Ludger

SAFETY DATA SHEET

LudgerLiberate Hydrazinolysis Kit - LL-HYDRAZ-A2

Version: 1.1
Date Written: 22nd March 2012
Date reviewed: 3rd March 2017

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

Product Name	**LudgerClean cartridges with 1M HCl**
Product Catalogue Name	**LC-CEX-A6, LC-CEX-H-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 1B)
Specific target organ toxicity – single exposure (Category 3)

2.2 Label elements

Signal Word: Danger

Hazard Statement(s)

H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.

Precautionary Statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305+P315+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTRE or doctor/ physician.

2.3 Other hazard information:
None.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms:	Hydrochloric acid:	HCl
	Resin:	AG Cation exchange resin, hydrogen form

Formula: Hydrochloric acid: HCl
Molecular Weight: HCl: 36.46g/mol

Component		Classification	Concentration
Name	CEX Resin	-	> 97 %
CAS-No.	none		
EC-No.	none		
2nd Name	Hydrochloric Acid	Skin Corr. 1B; STOT SE3; H314,	1 – 3 %
CAS-No.	7647-01-0	H335	
EC-No.	231-595-7		
Index-No.	017-002-01-X		

For the full text of the H-statements mentioned in this section, Sections 2 and 16.

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. 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.

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

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 can be 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. Compatible fire extinguisher media are Carbon dioxide, alcohol-resistant foam, and water spray.

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. Wear PPE.

7.2 Conditions for safe storage, including any incompatibilities
Store in a cool, dry, well-ventilated place at 2 – 8 °C. Cartridges must be stored horizontally.

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- Work-place Exposure Limits
		Indicative		
		STEL	5 ppm 8 mg/m3	UK. EH40 WEL- Work-place 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: Solid and Liquid Colour: Pale orange
Odour	Pungent
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	-30°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
Vapour Density	No data available
Relative Density	No data available
Solubility in water	Fully miscible.

Partition coefficient	No data available
Autoignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	None
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 in recommended conditions.

10.3 Possibility of Hazardous Reactions
No data available

10.4 Conditions to Avoid
Excessive humidity and heat. Store at the correct temperature, 2 – 8 °C.

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
Hydrochloric acid: LD50 Oral – Rabbit – 900mg/kg

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 the 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
Hydrochloric acid: Toxicity to Fish
LC50 – Gambusia affinis (mosquito Fish) – 282 mg/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
Contact a licensed professional disposal company of waste chemical (solid and liquid) materials, to arrange collection and disposal of waste products.

Contaminated packaging
Dispose of it as an unused product.

SECTION 14. TRANSPORT INFORMATION

This information is for HCl as the CEX resin has no classification.

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.

Hazard Statement(s)

H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.

Precautionary Statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305+P315+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTRE or doctor/ physician.

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

Product Name **LudgerClean EB20 cartridges**

Product Catalogue Name **LC-EB20-01**

CAS-No. **7440-44-0**

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
Classification according to Regulation (EU) No. 1272/2008 [EU-GHS/CLP]
This product has been classed as a non-hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements
The product does not require any labelling following EC directives or respective national laws.

Signal Word: None.

Hazard Statement(s)
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: Carbon, Charcoal activated
Formula: C
Molecular weight: 12.01 g/mol

Component		**Concentration**
Name	Carbon	-
CAS-No.	7440-44-0	

EC-No.	231-153-3	

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 person is conscious. Do not give anything by mouth if unconscious.

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

If eyes are exposed
Rinse eyes with water/ eye wash solution for at least 5 minutes as a precaution. If safe and easy to do so remove contact lenses and continue rinsing.

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

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 fully investigated.

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

SECTION 5. FIRE-FIGHTING MEASURES

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

5.2 Special hazards arising from the substance or mixture
Carbon oxides Combustible.

5.3 Advice for Firefighters
Wear self-contained breathing equipment, if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid the formation of dust and breathe it in. Wear PPE.

6.2 Environmental Precautions
None required.

6.3 Methods and material for containment and cleaning up
Use a damp cloth to sweep up the spilt product. Put the contaminated material and waste product into a suitable container with a lid and arrange 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
Handle the product wearing PPE, when used as part of clean-up use under extraction, due to the nature of the chemicals used in the process, not the product itself.

