SAFETY DATA SHEET

LudgerTag 2-AA Monosaccharide Release & Labelling Kit - LT-MONO-96

Version: 1.1
Date written: 1st February 2012
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SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY / UNDERTAKING

Product Name	**Monosaccharide Standard mix**
Product Catalogue Name	**CM-MONO-MIX-10, CM-MONOMIX-10, CM-MONOMIX-10X3**
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]

Not a hazardous substance according to Regulation (EC) No. 1272/2008

2.2 Label elements

The substance does not require any labelling following EC directives or respective national laws.

Signal Word: None required

Hazard Statement(s)
None required

Precautionary Statement(s)
None required

2.3 Other hazard information:
None required

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms:	Glucosamine Hydrochloride:	D-Glucosamine hydrochloride, 2-amino-2-deoxy- D-glucose hydrochloric
	Galactosamine Hydrochloride:	D-galactosamine hydrochloride, 2-Amino-2-deoxy-D-galactose hydrochloride
	Galactose:	Galactose (alpha form), alpha-D-Galactopyranose

	Mannose:	D-(+)-Mannose, D-Mannose
	Fucose:	L-Fucose, L-Galactose,6-deoxy-
	Glucose:	Dextrose, Corn Sugar
Formula:	Glucosamine Hydrochloride:	$C_6H_{13}NO_5$.HCl
	Galactosamine Hydrochloride:	$C_6H_{13}NO_5$.HCl
	Galactose:	$C_6H_{12}O_6$
	Mannose:	$C_6H_{12}O_6$
	Fucose:	$C_6H_{12}O_5$
	Glucose:	$C_6H_{12}O_6$
Molecular Weight:	Glucosamine Hydrochloride:	215.63
	Galactosamine Hydrochloride:	215.64
	Galactose:	180.16
	Mannose:	180.16
	Fucose:	164.16
	Glucose:	180.16

Each vial of CM-MONO-MIX-10 contains 10nmols of each monosaccharide below.

Component	**Concentration**
Name **Glucosamine Hydrochloride**	-
CAS-No. 66-84-2	
EC-No. No data available	
Name **Galactosamine Hydrochloride**	-
CAS-No. 1772-03-8	
EC-No. No data available	
Name **Galactose**	-
CAS-No. 3646-73-9	
EC-No. No data available	
Name **Mannose**	-
CAS-No. 3458-28-4	
EC-No. No data available	
Name **Fucose**	-
CAS-No. 2438-80-4	
EC-No. No data available	
Name **Glucose (Dextrose)**	-
CAS-No. 50-99-7	
EC-No. No data available	

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
Rinse mouth well with water.

If the skin is exposed
Wash the exposed area(s) well with plenty of soap and water.

If eyes are exposed
Flush the eye(s) with plenty of water or eye wash solution. If possible and present, remove contact lenses and continue rinsing.
If inhaled
Remove the affected person(s) to a source of fresh air. If the person is not breathing give artificial respiration.

4.2 Most important symptoms and effects, both acute and delayed
No data available

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Water spray, dry chemicals, carbon dioxide or foam, are appropriate media for extinguishing fire. Choose the most appropriate for the surrounding fire and materials.

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

5.3 Advice for Firefighters
Fire fighters to wear self-contained breathing apparatus, if deemed necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing in any material. Wear laboratory gloves and protective clothing, such as a laboratory coat.

6.2 Environmental Precautions
No data available

6.3 Methods and material for containment and cleaning up
Collect the spillage with an absorbent material, such as a paper towel, vermiculite, or sand. Collect and store the spillage/waste material in an appropriately labelled container and arrange collection for disposal. Wash the spillage area with water.

6.4 Reference to other sections
More information on disposal of the product is in Section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin, inhalation of dust, mists and/or vapours associated with the material. Work with the material in a fume hood. Wear laboratory gloves, coat and glasses, follow good laboratory practice and wash your hands before and after handling the material.

7.2 Conditions for safe storage, including any incompatibilities
Store below - 18°C. The material is to be stored in original packaging or similar tightly closing packaging.

7.3 Specific end uses
No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters
This product contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Users must wear personal protective equipment e.g. Laboratory gloves, glasses and coats. Wash hands and avoid contact with skin.

Personal Protective Equipment
Eye/face protection
Use Safety glasses or goggles, which have been tested and approved under appropriate government standards, such as NIOSH (US) or EN 166 (EU).

Skin protection
Handle with gloves. The wearer should check for holes/tears before use. Proper glove removal technique should be used, to avoid potential contact with skin. Gloves must satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. Wash and dry your hands after handling the material.

Body Protection
Wear a laboratory coat or similar coverings.

Respiratory protection
Respiratory protection is not required. It is recommended where possible to handle the product under extraction when used as part of a kit.

Thermal hazards
No data available

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Opaque crystalline powder
Odour	None
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	No data available
Initial boiling point and boiling range	No data available
Flash Point	No data available
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Relative Density	No data available
Solubility in water and solvents	Soluble

Partition coefficient	No data available
Autoignition 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
Stable when stored at recommended temperature. Store at -18°C.

10.3 Possibility of Hazardous Reactions
No data available

10.4 Conditions to Avoid
Avoid exposure to sources of heat and humidity.

10.5 Incompatible materials
Strong oxidising agents.

10.6 Hazardous decomposition products
No data available

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Glucosamine Hydrochloride:
LD50 Oral - Mouse - 15,000 mg/kg
Remarks: Peripheral Nerve and Sensation: Sensory change involving peripheral nerve. (RTECS)

Galactosamine Hydrochloride:
LD50 Intraperitoneal - Mouse - 2,660 mg/kg
Remarks: Behavioral: Somnolence (general depressed activity). Liver: Other changes. Skin corrosion/

Glucose
LD50 Oral - Rat - 25,800 mg/kg
Remarks: Behavioral: Coma. Cyanosis Diarrhoea

No data available for the rest of the monosaccharides

Skin corrosion/irritation
No data available

Serious eye damage/irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity

Galactosamine Hydrochloride:
Rat
Liver
Other mutation test systems
Rat
Other mutation test systems

Glucose
Mouse
lymphocyte
Mutation in mammalian somatic cells.

No data available for the rest of the monosaccharides

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

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

Inhalation	Possible allergic reaction to the material, reaction can be acute.
Ingestion	Possible allergic reaction to the material, reaction can be acute.
Skin	Possible allergic reaction to the material, reaction can be acute.
Eyes	Possible allergic reaction to the material, reaction can be acute.

