collect as waste.

6.4 Reference to other sections
See section 13 for disposal of waste material(s).

SECTION 7. HANDLING AND STORAGE
7.1 Precautions for safe handling
Avoid inhalation of vapour or mist. Keep away from sources of ignition- No smoking. Take measures to prevent the build up of electrostatic charge.

7.2 Conditions for safe storage, including any incompatibilities
Store in a cool place. Keep container closed in a dry well ventilated place.

7.3 Specific end uses
No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

8.4 Exposure controls
Appropriate engineering controls
Handle in accordance with good laboratory hygiene and safety practice. Wash hands before breaks and at the end of the day.

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).

Skin protection
Handle with gloves, which should be inspected before use. Use proper glove removal technique (removal without the outside of the glove touching the skin) to avoid contact with the skin/chemical. Dispose of contaminated gloves as Laboratory waste in accordance with applicable laws and good laboratory practices. Wash and dry hands.
Gloves should be of the standard that will stratify the specifications of EU directive 89/696/EEC and the standard EN 374 derived from it.

Body Protection
The type of protective clothing must be selected according to the amount of substance at the specific workplace being used. Impervious coats or laboratory coats.

Respiratory protection
Use substance in an operation fume hood/ outside venting extraction cupboard. Wear full face respirator if appropriate to use, must be tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Form: Liquid, clear</td>
</tr>
<tr>
<td>Colour</td>
<td>Colourless</td>
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<tr>
<td>Odour</td>
<td>No data available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing/Melting Point</td>
<td>Melting point/range: 16-19°C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>189°C</td>
</tr>
<tr>
<td>Flash Point</td>
<td>87°C – Closed cup</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td>Upper explosion limit: 42% (V)</td>
</tr>
<tr>
<td></td>
<td>Lower explosion limit: 3.5% (V)</td>
</tr>
</tbody>
</table>
Vapour Pressure, Pa at temperature degree C 0.55hPa at 20°C
Relative Density 1.1g/mL
Solubility in water and solvents Completely miscible
Partition coefficient: n-octanol/water log Pow: - 2.03
Auto ignition temperature No data available
 Decomposition temperature No data available
Viscosity No data available
Explosive properties No data available
Oxidising properties No data available

9.2 Other information
No data available

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
No data available

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to Avoid
Heat, flames and sparks

10.5 Incompatible materials
Acid chlorides, Phosphorus halides, Strong acids, Strong oxidizing agents and strong reducing agents.

10.6 Hazardous decomposition products
Other decomposition products – No data available

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute toxicity
LD50 Oral – Rat – 14,500mg/kg
LC50 Inhalation – Rat – 4h – 40250ppm
LD50 Dermal – Rabbit - > 5,000mg/kg

Skin corrosion/irritation
Skin – Rabbit – No skin irritation – 4h

Serious eye damage/irritation
Eyes – Rabbit – Mild eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Genotoxicity in vitro – Mouse – lymphocyte
Cytogenetic analysis
Genotoxicity in vitro – Mouse – lymphocyte
Mutation in mammalian somatic cells
Genotoxicity in vivo – Rat – Intraperitoneal
Cytogenetic analysis
Genotoxicity in vivo - Mouse – Intraperitoneal
DNA damage

Carcinogenicity
Carcinogenicity – Rat – Oral
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Others: Tumors.

Carcinogenicity – Mouse – Oral
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Lukaemia skin and appendages: Other: Tumors.

IARC: No component of this product presents at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
Reproductive toxicity – Rat – Intraperitoneal
Effects on fertility: Abortion

Reproductive toxicity – Rat – Intraperitoneal
Effects on fertility: Post – implantation mortality (e.g. dead and/or resorbed implants per total number of implants).

Reproductive toxicity – Rat – Subcutaneous
Effects on fertility: Post – implantation mortality (e.g. dead and/or resorbed implants per total number of implants). Effects on fertility: Litter size (e.g. # fetuses per litter; measured before birth).

Reproductive toxicity – Mouse – Oral
Effects on fertility: Pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or fetus: Fetotoxicity (except death, e.g. stunted fetus). Specific developmental abnormalities: Musculoskeletal system.

Reproductive toxicity – Mouse – Intraperitoneal
Effects on embryo or fetus: Fetotoxicity (except death, e.g. stunted fetus). Specific developmental abnormalities: Musculoskeletal system.