7.2 Conditions for safe storage, including any incompatibilities
Store in a dry, well-ventilated area. Keep sealed in the container until required preventing contamination.

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
Handle the product wearing Personal protective equipment, wash and dry hands before and after handling the product. General good laboratory and safety practice.

Personal Protective Equipment
Eye/face protection
Wear eye protective equipment tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection
Handle the product wearing gloves. Gloves are to satisfy the specifications of EU Directive 2016/425 and the standard EN 374 derived from it. Gloves must be checked for tears/holes before use and to be removed using the proper glove removal technique so that the outer side of the gloves does not touch any skin. Gloves are to be disposed of as contaminated solid waste. See Section 13 for information on waste disposal.

Body Protection
Wear a laboratory coat or similar covering over the operator's outside clothing.

Respiratory protection
Respiratory protection is not required with this product (on its own), when used for cleaning up the chemicals used require that the product is handled under extraction.

Thermal hazards
None.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: fine powder Colour: black

Odour	Odourless
Odour threshold	None
pH	6.0 – 9 at 40g/l at 25°C
Freezing/Melting Point	Melting point/range: 3,550°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	<0.01 hPa at 20°C
Vapour Density	No data available
Relative Density	0.250 – 0.600 g/cm3
Solubility in water	Insoluble
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

Bulk Density	250 – 550 kg/m3 at 20°C

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available.

10.2 Chemical stability
The product is stable at the correct storage conditions.

10.3 Possibility of Hazardous Reactions
No data available.

10.4 Conditions to Avoid
High moisture and extreme temperatures.

10.5 Incompatible materials
Strong oxidizing agents.

10.6 Hazardous decomposition products
Other decomposition products.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Intravenous – Mouse – 440 mg/kg

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 presents 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 irritate the respiratory tract.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through the skin. May irritate the skin.
Eyes	May causes 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: FF5250100

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
Dispose of by using a licensed professional chemical liquid and solid waste disposal company. To be incinerated.

Contaminated packaging
Dispose of packaging as solid contaminated waste.

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: - IMDG: - IATA: -

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	**LudgerClean EB20 Wash A solution, Aqueous Solution of 0.1% TFA and 5% Acetonitrile.**
Product Catalogue Name	**LC-EB20-WASHA-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]
Trifluoroacetic acid 0.1%
Not a hazardous substance or mixture according to Regulation (EC) No 1272/2008.

Acetonitrile
Flammable liquids (Category 2)
Acute toxicity, Inhalation (Category 4)
Acute toxicity, Dermal (Category 4)
Acute toxicity, Oral (Category 4)
Eye Irritation (Category 2)

2.2 Label elements

Signal Word: Warning

Hazard Statement(s)

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H319	Causes serious eye irritation.
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.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse

	skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.

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:	Trifluoroacetic acid: TFA Acetonitrile: Methyl cyanide, CAN
Formula:	Trifluoroacetic acid: $C_2HF_3O_2$ Acetonitrile: C_2H_3N Water: H_2OH_2O
Molecular Weight:	Trifluoroacetic acid: 114.02 g/mol Acetonitrile: 41.05 g/mol Water: 18.02 g/mol

Component	Concentration
Name Trifluoroacetic Acid	0.1%
CAS-No. 76-05-01	
EC-No. 200-929-3	
Index-No. 607-091-00-1	
2nd Name Acetonitrile	5%
CAS-No. 75-05-08	
EC-No. 200-835-2	
Index-No. 608-001-00-3	
Name Water	94.9%
CAS-No. 7732-18-5	
EC-No. 231-791-2	

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 physician/ first responder in attendance.

If Ingested
DO NOT induce vomiting. Immediately make the victim drink water (two glasses at most). Consult a physician. 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, unconsciousness, shortness of breath, coughing and wheezing.

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, nitrogen oxides (NOx), hydrogen cyanide (hydrocyanic acid), hydrogen fluoride. Combustible. Pay attention to flashback. Vapours are heavier than air and may spread along floors. Development of hazardous combustion gases or vapours is possible in the event of a fire. Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for fire-fighters
Wear self-contained breathing equipment if necessary. Use water spray to cool unopened containers. The product itself does not burn.

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.