Signs and symptoms of exposure
Possible hypersensitivity to material.

To our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

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

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
Any waste substances should be disposed of by a licensed professional disposal company.
Contaminated packaging
Dispose of as a used product/material.

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 datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1. Safety, health and environmental regulations/legislation specific to 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 currently 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.

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

Product Name	**Xylose Standard**
Product Catalogue Name	**CM-XYLOSE-100**
CAS-No.	**58-86-6**
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]

Not a hazardous substance according to Regulation (EC) No. 1272/2008

2.2 Label elements

The substance does not require any labelling following EC directives or respective national laws.

Signal Word: None required

Hazard Statement(s)
None required

Precautionary Statement(s)
None required

2.3 Other hazard information:
None required

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3. 1 Substances

Synonyms:	Wood Sugar
Formula:	$C_5H_{10}O_5$
Molecular Weight:	150.13

Component		Concentration
Name	**Xylose**	-
CAS-No.	58-86-6	
EC-No.	No data available	

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
Rinse mouth well with water.

If the skin is exposed
Wash the exposed area(s) well with plenty of soap and water.

If eyes are exposed
Flush the eye(s) with plenty of water or eye wash solution. If possible and present, remove contact lenses and continue rinsing.

If inhaled
Remove the affected person(s) to a source of fresh air. If the person is not breathing give artificial respiration.

4.2 Most important symptoms and effects, both acute and delayed
No data available

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Water spray, dry chemicals, carbon dioxide or foam, are appropriate media for extinguishing fire. Choose the most appropriate for the surrounding fire and materials.

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

5.3 Advice for Firefighters
Fire fighters to wear self-contained breathing apparatus, if deemed necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing in any material. Wear laboratory gloves and protective clothing, such as a laboratory coat.

6.2 Environmental Precautions
No data available

6.3 Methods and material for containment and cleaning up
Collect the spillage with an absorbent material, such as a paper towel, vermiculite, or sand. Collect and store the spillage/waste material in an appropriately labelled container, and arrange collection for disposal. Wash the spillage area with water.

6.4 Reference to other sections
More information on disposal of the product is in Section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin, inhalation of dust, mists and/or vapours associated with the material. Work with the material in a fume hood. Wear laboratory gloves, coat and glasses, follow good laboratory practice and wash your hands before and after handling the material.

7.2 Conditions for safe storage, including any incompatibilities
Store below - 18°C. The material is to be stored in original packaging or similar tightly closing packaging.

7.3 Specific end uses
No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters
This product contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Users must wear personal protective equipment e.g. Laboratory gloves, glasses and coats. Wash hands and avoid contact with skin.

Personal Protective Equipment
Eye / face protection
Use Safety glasses or goggles, which have been tested and approved under appropriate government standards, such as NIOSH (US) or EN 166 (EU).

Skin protection
Handle with gloves. The wearer should check for holes/tears before use. Proper glove removal technique should be used, to avoid potential contact with skin. Gloves must satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. Wash and dry your hands after handling the material.

Body Protection
Wear a laboratory coat or similar coverings.

Respiratory protection
Respiratory protection is not required. It is recommended where possible to handle the product under extraction when used as part of a kit.

Thermal hazards
No data available

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Opaque crystalline powder
Odour	None
Odour threshold	No data available
pH	4.5 - 6.0
Melting Point/ Freezing point	154-158°C
Initial boiling point and boiling range	No data available
Flash Point	No data available
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Relative Density	1.525g/cm3
Solubility in water and solvents	150.13g/l a 20° C
Partition coefficient	No data available
Autoignition 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
Stable when stored at recommended temperature. Store at -18°C.

10.3 Possibility of Hazardous Reactions
No data available

10.4 Conditions to Avoid
Avoid exposure to sources of moisture.

10.5 Incompatible materials
Strong oxidisers.

10.6 Hazardous decomposition products
No data available

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - > 2,200 mg/kg Remarks: (ECHA)

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

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

Reproductive toxicity
No data available

STOT-single exposure
No data available
Acute oral toxicity - Possible damages: Stomach/intestinal disorders, The substance has a laxative effect.

STOT-repeated exposure
No data available

Aspiration hazard.
No data available

Potential Health Hazards

Inhalation	Possible allergic reaction to the material.
Ingestion	Possible allergic reaction to the material.
Skin	Possible allergic reaction to the material.
Eyes	Possible allergic reaction to the material.

Signs and symptoms of exposure
Possible hypersensitivity to material.

Additional Information
Repeated dose toxicity - Rat - male and female - Oral - 104 Weeks - No observed adverse effect level - 2,214 mg/kg
(ECHA)
RTECS: Not available
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and Degradability
Biodegradability aerobic - Exposure time 15 d
Result: 62.9 % - Readily biodegradable

12.3 Bioaccumulative potential
No data available

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 ecological problems are to be expected when the product is handled and used with due care and attention.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
Any waste substances should be disposed of by a licensed professional disposal company.
Contaminated packaging
Dispose of as a used product/material.

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 datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1. Safety, health and environmental regulations/legislation specific to 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 currently 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.

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

Product Name	**2AA Dye**
Product Catalogue Name	**LT-2AA-01/02/03**
CAS-No.	**118-92-3**
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]
Serious eye damage (Category 1)

2.2 Label elements

Signal Word: Warning

Hazard Statement(s)

H318	Serious eye damage
H319	Causes serious eye irritation.

Precautionary Statement(s)

P280	Wear eye protection/ face protection.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.

2.3 Other hazard information:
None

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3. 1 Substances

Synonyms:	anthranilic acid 2-aminobenzoic acid

Formula: $C_7H_7NO_2$
Molecular weight: 137.14 g/mol

Component		Concentration
Name	2-AA Dye	< = 100%
CAS-No.	118-92-3	
EC-No.	204-287-5	

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
Rinse mouth well with water. Never give anything by mouth if the person has lost consciousness. Consult a physician.

In case of skin contact
Wash well with soap and water. Consult a physician.

If eyes are exposed
Rinse well with water/ eye wash solution for at least 15 minutes. Consult a physician. Show this safety data sheet to the physician/ first responder in attendance.

If inhaled
Move the affected person(s) into fresh air. If not breathing, give artificial respiration. Consult a physician.

If swallowed
After swallowing: immediately make the victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

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, and dry chemical or carbon dioxide extinguishers.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, nitrogen oxides (NOx).