STOT-single exposure
No data available

STOT-repeated exposure
No data available

Aspiration hazard.
No data available

Potential Health Hazards

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

Ingestion
May be harmful if swallowed.

Skin
May be harmful if absorbed through skin. May cause skin irritation.

Eyes
May cause eye irritation.

Aggravated Medical Condition
Avoid contact with DMSO solutions containing toxic materials or materials with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through the skin and may carry such materials into the body.

Signs and symptoms of exposure
Effects due to ingestion may include; Nausea, Fatigue, Headache.

Additional Information
SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to Fish
LC50-Pimephales promelas (fathead minnow) – 34,000mg/l - 96h

Toxicity to daphnia and other Aquatic invertebrates
LC50-Oncorhynchus mykiss (rainbow trout) – 34,000mg/l-96h

Toxicity to algae
EC50-Daphnia pulex (water fleas) – 27,500mg/l

EC50-Lepomis macrochirus (bluegill) - >400,000mg/l-96h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
No data available

12.6 Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber or to be disposed of by a licensed professional waste disposal company.

Contaminated packaging
Dispose of as the unused product.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
ADR/RID: -  
IMDG: -  
IATA: -

14.2 UN Proper Shipping Name
ADR/RID: Not Dangerous Goods
IMDG: Not Dangerous Goods
IATA: Not Dangerous Goods

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

14.4 Packing group
ADR/RID: -  
IMDG: -  
IATA: -

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

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

15.2 Chemical Safety Assessment
No data available

Please note that the label elements that used to go in Section 15 are now in Section 2.

SECTION 16. OTHER INFORMATION

The advice offered is derived from the current available information on the hazardous materials in this product and its component(s). Consideration has been made regarding the quantities offered in the pre-dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.
SAFETY DATA SHEET - dichloromethane

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

Product Name: dichloromethane

Product Catalogue Name: LT-PERMET-DCM-96

CAS-No.: 75-09-2

Company: Ludger Ltd
Culham Science Centre
Abingdon
Oxfordshire
OX14 3EB

Telephone: 01865 408554
Emergency Telephone: 01865 408554
Email: info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
Skin irritation (Category 2), H315 Eye irritation (Category 2), H319 Carcinogenicity (Category 2), H351

Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 2), Liver, Blood, Central nervous system, H373

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

2.2 Label elements

Signal Word: Warning

Hazard Statement(s)

H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H336 May cause drowsiness or dizziness.
H351 Suspected of causing cancer.
H373 May cause damage to organs (Liver, Blood, Central nervous system) through prolonged or repeated exposure.

Precautionary Statement(s)

P261 Avoid breathing vapours.
P281 Use personal protective equipment as required.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Supplemental Hazard Statements none

2.3 Other hazard information:
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
Synonyms: methylene chloride (DCM)
Formula: CH2Cl2

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
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</thead>
<tbody>
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<td>EC-No.</td>
<td>200-838-9</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
Consult a physician. Show this safety data sheet to the doctor in attendance.

If Ingested
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

If skin is exposed
Wash off with soap and plenty of water. Consult a physician.

If eyes are exposed
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

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 immediate medical attention and special treatment needed
No data available

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas
5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.8 Environmental Precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.9 Methods and material for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Heat sensitive. Store under inert gas.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end uses
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

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>ValueForm of exposure</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylene chloride</td>
<td>75-09-2</td>
<td>STEL</td>
<td>300 ppm 1,060 mg/m3</td>
<td>UK. EH40 WEL - Workplace Exposure Limits</td>
</tr>
</tbody>
</table>

Remarks
Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.

8.5 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**Personal Protective Equipment**

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

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Thermal hazards**
No information available.