7.2 Conditions for safe storage, including any incompatibilities
Store in a well-ventilated, cool and dry environment, away from direct sunlight. 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 of the mixture with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Acetonitrile	75-05-8	TWA	40 ppm 70 mg/m3	Europe. Indicative occupational exposure limits values.
	Remarks	Identifies the possibility of significant uptake through the skin. Indicative.		
		STEL	60 ppm 102 mg/m3	UK. EH40 WEL- Workplace Exposure Limits.
		Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.		
		TWA	40 ppm 68 mg/m3	UK. EH40 WEL- Workplace Exposure Limits.

8.2 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, wash, and dry hands before and after handling the product.
The gloves used must satisfy the specifications of EU Directive 2016/425 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	None
Odour threshold	No data available
pH	5.0 to 7.0 at 25°C
Freezing/Melting Point	0.0 °C
Initial boiling point and boiling range	100°C
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	1.000 g/mL at 3.98°C
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
None

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

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

10.3 Possibility of Hazardous Reactions
No data available

10.4 Conditions to Avoid
Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Strong bases and acids, Alkali metals, Reducing and oxidizing agents.

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

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Acetonitrile:

LD50 Oral - Mouse - male and female - 617 mg/kg (OECD Test Guideline 401)
LC50 Inhalation - Mouse - male and female - 4 h - 6.022 mg/l (OECD Test Guideline 403)
Acute toxicity estimate Dermal - 1,500 mg/kg (Expert judgment)

Skin corrosion/irritation
Acetonitrile:
Skin - Rabbit Result: No skin irritation - 4 h (OECD Test Guideline 404)

Serious eye damage/irritation
Acetonitrile:
Eyes - Rabbit Result: Causes serious eye irritation. (OECD Test Guideline 405)
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitisation
Acetonitrile:
Buehler Test - Guinea pig Result: negative (OECD Test Guideline 406)

Germ cell mutagenicity
Ames test
S. typhimurium Result: negative
Remarks: (ECHA)
In vitro mammalian cell gene mutation test
Chinese hamster ovary cells
Result: negative
Mutagenicity (mammal cell test): chromosome aberration.
Chinese hamster ovary cells
Result: Positive results were obtained in some in vitro tests.
Remarks: (National Toxicology Program)
sister chromatid exchange assay
Chinese hamster ovary cells
Result: negative
Remarks: Sister chromatid exchange
Saccharomyces cerevisiae
Result: positive
Remarks: Cytogenetic analysis (ECHA)
In vitro mammalian cell gene mutation test
Mouse lymphoma test Result: negative
OECD Test Guideline 474
Mouse - male and female
Result: negative

Carcinogenicity

No evidence of carcinogenicity in animal studies.

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
Acetonitrile: Animal testing did not show any effects on fertility.

STOT-single exposure
The substance or mixture is not classified as a specific target organ toxicant, single exposure.

STOT-repeated exposure
The substance or mixture is not classified as a specific target organ toxicant, repeated exposure.

Aspiration hazard
No data available

Potential Health Hazards

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

Signs and symptoms of exposure
Abdominal pain, nausea, vomiting, dizziness, weakness, confusion, drowsiness, unconsciousness, shortness of breath, coughing and wheezing.

Additional information
RTECS: AL7700000
RTECS: AJ9625000
RTECS: ZC0110000

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
Acetonitrile:
Toxicity to fish
flow-through test LC50 - Pimephales promelas (fathead minnow) - 1,640 mg/l - 96 h
Remarks: (ECHA)

Toxicity to algae
static test NOEC - Phaeodactylum tricornutum - 400 mg/l - 72 h (ISO 10253)
static test ErC50 - Phaeodactylum tricornutum - 9,696 mg/l - 72 h (ISO 10253)

12.2 Persistence and degradability
Acetonitrile:
Biodegradability Result: 70 % - Readily biodegradable. (OECD Test Guideline 310)

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
Potentially harmful to aquatic life.
Avoid release to the environment.
Acetonitrile: stability in water
DT50 - > 9,999 d pH 7 at 25 °C
Remarks: (calculated) Hydrolyzes slowly

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
Contact a professional, licensed chemical waste disposal company for disposal of this product.