5.3 Advice for Firefighters

Wear a self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear personal protective clothing when handling the chemical. Avoid dust formation. Avoid breathing in vapours, mist, dust or gas when clearing the chemical, work in a well-ventilated area.

6.2 Environmental Precautions
Prevent any further leaking / spillage if possible. Do not let the chemical enter the drainage system and discharge into the environment must be avoided.

6.3 Methods and material for containment and cleaning up
Gently sweep the chemical, do not create dust, and put it into a suitable container with a lid. Seal the container and arrange disposal.

6.4 Reference to other sections
See section 13 for information on the disposal of the chemical.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes and the formation of dust and aerosols. Provide appropriate exhaust ventilation when handling the chemical, if dust can be formed.

7.2 Conditions for safe storage, including any incompatibilities
Keep the container in a dry, cool and well-ventilated place.

7.3 Specific end uses
No data are available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

8.2 Exposure controls
Appropriate engineering controls
General advice is to always wear PPE when handling the chemical, following good laboratory practice. Wash hands after the removal of gloves.

Personal Protective Equipment
Eye/face protection
Safety glasses with side shields conforming to UN166. To have available equipment tested and approved under appropriate government standards such as NIOSH(US) or EN 166 (EU).

Skin protection
Handle with gloves. Following good laboratory practice the gloves should be checked for tears before use and proper glove removal techniques should be used when removing them. Dispose of used gloves as contaminated chemical waste. Wash and dry hands.
Gloves should be of the standard to satisfy the specifications of EU directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Laboratory coat or a similar covering.

Respiratory protection
If under extraction none is required.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: Solid
Odour	No data available
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	Melting point/range: 144-148°C – lit.
Initial boiling point and boiling range	No data available
Flash Point	No data available
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Relative Density	No data available
Solubility in water and solvents (mg/l)	No data available
Partition coefficient	No data available
Autoignition 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
Forms explosive mixtures with air on intense heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical. The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

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

10.3 Possibility of Hazardous Reactions
Violent reactions are possible with Strong oxidizing agents and Strong bases

10.4 Conditions to Avoid
No data available

10.5 Incompatible materials
Strong oxidising 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 – 5,410 mg/kg
Remarks: Behavioural: Somnolence (general depressed activity), excitement and ataxia.
LC50 Inhalation – rat – 4h - >5.3mg/L

Skin corrosion/irritation
Skin – rabbit – No skin irritation.

Serious eye damage/irritation
Eyes – rabbit – Moderate eye irritation.

Respiratory or skin sensitisation
No data are available.

Germ cell mutagenicity
Genotoxicity in vitro – Not mutagenic in Ames test.
Histidine reversion (Ames)

Genotoxicity in vitro – Human – lymphocyte.
Mutation in mammalian somatic cells.

Genotoxicity in vivo – mouse – Intraperitoneal.
Sister chromatid exchange.

Carcinogenicity
Carcinogenicity – rat – Oral
Tumorigenic: Equivocal Tumorigenic agent by RTECS criteria. Kidney, Ureter, Bladder: Tumors
Carcinogenicity – mouse – Subcutaneous
Tumorigenic: Equivocal Tumorigenic agent by RTECS criteria. Lungs, Thorax or respiration: Bronchiogenic carcinoma. Liver: tumors.
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP or EPA classification.
IARC: 3 – Group 3: Not classifiable as to its carcinogenicity to humans (anthranilic acid)

Reproductive toxicity
Reproductive toxicity – mouse – Oral
Effects on fertility: Female fertility index (e.g. # females pregnant per # sperm-positive females; # females pregnant per # females mated).

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 the skin. May cause skin irritation.
Eyes Cause serious eye irritation.

Signs and symptoms of exposure
To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: CB2450000

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 – Pimephales promelas (Fathead minnow) – 97 mg/l – 96h
Toxicity to daphnia and other aquatic invertebrates.	EC50 – Daphnia magna (Water flea) – 85.7 mg/l – 48h
Toxicity to algae	EC50 – Desmodesmus subspicatus (Green algae) – 31.3 mg/l – 72h

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
Harmful to aquatic life. No data available

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
Waste can be burnt in a chemical incinerator equipped with an afterburner and scrubbers when first dissolved in a solvent, if impractical, seek a licensed disposal company for the disposal of waste materials.

Contaminated packaging
Treat packaging as an unused product and dispose of it with a licensed waste disposal company.

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 to 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 currently 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.

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

Product Name	**2 Molar Trifluoroacetic acid in water**
Product Catalogue Name	**LT-2MTFA-01**
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 Corrosion (Category 1A)
Acute toxicity, Inhalation (Category 4)
Long-term (chronic) aquatic hazard (Category 3), H412

2.2 Label elements

Signal Word: Danger

Hazard Statement(s)

H314	Causes severe skin burns and eye damage.
H332	Harmful if inhaled
H412	Harmful to aquatic life with long-lasting effects.

Precautionary Statement(s)

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Other hazard information:
None.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

3. 1 Substances

Synonyms: TFA in water
Formula: TFA: $C_2HF_3O_2$
Molecular weight: TFA: 114.02 g/mol
Water: 18.02 g/mol

Component	Concentration	Classification
Name TFA	14%	Acute Tox. 4; Skin Corr. 1A; Eye Dam. 1; Aquatic Chronic 3; H332, H314, H318, H412
CAS-No. 76-05-1		
EC-No. 200-929-3		
Index-No. 607-091-00-1		

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 if the person is unconscious. Rinse mouth with water. Consult a physician

If the skin is exposed
Remove any contaminated clothing immediately. Wash the area well with plenty of soap and water. Consult a physician

If eyes are exposed
Rinse thoroughly with water or eye wash solution for at least 15 minutes. Consult a physician

If inhaled
Remove the affected person to a source of ventilation/ 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
Choose an extinguishing media appropriate to the surrounding area, extinguisher media such as water, is not suitable if electrical items/ sockets are near the fire, a CO_2 extinguisher would be more suitable.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen fluoride.

5.3 Advice for Firefighters
Wear self-contained breathing apparatus for fire fighting if deemed necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear personal protective equipment when handling the product. Avoid breathing in vapours/ gas/ mist by ensuring adequate ventilation. Remove any unrequired staff from the area.

6.2 Environmental Precautions
Contain the spill and prevent any more leakage/ spillage. Do not let the product enter the drainage system. Discharge into the environment must be avoided

6.3 Methods and material for containment and cleaning up
Soak up spillage with inert material, such as vermiculite, and collect and store it in a suitable container. Arrange disposal of the waste material and clean area. Do not let any discharge enter the drainage system.