---

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Form: liquid, Colour: colourless</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing/Melting Point</td>
<td>-97 °C</td>
</tr>
<tr>
<td>Initial boiling point and</td>
<td>39.8 - 40 °C</td>
</tr>
<tr>
<td>boiling range</td>
<td></td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>0.71</td>
</tr>
<tr>
<td>Flammability</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper/lower flammability or</td>
<td>Upper explosion limit: 19 %(V)</td>
</tr>
<tr>
<td>explosive limits</td>
<td>Lower explosion limit: 12 %(V)</td>
</tr>
<tr>
<td>Vapour Pressure, Pa at temperature degree C</td>
<td>470.9 hPa at 20.0 °C</td>
</tr>
</tbody>
</table>
Relative Density 1.325 g/mL at 25 °C
Solubility in water and slightly soluble
solvents (mg/l)
Partition coefficient log Pow: 1.25
Autoignition temperature 556.1 °C
662.0 °C
Decomposition temperature No data available
Viscosity No data available
Explosive properties No data available
Oxidising properties No data available

9.2 Other information
Relative vapour density 2.93 - (Air = 1.0)

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Contains the following stabiliser(s): 2-Methyl-2-butene (>0.005 - <0.015 %)

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to Avoid
Heat, flames and sparks. Exposure to sunlight.

10.5 Incompatible materials
Alkali metals, Aluminum, Strong oxidizing agents, Bases, Amines, Magnesium, Strong acids and strong bases, Vinyl compounds

10.6 Hazardous decomposition products
Other decomposition products - No data available In the event of fire: see section 5.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 2,000 mg/kg
LC50 Inhalation - Rat - 52,000 mg/m3
LD50 Dermal - Rat - > 2,000 mg/kg (OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin. - 24 h (Draize Test)

Serious eye damage/irritation
Eyes - Rabbit
Result: Irritating to eyes. - 24 h (Draize Test)

Respiratory or skin sensitisation
No data available
Germ cell mutagenicity
Rat
DNA damage

Reproductive toxicity
No data available

STOT-single exposure
May cause respiratory irritation. May cause drowsiness or dizziness

STOT-repeated exposure
Inhalation - May cause damage to organs through prolonged or repeated exposure. - Central nervous system
Oral - May cause damage to organs through prolonged or repeated exposure. - Liver, Blood

Aspiration hazard.
No data available

Potential Health Hazards
Corrosive and causes severe burns.

Signs and symptoms of exposure
Dichloromethane is metabolized in the body producing carbon monoxide which increases and sustains carboxyhemoglobin levels in the blood, reducing the oxygen-carrying capacity of the blood., Acts as a simple asphyxiant by displacing air., anesthetic effects, Difficulty in breathing, Headache, Dizziness, Prolonged or repeated contact with skin may cause; defatting, Dermatitis, Contact with eyes can cause; Redness, Blurred vision, Provokes tears., Effects due to ingestion may include:, Gastrointestinal discomfort, Central nervous system depression, Paresthesia., Drowsiness, Convulsions, Conjunctivitis., Pulmonary edema. Effects may be delayed., Irregular breathing., Stomach/intestinal disorders, Nausea, Vomiting, Increased liver enzymes., Weakness, Heavy or prolonged skin exposure may result in the absorption of harmful amounts of material., Abdominal pain.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 193.00 mg/l - 96 h NOEC - Cyprinodon variegatus (sheepshead minnow) - 130 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates.

12.2 Persistence and degradability
Biodegradability Result: < 26 % - Not readily biodegradable.
(OECD Test Guideline 301C)

12.3 Bioaccumulative potential
Does not bioaccumulate.

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. Other adverse effects
No data available
SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
ADR/RID: 1593  
IMDG: -1593  
IATA: 1593

14.2 UN Proper Shipping Name
ADR/RID:  
DICHLOROMETHANE  
IMDG:  
DICHLOROMETHANE  
IATA: Dichloromethane

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

14.4 Packing 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
Methylene chloride  CAS-No.: 75-09-2
REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)
Paint strippers containing dichloromethane in a concentration equal to or greater than 0,1 % by weight shall not be: (a) placed on the market for the first time for supply to the general public or to professionals after 6 December 2010; (b) placed on the market for supply to the general public or to professionals after 6 December 2011; (c) used by professionals after 6 June 2012.

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16. OTHER INFORMATION
Full text of H-Statements referred to under sections 2 and 3.
H315  Causes skin irritation.
H319  Causes serious eye irritation.
H335  May cause respiratory irritation.
H336  May cause drowsiness or dizziness.
H351  Suspected of causing cancer.
H373  May cause damage to organs (/$/*_ORGAN_REPEAT/$/) through prolonged or repeated exposure.

The advice offered is derived from the current available information on the hazardous materials in this product and its component(s). Consideration has been made regarding the quantities offered in the pre dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.