Contaminated packaging
Dispose of chemical-contaminated solid waste.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
Trifluoroacetic acid:
ADR/RID: 2699 IMDG: 2699 IATA: 2699

Acetonitrile:
ADR/RID: 1648 IMDG: 1648 IATA: 1648

14.2 UN Proper Shipping Name
Trifluoroacetic acid:
ADR/RID: TRIFLUOROACETIC ACID
IMDG: TRIFLUOROACETIC ACID
IATA: Trifluoroacetic acid

Acetonitrile:
ADR/RID: ACETONITRILE
IMDG: ACETONITRILE
IATA: Acetonitrile

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

Acetonitrile:
ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packing group
Trifluoroacetic acid:
ADR/RID: I IMDG: I IATA: I

Acetonitrile:
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	**LudgerClean EB20 Wash B solution, Aqueous Solution of 0.1% TFA and 50% Acetonitrile.**
Product Catalogue Name	**LC-EB20-WASHB-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]
Trifluoroacetic acid 0.1%
Not a hazardous substance or mixture according to Regulation (EC) No 1272/2008.

Acetonitrile
Flammable liquids (Category 2)
Acute toxicity, Inhalation (Category 4)
Acute toxicity, Dermal (Category 4)
Acute toxicity, Oral (Category 4)
Eye Irritation (Category 2)

2.2 Label elements

Signal Word: Warning

Hazard Statement(s)

H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H412	Harmful to aquatic life with long-lasting effects.

Precautionary Statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces – No smoking.
P273	Avoid release to the environment.

P280	Wear protective gloves/protective clothing.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.

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:	Trifluoroacetic acid: TFA
	Acetonitrile: Methyl cyanide, ACN
Formula:	Trifluoroacetic acid: $C_2HF_3O_2$
	Acetonitrile: C_2H_3N
	Water: H_2OH_2O
Molecular Weight:	Trifluoroacetic acid: 114.02 g/mol
	Acetonitrile: 41.05 g/mol
	Water: 18.02 g/mol

Component	Classification	Concentration
Name Trifluoroacetic Acid	No components need to be	0.1%
CAS-No. 76-05-01	disclosed according to the	
EC-No. 200-929-3	applicable regulations for this	
Index-No. 607-091-00-1	concentration.	
2nd Name Acetonitrile	Flam. Liq. 2; Acute Tox. 4; Eye	50%
CAS-No. 75-05-08	Irrit. 2; H225, H302, H332,	
EC-No. 200-835-2	H312, H319	
Index-No. 608-001-00-3		
Name Water		49.9%
CAS-No. 7732-18-5		
EC-No. 231-791-2		

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 physician/ first responder in attendance.

If Ingested
DO NOT induce vomiting. Immediately make the victim drink water (two glasses at most). Consult a physician. Never give anything by mouth if the person is unconscious.

If the skin is exposed
Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

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. Call an ophthalmologist.

If inhaled
Move the affected person to a source of fresh air, if not breathing give artificial respiration. Oxygen if necessary. Immediately call in a physician.

4.2 Most important symptoms and effects, both acute and delayed
Abdominal pain, nausea, vomiting, dizziness, weakness, confusion, drowsiness, unconsciousness, shortness of breath, coughing and wheezing.

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, nitrogen oxides (NOx), hydrogen cyanide (hydrocyanic acid), hydrogen fluoride. Combustible. Pay attention to flashback. Vapours are heavier than air and may spread along floors. Development of hazardous combustion gases or vapours is possible in the event of a fire. Forms explosive mixtures with air at ambient temperatures.

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

5.4 Further information
Remove the container from the danger zone and cool it with water. Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the groundwater system.

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.
For personal protection see section 8.

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.

7.2 Conditions for safe storage, including any incompatibilities
Store in a well-ventilated, cool, and dry environment, away from direct sunlight. 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 of the mixture with workplace control parameters

Component		CAS-No.	Value	Control parameters	Basis
Acetonitrile		75-05-8	TWA	40 ppm 70 mg/m3	Europe. Indicative occupational exposure limits values.
		Remarks	Identifies the possibility of significant uptake through the skin. Indicative.		
			STEL	60 ppm 102 mg/m3	UK. EH40 WEL- Workplace Exposure Limits.
			Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.		
			TWA	40 ppm 68 mg/m3	UK. EH40 WEL- Workplace Exposure Limits.