6.4 Reference to other sections
For more information regarding waste disposal, see Section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin, eyes and inhalation of vapour or mist.

7.2 Conditions for safe storage, including any incompatibilities
Store the product in a dry cool place. Keep the container tightly sealed until required. Once opened and not all the product is used the container must be resealed and stored upright.

7.3 Specific end uses
No data available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
This product does not contain any substances that have any occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle the product following good laboratory and safety practices. Users must wear personal protective equipment, such as gloves when handling the product. Wash hands before and after handling, even with the use of gloves.

Personal Protective Equipment
Eye / face protection
Wear laboratory glasses or safety goggles. Use equipment for eye protection tested and approved under appropriate standards such as NIOSH (US) or EN 166 (EU).

Skin protection
Handle with gloves, check gloves before using for any tears/ holes. Remove used gloves using the proper glove removal technique, so that the outer side of the glove does not touch the skin, to avoid skin contact with the product. Dispose of used gloves as contaminated waste, see section 13 for information. Gloves must satisfy the specifications of the EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Wear a laboratory coat or similar covering over clothing.

Respiratory protection
Handle the material under an extraction cabinet or fume hood. If respirators are required, they should be tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Thermal hazards
No data available.

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let the product enter drains. Discharge into the environment must be avoided

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: Clear, liquid
Odour	Pungent
Odour threshold	No data available
pH	1.0 at 1 g/l at 20 °C
Freezing/Melting Point	Melting point/range: -15.4 °C - lit
Initial boiling point and boiling range	72.4 °C - lit
Flash Point	> 100 °C - closed cup - Tested according to Annex V of Directive 67/548/EEC.-
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	130.0 hPa at 20.0 °C 142.7 hPa at 25.0 °C
Relative Density	1.489 g/cm3 at 20 °C
Solubility in water and solvents	Soluble
Partition coefficient	og Pow: -2.10
Autoignition 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
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
Strong bases, metals, oxidizing agents, alcohols, epoxides, steel (all types and surface treatments), and aluminium. Reacts with Alkali metals.

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen fluoride 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
TFA: LC50 Inhalation – Rat – 4hr - 10,000mg/m3
Remarks: Sense organs and special senses (Nose, Eye, Ear and Taste): Eye: Conjunctive irritation. Behavioural: Somnolence (general depressed activity). Lungs, Thorax or respiration: Dyspnea.

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.

Carcinogenicity
IARC: No components of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogenic by IARC.

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

Inhalation	May be harmful if inhaled. Destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion	May be harmful if swallowed, causes burns.
Skin	May be harmful if absorbed through the skin. Causes skin burns.
Eyes	Causes eye burns.

Signs and symptoms of exposure
The product is harmful to tissue of the mucous membranes and upper respiratory tract, eyes and skin. Can

cause spams, inflammation and edema of the larynx and bronchi, pneumonitis and pulmonary edema. Coughing, wheezing, laryngitis, shortness of breath, headaches, nausea and vomiting.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish — LC50 - Danio rerio (zebra fish) - > 1,000 mg/l - 96 h (OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates

EC50 - Daphnia magna (Water flea) - 55.00 mg/l - 24 h

Toxicity to algae - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability Result: - Not readily biodegradable. (OECD Test Guideline 301D) Remarks: No data available

12.3 Bioaccumulative potential

No bioaccumulation is to be expected (log Pow <= 4).

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

Harmful to aquatic life with long-lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods

Contact waste professional waste disposal company that is licensed to carry such waste material for the disposal of waste products. This product cannot go into the drainage systems.

Contaminated packaging

Dispose of it as an unused product.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number

TFA: ADR/RID: 2699 IMDG: 2699 IATA: 2699

14.2 UN Proper Shipping Name

TFA: ADR/RID: TRIFLUOROACETIC ACID
IMDG: TRIFLUOROACETIC ACID
IATA: Trifluoroacetic Acid

14.3 Transport hazard class(es)

TFA: ADR/RID: 8 IMDG: 8 IATA: 8

14.4 Packing group

TFA: ADR/RID: I IMDG: I IATA: I

14.5 Environmental hazards
TFA: 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 currently 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.

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

Product Name	**Hydrochloric Acid 6M (aq)**
Product Catalogue Name	**LT-6MHCL-01**
CAS Number	**7647-01-0**
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
Corrosive to metals (Category 1), H290
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

2.2 Label elements

Signal Word: Danger Warning

Hazard Statement(s)

H290	May be corrosive to metals.
H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation.

Precautionary Statement(s)

P302 + P352	IF ON SKIN (or hair): wash with plenty of water
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Other hazard information:
None.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

3. 1 Substances

Synonyms:	None

Formula: HCl
H_2O
Molecular Weight: HCl: 36.46g/mol
Water: 18.02 g/mol

Component		Classification	Concentration
Name	Water	-	75-80%
CAS-No.	7732-18-5		
EC-No.	231-791-2		
2nd Name	Hydrochloric Acid	Met. Corr. 1; Skin Corr. 1B; Eye Irrit. 2; STOT SE 3; H290, H314, 315, H319, H335 Concentration limits: Eye Irrit. 2; H319: 10 % ≤ C < 25 % STOT SE 3; H335: C ≥ 10 % Skin Corr. 1B; H314: C ≥ 25 % Skin Irrit. 2; H315: 10 % ≤ C < 25 %	20-25%
CAS-No.	7647-01-0		
EC-No.	231-595-7		
Index-No.	017-002-01-X		

For the full text of the H-statements mentioned in this section, Section 2.

SECTION 4. FIRST-AID MEASURES

4.1 Description of First Aid Measures

General Advice
Consult a physician. Show this safety data sheet to the physician/ first responder in attendance.

If Ingested
Do NOT induce vomiting. Do not give anything by mouth if the person is unconscious. Rinse mouth well with water.

If the skin is exposed
Remove contaminated clothing and shoes immediately. Wash the area well with plenty of soap and water. Consult a physician.

If eyes are exposed
Rinse thoroughly with water or eye wash, for at least 15 minutes. Remove contact lenses if present and continue rinsing. Consult a physician.

If inhaled
Remove the person to a source of fresh air/ ventilation. If not breathing, give artificial respiration.

4.2 Most important symptoms and effects, both acute and delayed
Burning sensation, coughing and difficulty breathing. This product is destructive to tissue of the mucous membranes and upper respiratory tract, eyes and skin.