8.2 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 2016/425 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).

Control of environmental exposure
Do not let the product enter drains. Risk of explosion.

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	None
Odour threshold	No data available
pH	5.0 to 7.0 at 25°C
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	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
None

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

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

10.3 Possibility of Hazardous Reactions
No data available

10.4 Conditions to Avoid
Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Strong bases and acids, Alkali metals, Reducing and oxidizing agents.

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

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Acetonitrile:
LD50 Oral - Mouse - male and female - 617 mg/kg (OECD Test Guideline 401)
LC50 Inhalation - Mouse - male and female - 4 h - 6.022 mg/l (OECD Test Guideline 403)
Acute toxicity estimate Dermal - 1,500 mg/kg (Expert judgment)

Skin corrosion/irritation
Acetonitrile:
Skin - Rabbit Result: No skin irritation - 4 h (OECD Test Guideline 404)

Serious eye damage/irritation
Acetonitrile:
Eyes - Rabbit Result: Causes serious eye irritation. (OECD Test Guideline 405)
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitisation
Acetonitrile:
Buehler Test - Guinea pig Result: negative (OECD Test Guideline 406)

Germ cell mutagenicity
Ames test
S. typhimurium Result: negative
Remarks: (ECHA)
In vitro mammalian cell gene mutation test
Chinese hamster ovary cells
Result: negative
Mutagenicity (mammal cell test): chromosome aberration.
Chinese hamster ovary cells
Result: Positive results were obtained in some in vitro tests.
Remarks: (National Toxicology Program)
sister chromatid exchange assay
Chinese hamster ovary cells
Result: negative
Remarks: Sister chromatid exchange
Saccharomyces cerevisiae
Result: positive
Remarks: Cytogenetic analysis (ECHA)
In vitro mammalian cell gene mutation test
Mouse lymphoma test Result: negative
OECD Test Guideline 474

Mouse - male and female
Result: negative

Carcinogenicity

No evidence of carcinogenicity in animal studies.

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
Acetonitrile: Animal testing did not show any effects on fertility.

STOT-single exposure
The substance or mixture is not classified as a specific target organ toxicant, single exposure.

STOT-repeated exposure
The substance or mixture is not classified as a specific target organ toxicant, repeated exposure.

Aspiration hazard.
No data available

Potential Health Hazards

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

Signs and symptoms of exposure
Abdominal pain, nausea, vomiting, dizziness, weakness, confusion, drowsiness, unconsciousness, shortness of breath, coughing and wheezing.

Additional information
RTECS: AL7700000
RTECS: AJ9625000
RTECS: ZC0110000

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
Acetonitrile:
Toxicity to fish
flow-through test LC50 - Pimephales promelas (fathead minnow) - 1,640 mg/l - 96 h
Remarks: (ECHA)

Toxicity to algae
static test NOEC - Phaeodactylum tricornutum - 400 mg/l - 72 h (ISO 10253)
static test ErC50 - Phaeodactylum tricornutum - 9,696 mg/l - 72 h (ISO 10253)

12.2 Persistence and Degradability
Acetonitrile:
Biodegradability Result: 70 % - Readily biodegradable. (OECD Test Guideline 310)

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
Potentially harmful to aquatic life.
Avoid release to the environment.
Acetonitrile: stability in water
DT50 - > 9,999 d pH 7 at 25 °C
Remarks: (calculated) Hydrolyzes slowly

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
Contact a professional, licensed chemical waste disposal company for disposal of this product.
Contaminated packaging
Dispose of chemical-contaminated solid waste.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
Trifluoroacetic acid:
ADR/RID: 2699 IMDG: 2699 IATA: 2699

Acetonitrile:
ADR/RID: 1648 IMDG: 1648 IATA: 1648

14.2 UN Proper Shipping Name
Trifluoroacetic acid:
ADR/RID: TRIFLUOROACETIC ACID
IMDG: TRIFLUOROACETIC ACID
IATA: Trifluoroacetic acid

Acetonitrile:
ADR/RID: ACETONITRILE
IMDG: ACETONITRILE
IATA: Acetonitrile

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

Acetonitrile:
ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packing group
Trifluoroacetic acid:
ADR/RID: I IMDG: I IATA: I