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Select an extinguisher whose media is compatible with the surroundings of the fire, such as water spray, dry chemical and carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Hydrogen Chloride gas

5.3 Advice for Firefighters
If necessary, firefighters are to wear self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear personal protective equipment. Avoid breathing in vapours, mist or gas by ensuring adequate ventilation. Move any unrequired staff away from the spill area.

6.2 Environmental Precautions
Prevent any further leakage if practical and safe to do so. Do not let the product enter the drainage system.

6.3 Methods and material for containment and cleaning up
Soak up the spillage by using an inert absorbent material, such as vermiculite. Collect the waste material and store it in a suitable container with a lid and arrange for collection and disposal.

6.4 Reference to other sections
For information on disposal see Section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin, eyes and inhalation of vapour or mist.

7.2 Conditions for safe storage, including any incompatibilities
Store in a cool, dry, well-ventilated place. Containers that have been opened must be resealed and kept upright.

7.3 Specific end uses
No data available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Hydrochloric Acid	7647-01-0	TWA	5 ppm 8 mg/m3	Europe. Commission Directive 2009/39/EC establishing a first list of inductive occupational limit values.
	Remarks	Indicative		
		STEL	10 ppm 15 mg/m3	Europe. Commission Directive 2009/39/EC establishing a first list of inductive occupational limit values.
		Indicative		

		TWA	1 ppm 2 mg/m3	UK. EH40 WEL-Workplace Exposure Limits
		Indicative		
		STEL	5 ppm 8 mg/m3	UK. EH40 WEL-Workplace Exposure Limits

8.2 Exposure controls

Appropriate engineering controls
Handle the product following good laboratory and safety practices. Wash hands before and after handling the product, even with wearing gloves.

Personal Protective Equipment
Eye / face protection
Wear fitted safety goggles/ glasses when handling the product. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection
Wear gloves when handling the product. Gloves must be inspected before use for tears/ holes and proper glove removal technique to be employed, to avoid skin contact with the product. Dispose of used gloves as contaminated waste (See section 13), wash and dry hands. Gloves must satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Wear a laboratory coat or similar covering over clothing when handling the product.

Respiratory protection
Handle the product whilst using a fume cupboard/extraction hood.

Thermal hazards
No data available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: Liquid Colour: Clear
Odour	No data available
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	-30°C
Initial boiling point and boiling range	> 100°C – lit.
Flash Point	No data available
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available No data available
Vapour Density	No data available
Relative Density	No data available
Solubility in water	Soluble
Partition coefficient	No data available

Autoignition 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
No data available

10.5 Incompatible materials
Bases, Amines, Alkali metals, Metals, permanganates, e.g. potassium permanganate, Fluorine, metal acetylides, hexalithium disilicide.

10.6 Hazardous decomposition products
Other decomposition products - No data available

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

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP or EPA classification.
IARC: 3 – Group 3: Not classifiable as to its carcinogenicity to humans.

Reproductive toxicity
No data available

STOT-single exposure
Inhalation – May cause respiratory irritation.

STOT-repeated exposure
No data available

Aspiration hazard.
No data available

Potential Health Hazards

Inhalation	Harmful if inhaled. Material is destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion	Harmful if swallowed. Causes burns.
Skin	Harmful if absorbed through the skin. Causes skin burns.
Eyes	Causes burns to the eyes**.**

Signs and symptoms of exposure
Burning sensation, coughing, breathing problems, inflammation of larynx and bronchi. The product is destructive to the tissue of the mucous membranes and upper respiratory tract, eyes and skin.

Additional Information
RTECS: MW4025000

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

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
Contact a licensed professional disposal company of waste chemical materials, to arrange collection and disposal of waste products.

Contaminated packaging
Dispose of it as an unused product.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
ADR/RID: 1789 IMDG: 1789 IATA: 1789

14.2 UN Proper Shipping Name
ADR/RID: HYDROCHLORIC ACID
IMDG: HYDROCHLORIC ACID
IATA: Hydrochloric Acid

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

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

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 to 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 currently 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.

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

Product Name	**Sodium cyanoborohydride**
Product Catalogue Name	**LT-CYANOB-01/02/03/05/96**
CAS-No.	**25895-60-7**
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 the Regulation (EC) No. 1272/2008 [EU-GHS/CLP]
Flammable solids (Category 1), H228
Substances, which in contact with water emit flammable gases (category 1), H260
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Inhalation (Category 2), H330
Acute toxicity, Dermal (Category 2), H310
Skin corrosion (Sub-category 1B), H314
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

2.2 Label elements

Signal Word: Danger

Hazard Statement(s)
H228 Flammable solid.
H260 In contact with water releases flammable gases which may ignite spontaneously.
H300 + H310 + H330 Fatal if swallowed, in contact with skin or if inhaled.
H314 Causes severe skin burns and eye damage.
H330 Fatal if inhaled.
H410 Very toxic to aquatic life with long-lasting effects.

Precautionary Statement(s)
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P223 Keep away from any possible contact with water, because of violent reactions and possible flash fire.
P260 Do not breathe dust or mist
P264 Wash hands thoroughly after handling.

P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284 Wear respiratory protection.
P301 + P310 + P330 + P310 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/ doctor.
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/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.

2.3 Other hazard information
(EU)
EUH032 Contact with acids liberates very toxic gas.

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. Stench.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3. 1 Substances
Synonyms: Sodium Cyanotrihydridoborate
Formula: CH_3BNNa
Molecular weight 62.84 g/mol

Component	Concentration	Classification
Sodium Cyanotrihydroborate	100%	Flam. Sol. 1; Acute Tox. 2; Skin Corr. 1B; Aquatic Acute 1; Aquatic Chronic 1; H228, H300, H330, H310, H314, H400, H410 M-Factor - Aquatic Acute: 10
CAS-No. 25895-60-7	-	
EC-No. 247-317-2		

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 doctor/ first responder in attendance.

If Ingested
Do NOT induce vomiting. Rinse mouth well with water unless the person(s) is unconscious.

If the skin is exposed
Remove contaminated clothing/shoes immediately. Wash the affected area(s) with water and soap.

If eyes are exposed
Wash eye(s) with plenty of water for at least 15 minutes, if unsure seek medical advice.

If inhaled
Move into a source of fresh air, if not breathing give artificial respiration.

4.2 Most important symptoms and effects, both acute and delayed
Burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting.
To our knowledge, the chemical, physical and toxicological properties have not been thoroughly

investigated. Absorption into the body leads to the formation of methaemoglobin which in sufficient concentration causes cyanosis.
Onset may be delayed two to four hours or longer.