Acetonitrile:
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	**Acetic Anhydride**
Product Catalogue Name	**LL-ACETANHYD-01**
CAS-No.	**108-24-7**
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]
Flammable liquids (Category 3)
Acute toxicity, Inhalation (Category 4)
Acute toxicity, Oral (Category 4)
Skin corrosion (Category 1B)
Serious eye damage (Category 1)

2.2 Label elements



Signal Word: Danger

Hazard Statement(s)

H226	Flammable liquid and vapour
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H332	Harmful if inhaled.
H318	Serious 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.
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 safe to do so. Continue rinsing.

2.3 Other hazard information:
Lachrymator. Reacts violently with water.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Synonyms: None
Formula: $C_4H_6O_3$
Molecular weight: 102.09 g/mol

Component		Classification	Concentration
Name	Acetic Anhydride	Flam. Liq. 3; Acute Tox. 4; Skin	100%
CAS-No.	108-24-7	Corr. 1B; Eye Dam. 1; H226,	
EC-No.	203-564-8	H302, H332, H314, H318	
Index-No.	607-008-00-9		

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
After swallowing: make the affected person drink water (two glasses at most) and avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise. Never give anything by mouth if the person is unconscious.

If the skin is exposed
Remove immediately any contaminated clothing, or shoes. Wash the area well with plenty of water. Take the affected person to the hospital, along with a copy of this SDS.

If eyes are exposed
Rinse thoroughly with water for at least 15 minutes, remove contact lenses if present and continue rinsing. Immediately call in an ophthalmologist.

If inhaled
Move the affected person into a source of fresh air/ ventilation. If not breathing give artificial respiration. Call in a physician.

4.2 Most important symptoms and effects, both acute and delayed
Problems breathing, shortness of breath, coughing, wheezing, burning sensation, irritation of the airways, causing inflammation and potential swelling. Material is destructive to eyes, skin and the tissue of the mucous membranes and upper respiratory tract. 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.

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Select extinguishing media appropriate to the surrounding area. Types of media that are compatible, are water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

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

5.3 Advice for Firefighters
Firefighters are to wear self-contained breathing equipment and use water spray to cool unopened containers near the source of the fire.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation to avoid breathing vapours, gas or mist, and wear respiratory protection. Avoid substance contact. Keep away from heat remove all sources of ignition and move non-essential personnel away from the area.
For personal protection see section 8.

6.2 Environmental Precautions
Prevent further spillage, if safe to do so. Do not let the product enter the drainage system.

6.3 Methods and material for containment and cleaning up
Contain the spillage by using a spill mat or inert material to soak up the spilt product, such as vermiculite. Carefully collect the contaminated material and carefully put it into a suitable container with a lid and arrange collection for disposal.

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
Wear PPE when handling the product. Avoid contact with skin, eyes and 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 dry, cool place. Reacts violently to water.

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
Components with workplace control parameters.

Component	CAS-No.	Value	Control parameters	Basis
Name Acetic Anhydride	108-24-7	STEL	2 ppm 10 mg/m3	UK. EH40 WEL – Workplace Exposure Limits.

		TWA	0.5 ppm 2.5 mg/m3	UK. EH40 WEL – Workplace Exposure Limits.

8.2 Exposure controls
Appropriate engineering controls
When handling the product wear PPE, wash hands before and after handling the product and avoid contact with skin, eyes and clothing.

Personal Protective Equipment
Eye/face protection
Wear fitted safety glasses/goggles. Use eye protection that has been tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection
Handle the product wearing gloves. Gloves are to be checked for tears/holes before use. Remove gloves using the proper glove removal technique, so that the outside of the gloves do not touch the skin when being removed. The removed gloves are to be disposed of as contaminated solid waste, see Section 13 for more information.
The gloves used should satisfy the specifications of EU Direction 2016/425 and standard EN 374 derived from it.

Body Protection
A Laboratory coat or similar covering over the handler's clothing is to be worn when handling the product.

Respiratory protection
Handle the product under extraction, in a fume hood. Use equipment that has been tested and approved of under the appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let the product enter drains. Risk of explosion.

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	Melting point/range: -73°C – lit.
Initial boiling point and boiling range	138 - 140°C – lit.
Flash Point	49°C – closed cup
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	Upper explosion limit: 10.3% (V) Lower explosion limit: 2.7% (V)
Vapour Pressure	5 hPa at 20°C 13 hPa at 36°C 6.69 hPa

Vapour Density	3.52 – (Air = 1.0)
Relative Density	1.08 g/cm3
Solubility in water	Slightly soluble
Partition coefficient n-octanol/water	log Pow: ca.-0.5 - Bioaccumulation is not expected.
Autoignition temperature	316 °C at 1,013.25 hPa
Decomposition temperature	No data available
Viscosity	Viscosity, kinematic: No data available
Viscosity, dynamic:	0.84 mPa.s at 25 °C
Explosive properties	No data available
Oxidising properties	No data available

9.2 Other information

Surface tension	31.93 mN/m at 25°C

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity
Can violently decompose at elevated temperatures Vapor/air mixtures are explosive at intense warming.

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

10.3 Possibility of Hazardous Reactions
Exothermic reaction with Ammonia Potassium hydroxide nitrates Sodium hydroxide Acetic acid, diluted Violent reactions possible with Water Possible formation of acetic acid

10.4 Conditions to Avoid
Do not allow water to enter the container due to the violent reaction from the product.
Heat, flames and sparks.

10.5 Incompatible materials
Acids, Alcohols, Bases, Oxidizing agents, Reducing agents, Powdered metals.

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 – male and female-6300 mg/kg
Remarks: (ECHA)
LC50 Inhalation – Rat – 4,200 mg/m3
LD50 Dermal – Rabbit – 4,320 mg/kg

Skin corrosion/irritation
Skin – in vitro test
Result: Causes burns. - 4 h
Remarks: (ECHA)

Serious eye damage/irritation
Eyes - Rat
Result: Corrosive - 24 h

Remarks: (ECHA)

Respiratory or skin sensitisation
No data available.

Germ cell mutagenicity
In vitro mammalian cell gene mutation test
mouse lymphoma cells
Result: negative
Ames test
Salmonella typhimurium
Result: negative
Chromosome aberration test in vitro
Chinese hamster ovary cells
Result: negative
OECD Test Guideline 474
Rat - male and female - Bone marrow
Result: negative

Carcinogenicity
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
No data available.

STOT-single exposure
No data available.

STOT-repeated exposure
No data available.

Aspiration hazard.
No data available.

Potential Health Hazards

Inhalation	Toxic if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion	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
Problems breathing, shortness of breath, coughing, wheezing, burning sensation, irritation of the airways, causing inflammation and potential swelling. Material is destructive to eyes, skin and the tissue of the mucous membranes and upper respiratory tract.

Additional Information
RTECS: AK1925000

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity
Toxicity to Fish

semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - >300.82 mg/l - 96 h
(OECD Test Guideline 203)
Remarks: (in analogy to similar products)

Toxicity to daphnia and other aquatic invertebrates
static test EC50 - Daphnia magna (Water flea) - > 1,000 mg/l - 48 h
(OECD Test Guideline 202)

Toxicity to algae
static test ErC50 - Skeletonema costatum - > 300.82 mg/l - 72 h
(ISO 10253)

Toxicity to bacteria
static test NOEC - Pseudomonas putida - 1,150 mg/l - 16 h
Remarks: (ECHA)

12.2 Persistence and Degradability
Biodegradability Zahn-Wellens Test - Exposure time 5 d Result: > 95 % - Readily biodegradable. (OECD Test Guideline 302B)

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
No data available.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
Dispose of liquid and solid waste by contacting a professional licensed chemical waste disposal company. The product can be disposed of by using a chemical incinerator fitted with an afterburner and scrubber, but extra is to be taken as the product is flammable.
Contaminated packaging
Dispose of it as an unused product.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
ADR/RID: 1715 IMDG: 1715 IATA: 1715

14.2 UN Proper Shipping Name
ADR/RID: ACETIC ANHYDRIDE
IMDG: ACETIC ANHYDRIDE
IATA: Acetic Anhydride

14.3 Transport hazard class(es)
ADR/RID: 8 (3) IMDG: 8 (3) IATA: 8 (3)

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 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 **Sodium Bicarbonate**

Product Catalogue Name **LL-BICARB-01**

CAS-No. **144-55-8**

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]
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:
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: Sodium hydrogen carbonate
Formula: $CHNaO_3$
Molecular weight: 84.01 g/mol

Component		Concentration
Name	Sodium Bicarbonate	-
CAS-No.	144-5-8	

EC-No. 205-633-8	

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

If eyes are exposed
Flush eyes with water as a precaution.