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides, Hydrogen cyanide (Hydrocyanic acid), Borane/boron oxides.

5.3 Advice for Firefighters
Wear a 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; gently sweep up to avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation and remove all sources of ignition. Evacuate personnel to a safe area; avoid breathing in dust/gas or mist.
For personal protection see section 8.

6.2 Environmental Precautions
Prevent further leakage or spillage if safe to do so. Do not let the chemical enter the drainage system and further discharge into the environment must be avoided.

6.3 Methods and material for containment and cleaning up
Contain the spill with matting if necessary and then collect using either an electrically protected vacuum cleaner or by damp brushing (not wet) and putting the collected waste into a secure dry container, do not flush with water. Dispose according to local regulations.

6.4 Reference to other sections
For disposal regulations see section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes and avoid the formation of dust when handling. Provide appropriate exhaust ventilation in work areas where dust could be formed. Keep away from sources of ignition (No Smoking) and 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 the container tightly closed in a dry and well-ventilated place.
Never allow the product to get into contact with water during storage as it is moisture sensitive. Do not store near acids. Handle and open the container with care. Hygroscopic. Handle when open under an inert gas.

7.3 Specific end uses
No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Contains no substances with occupational exposure limit values.

Component	CAS No.	Value Form of exposure	Control parameters	Basis
Sodium Cyanoborohydride	25895-60-7	TWA	5 mg/m3	UK. EH40 WEL - Workplace Exposure Limits
	Remarks	Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity. Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used		

8.2 Exposure controls

Appropriate engineering controls

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

Personal protective equipment

Eye/Face protection

Face shields and safety glasses must be worn following good laboratory practice. Eye protection should be tested and approved under appropriate government standards such as EN 166 (EU) or NIOSH (US).

Skin protection

Handle with gloves always following good laboratory practice. Gloves must be inspected before use and be removed in the proper glove removal technique (without touching the gloves' outer surface) to avoid skin contact. Dispose of contaminated gloves after use as contaminated waste, following local regulations. Wash and dry hands.
Gloves to be within the specifications of EU directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)
Data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

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 approval for any specific use scenario.

Body protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. 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 particle respirator type N100 (US) or type P3 (EN 143) 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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let the product enter drains. Discharge into the environment must be avoided.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: Powder Colour: Beige
Odour	No data available
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	Melting point/range :> 242°C
Initial boiling point and boiling range	No data available
Flash Point	No data available
Evaporation rate	No data available
Flammability (solids and gases)	The substance or mixture is a flammable solid with the subcategory 1.
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Relative Density	No data available
Solubility in water and solvents	No data available
Partition coefficient	No data available
Autoignition 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
None 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
Reacts violently with water.

10.4 Conditions to Avoid
Do not allow water to enter the container because of a violent reaction.
Heat, flames and sparks. Extremes of temperature and direct sunlight. Exposure to sunlight.

10.5 Incompatible materials
Do not store near acids or oxidising agents.

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx), Hydrogen cyanide (hydrocyanic acid), Borane/boron oxides
Reacts with water to form: - Hydrogen gas
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Borane/boron oxides, Sodium oxides

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

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

Reproductive toxicity
No data available

STOT (specific target organ toxicity) -single exposure
No data available

STOT (specific target organ toxicity) -repeated exposure
No data available

Aspiration hazard.
No data available

Potential health effects

Inhalation	May be fatal if inhaled. Material is extremely destructive to the tissue of the mucus membranes and upper respiratory tract.
Ingestion	May be fatal if swallowed. Causes burns.

Signs and symptoms of Exposure
Burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting. To our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated. Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed two to four hours or longer.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

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
Very toxic to aquatic life with long-lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
Product or/and collect waste from spillage.
Burn in a chemical incinerator equipped with an afterburner and scrubber but take extra precautions when igniting as this material is highly flammable. Or to contact a licensed disposal company and arrange disposal, inform the company of the nature of the waste.

Contaminated packaging
Dispose of as the unused product, with a licensed disposal company.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
ADR/RID: 3179 IMDG: 3179 IATA: 3179

14.2 UN Proper Shipping Name
ADR/RID: FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S. (Sodium cyanotrihydroborate)
IMDG: FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S. (Sodium cyanotrihydroborate)
IATA: Flammable solid, toxic, inorganic, n.o.s. (Sodium cyanotrihydroborate)

14.3 Transport hazard class (es)
ADR/RID: 4.1 (6.1) IMDG: 4.1 (6.1) IATA: 4.1 (6.1)

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

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 to the substance or mixture
No data available

15.2 Chemical Safety Assessment
No data available

SECTION 16. OTHER INFORMATION

The advice offered is derived from the currently 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.

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

Product Name **Sodium Acetate Solution (aq)**

Product Catalogue Name **LT-NAOAC-01**

CAS Number **127-09-3**

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
Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements

The product does not need to be labelled following 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: Sodium Acetate: Acetic acid sodium salt
Formula: Sodium Acetate: $C_2H_3NaO_2$
Water: H_2O
Molecular Weight: 82.03g/mol

Component		Concentration
Name	Water	99%
CAS-No.	7732-18-5	

EC-No.	231-791-2	
2nd Name	Sodium Acetate	1%
CAS-No.	127-09-3	
EC-No.	204-823-8	

SECTION 4. FIRST-AID MEASURES

4.1 Description of First Aid Measures

General Advice
Consult a physician. Show this safety data sheet to the physician/ first responder in attendance.

If Ingested
Rise mouth well with water. DO NOT give anything by mouth if the person is unconscious. Consult a physician.

If the skin is exposed
Wash the area well with soap and water. Consult a physician.

If eyes are exposed
Rinse well with water/ eye wash for at least 15 minutes, remove contact lenses if present and continue rinsing. Consult a physician.

If inhaled
Move the affected person to a source of fresh air/ventilation. If not breathing give artificial respiration.

4.2 Most important symptoms and effects, both acute and delayed
Abdominal pain, Nausea, Vomiting.

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Use a media fire extinguisher that is suitable for the surroundings of the fire. Water spray, alcohol-resistant foam, dry chemicals, or carbon dioxide are all compatible with the product for use as a fire extinguisher.

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

5.3 Advice for Firefighters
If necessary, firefighters are to wear self-breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Users must wear PPE (Personal protective clothing). Avoid contact with eyes and skin. Ensure adequate ventilation.

6.2 Environmental Precautions
Do not let the product enter the drainage system.

6.3 Methods and material for containment and cleaning up
Contain the spillage by using spill mats or an inert substance such as vermiculite. Collect the waste material and store it in a suitable container with a lid. Arrange for the waste material to be collected and disposed of.

6.4 Reference to other sections
For more information on disposal see Section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Wear PPE (Personal protective clothing) when handling the product.

7.2 Conditions for safe storage, including any incompatibilities
Keep refrigerated, between 2-8°C. Keep the container upright and tightly sealed once opened.

7.3 Specific end uses
No data available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
This product contains no substances with any occupational exposure limits.

8.2 Exposure controls

Appropriate engineering controls
Wear PPE, and wash hands before and after handling the product, even with gloves, avoid contact with skin. Handle the product following good laboratory and safety practices.

Personal Protective Equipment

Eye / face protection
Use safety glasses with side shields conforming to EN 166. Equipment for eye protection should be tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection
Wear gloves when handling the product. Gloves should be inspected before use for tares and holes and proper glove removal technique should be used, to avoid the outer surface of the glove touching the skin. Dispose of gloves as contaminated solid waste, see section 13. Wash and dry hands.
Gloves should satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Wear a laboratory coat or similar covering over outside clothing.

Respiratory protection
No data available.

Thermal hazards
No data available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: Liquid Colour: Colourless
Odour	No data available
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	0.0°C
Initial boiling point and boiling range	100°C
Flash Point	Not applicable
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Vapour Density	No data available
Relative Density	1.528 g/cm^3
Solubility in water	Completely miscible
Partition coefficient	No data available
Autoignition 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
Exposure to heat.

10.5 Incompatible materials
Strong oxidizing materials.

10.6 Hazardous decomposition products
Other decomposition products – No data available.

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

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

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

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through the skin. May cause skin irritation.
Eyes	Causes eye irritation.

Signs and symptoms of exposure
Abdominal pain, nausea, vomiting.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

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
Contact a licensed and professional waste disposal company, to arrange collection and disposal of solid and liquid waste. The product can be dissolved or mixed with a combustible solvent and burned in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Disposed of as an 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 to 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 currently 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.

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

Product Name **Sodium Acetate / Boric Acid / Methanol Solution**

Product Catalogue Name **LT-NBM-01**

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
According to Regulation (EC) No 1272/2008 [EU-GHS/CLP]

Boric Acid -	see section 3
Methanol -	Flammable liquids (Category 2)
	Acute toxicity, Inhalation (Category 3)
	Acute toxicity, Dermal (Category 3)
	Acute toxicity, Oral (Category 3)
	Specific target organ toxicity – single exposure (Category 1)
Sodium Acetate –	Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements



Signal Word: Danger

Hazard Statement(s)

Boric acid:		see section 3
	H360FD	May damage fertility. May damage the unborn child.
Methanol –	H225	Highly flammable liquid and vapour.
	H301	Toxic if swallowed.
	H311	Toxic in contact with skin.
	H331	Toxic if inhaled.
	H370	Causes damage to organs.

Precautionary Statement(s)

Boric Acid –	P308+P313	IF exposed or concerned: Get medical advice/attention.
Methanol –	P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
	P280	Wear protective gloves/ protective clothing.
	P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

mouth.
P302 + P352 + P312 IF ON SKIN: Wash with plenty of water. Call a POISON CENTER/ doctor if you feel unwell.
P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep

2.3 Other hazard information:
None.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3. 1 Substances

Synonyms: Sodium Acetate: Acetic acid sodium salt
Methanol: Methyl alcohol

Formula: Sodium Acetate: $C_2H_3NaO_2$
Boric Acid: H_3BO_3
Methanol: CH_4O

Molecular Weight: Sodium Acetate: 82.03 g/mol
Boric Acid: 61.83 g/mol
Methanol: 32.04 g/mol

Component		Concentration	Classification
Name	Sodium Acetate	4%	Not a hazardous substance according to Regulation (EC) No. 1272/2008
CAS-No.	127-09-3		
EC-No.	204-823-8		
2nd Name	Boric Acid	2%	Reproduction 1B; H360FD: when C ≥ 0.3% Hazard Statement: H360FD May damage fertility. May damage the unborn child when C≥0.3%
CAS-No.	10043-35-3		
EC-No.	233-139-2		
Index-No.	005-007-00-2		
Boric acid is Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
3rd Name	Methanol	94%	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301, H331, H311, H370 Concentration limits: >= 10 %: STOT SE 1, H370; 3 - < 10 %: STOT SE 2, H371;
CAS-No.	67-56-1		
EC-No.	200-659-6		
Index-No.	603-001-00X		

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 out well with water, never give anything by mouth if the person is unconscious.

If the skin is exposed
Wash the area well with plenty of soap and water.

If eyes are exposed
Rinse thoroughly for 15 minutes with water or eye wash solution. If present and able to, remove contact lenses and continue rinsing.

If inhaled
Move the affected person to a source of fresh air, if not breathing give artificial respiration.

4.2 Most important symptoms and effects, both acute and delayed
Abdominal pain, Nausea, Vomiting, dizziness, weakness, confusion, drowsiness, and unconsciousness.

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Select an extinguishing media appropriate to the surrounding area; compatible media for this product are water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon dioxides, Borane/boron oxides, and Sodium oxides.

5.3 Advice for Firefighters
Wear self-contained breathing equipment if necessary. Use water spray to cool unopened containers.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear PPE (Personal Protective Equipment). Avoid breathing in vapours, mist or gas by having adequate ventilation, and removing any unnecessary staff from the area. Remove any sources of ignition.

6.2 Environmental Precautions
If safe to do so, prevent further leakage/ spillage and DO NOT let the product enter the drainage system.

6.3 Methods and material for containment and cleaning up
Use a spillage mat, vermiculite or similar inert material to contain and soak up the spillage. Collect the contaminated material and store it in a suitable container for transportation and disposal.

6.4 Reference to other sections
See Section 13 for more information on disposal.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin, eyes and inhalation of vapour/ mist. Keep away from any sources of ignition and make sure that there is no build-up of electrostatic charge.

7.2 Conditions for safe storage, including any incompatibilities
Store at 2-8°C, in a well-ventilated, spark-free environment. Keep the container tightly sealed once opened and upright to prevent any spills.

7.3 Specific end uses
No data available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Methanol	67-56-1	STEL	250 ppm 333 mg/m3	UK. EH40 WEL-Workplace Exposure Limits.
	Remarks	Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.		
		TWA	200 ppm 266 mg/m3	UK. EH40 WEL-Workplace Exposure Limits.
		Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.		
		TWA	200 ppm 260 mg/m3	Europe. Indicative occupational exposure limits values.
		Identifies the possibility of significant uptake through the skin. Indicative.		

The other components in the mixture have no occupational exposure limit values.

1.2 Exposure controls

Appropriate engineering controls
Wear PPE (Personal Protective Equipment), and wash hands before and after handling the product, avoid contact with skin and eyes.

Personal Protective Equipment
Eye / face protection
Wear Safety goggles/glasses with side shields. These must conform to government standards such as NIOSH (US) or EN166 (EU).

Skin protection
Handle the product wearing gloves. These must be checked before use for tears/ holes. For removal of used gloves, the proper glove removal technique must be employed, to avoid contact with the outside of the glove with skin. Dispose of gloves as solid contaminated waste, and wash and dry hands before and after handling the product.
The gloves used must satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Handle the product wearing a laboratory coat or a similar covering over the outside of their clothing.

Respiratory protection
Handle the product under a fume hood or extractor unit. If respiratory protection is required use equipment that is approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Thermal hazards
No data available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: Liquid Colour: Colourless
Odour	Pungent
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	-98°C
Initial boiling point and boiling range	64.7°C
Flash Point	9.7°C – closed Cup
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	Upper explosion limit: 36% (V) Lower explosion limit: 6% (V)
Vapour Pressure	130.3 hPa at 20.0°C 546.6 hPa at 50.0°C
Vapour Density	No data available
Relative Density	0.791 g/mL at 25°C
Solubility in water and solvents	Completely miscible
Partition coefficient	log Pow:-0.77
Auto ignition temperature	455.0°C at 1,013 hPa
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. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Strong Oxidizing agents, Acid chlorides, Acid anhydrides, Alkali metals, Reducing agents, Acids, Potassium.

10.6 Hazardous decomposition products
Other decomposition products – No data available.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Methanol:	LD50 Oral – Rat -5,628 mg/kg
	LD50 – Inhalation – Rat – 4h – 64000ppm
	LD50 Inhalation – Rat – 4h – 87.6mg/l
	LD50 Dermal – Rabbit – 15,800mg/kg
Boric Acid:	LD50 Oral – Rat – 2,660mg/kg
Sodium Acetate:	LD50 Oral – Rat – 3,530 mg/kg

Skin corrosion/irritation

Methanol:	Skin – Rabbit – Irritating to the skin – 24h
Sodium Acetate:	Skin – Rabbit – Mild skin irritation – 24h

Serious eye damage/irritation

Methanol:	Skin – Rabbit – Irritating to the eye – 24h
Sodium Acetate:	Eyes – Rabbit – Mild eye irritation

Respiratory or skin sensitisation

Methanol:	Guinea Pig – OECD Test guideline 406 – Does not cause skin sensitization.

Germ cell mutagenicity

Methanol:	Genotoxicity in vitro – Non-mammalian – Other cell types – negative
	Genotoxicity in vivo – Mouse – male and female – Intraperitoneal – negative

Carcinogenicity

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

Reproductive toxicity

Boric Acid:	Fetotoxicity, Presumed human reproductive toxicant

STOT-single exposure

Methanol:	Causes damage to organs.

STOT-repeated exposure

No data available.

Aspiration hazard.

No data available

Potential Health Hazards

Inhalation	Toxic if inhaled. Causes respiratory tract irritation.
Ingestion	Toxic if swallowed.
Skin	Toxic if absorbed through the skin. Causes skin irritation.
Eyes	Causes serious eye irritation.

Signs and symptoms of exposure

Abdominal pain, Nausea, Vomiting, dizziness, weakness, confusion, drowsiness and unconsciousness.

Additional Information

Methanol:	Repeated dose toxicity – Monkey – Gavage – 72h – Lowest observed adverse effect level – 2,340mg/kg

RTECS: PC1400000
Boric Acid: RTECS: ED4550000
Sodium Acetate: RTECS: AJ4300010

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Methanol

Toxicity to fish:	LD50 – Oncrohynchus mykiss (Rainbow trout) – 19,000.00mg/l – 96h mortality LD50 – Lepomis macrochirus (Bluegill) – 15,400mg/l – 96h
Toxicity to daphnia and other aquatic invertebrates	EC50 – Daphnia magna (Water flea) – 24,500.00mg/l – 48h EC100 – Daphnia magna (Water flea) – 10,000.00mg/l – 24h
Toxicity to algae	Growth inhibition EC50 – Scenedesmus capricornutum (Freshwater algae) – 22,000mg/l – 96h

Boric Acid

Toxicity to fish:	LD50 – Ptychocheilus Lucius – 279mg/l – 96h LC0 – Lepomis macrochirus (Bluegill) - >1,021mg/l – 96h
Toxicity to daphnia and other aquatic invertebrates	LC50 – Daphnia magna (Water flea) – 53.2mg/l -21d EC50 – Daphnia magna (Water flea) – 133mg/l – 48h

Sodium Acetate

Toxicity to fish:	LC50 – Pimephales promelas (Fathead minnow) – 13,330mg/l – 120h LC50 – Lepomis macrochirus (Bluegill) – 5,000mg/l – 24h
Toxicity to daphnia and other aquatic invertebrates	EC50 – Daphnia magna (Water flea) - >1,000mg/l – 48h

12.2 Persistence and Degradability

Methanol
Biodegradability: aerobic – Exposure time 5d – Result: 72% - rapidly biodegradable
Sodium Acetate
Biodegradability: Result: 99% - Readily biodegradable.

12.3 Bioaccumulative potential

Methanol
Bioaccumulation: Cyprinus carpio (Carp) – 72d at 20°C – 5mg/l
Bioconcentration factor (BCF): 1.0

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

Contact a professional, licensed chemical waste disposal company. Waste products can be burnt in a chemical incinerator fitted with an afterburner and scrubber. Be aware that this product is flammable.

Contaminated packaging

Dispose of chemical-contaminated solid waste.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number

ADR/RID: 1230	IMDG: 1230	IATA: 1230

14.2 UN Proper Shipping Name

ADR/RID: METHANOL	IMDG: METHANOL	IATA: Methanol

14.3 Transport hazard class(es)

ADR/RID: 3 (6.1)	IMDG: 3 (6.1)	IATA: 3 (6.1)

14.4 Packing group

ADR/RID: II	IMDG: II	IATA: II

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 to 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 currently 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.