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
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
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
Carbon oxides, Sodium oxides

5.3 Advice for fire-fighters
Fire fighters to wear self-contained breathing apparatus, if deemed necessary. The product itself does not burn.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Wear laboratory gloves and protective clothing, such as a laboratory coat.

6.2 Environmental Precautions
No special environmental precautions are required.

6.3 Methods and material for containment and cleaning up

Collect the spillage by sweeping with a damp brush/paper towel or cloth to minimise the creation of dust. 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 hands before and after handling the material.

7.2 Conditions for safe storage, including any incompatibilities
Store in a dry, cool and well-ventilated place. 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
This product has no substances with occupational exposure limits 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 Regulation (EU)
2016/425 and the standard EN 374 derived from it. Wash and dry your hands after handling the material.

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
Wear a laboratory coat or similar coverings.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dust is desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and 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: White powder
Odour	None
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	300°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	2.160 g/cm3
Solubility in water and solvents	50 g/l
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 under recommended storage conditions.

10.3 Possibility of Hazardous Reactions
No data available

10.4 Conditions to Avoid
Exposure to moisture.

10.5 Incompatible materials
Strong acids, Strong oxidizing agents.

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sodium oxides.
Other decomposition products - No data available.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral – Rat – 4,220 mg/kg

Skin corrosion/irritation
Skin – Human – Mils skin irritation – 3 d

Serious eye damage/irritation
Eyes – Rabbit – Mild eye irritation – 30 s

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 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	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	May cause eye irritation.

Signs and symptoms of exposure
Exposure to large amounts can cause: Gastrointestinal disturbance, Heavy or prolonged skin exposure may result in the absorption of harmful amounts of this material.

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 unused 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	**Hydrazine**
Product Catalogue Name	**LL-HYDRAZINE-01**
CAS-No.	**302-01-2**

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]
Flammable liquids (Category 3), H226
Carcinogenicity (Category 1B), H350
Acute toxicity, Inhalation (Category 2), H330
Acute toxicity, Dermal (Category 3), H311
Acute toxicity, Oral (Category 3), H301
Skin corrosion (Category 1B), H314
Skin sensitization (Category 1), H317
Serious eye damage (Category 1), H318
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Flammable. May cause cancer. Toxic by inhalation, in contact with skin and if swallowed. Causes burns. May cause sensitization by skin contact. Very toxic to aquatic organisms.

2.2 Label elements

Signal Word: Danger

Hazard Statement(s)

H226	Flammable liquid and vapour.
H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H314	Causes severe burns and eye damage.

H317	May cause an allergic skin reaction.
H330	Fatal if inhaled.
H350	May cause cancer.
H410	Very toxic to aquatic life with long-lasting effects.

Precautionary Statement(s)

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261	Avoid breathing vapours.
P273	Avoid release to the environment.
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.
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:
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:	None
Formula:	H_4N_2
Molecular weight:	32.05 g/mol

Component	Classification	Concentration
Name Hydrazine	Flam. Liq. 3; Acute Tox. 3; Acute Tox. 2;	< = 100%
CAS-No. 302-01-2	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1;	
EC-No. 206-114-9	Skin Sens. 1; Carc. 1B; Aquatic Acute 1;	
Index-No. 007-008-00-3	Aquatic Chronic 1;	
This chemical is included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/ 2006 (REACH).	H226, H301, H330, H311, H314, H318, H317, H350, H400, H410	

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. First aider needs to protect himself. Show this safety data sheet to the physician/ first responder in attendance.

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

as quickly as possible. Do not attempt to neutralise.

If the skin is exposed
Remove contaminated clothing and shoes immediately. Wash the affected area well with plenty of soap and water. Immediately consult medical advice.

If eyes are exposed
Rinse thoroughly with plenty of water/ eye wash solution for at least 15 minutes, if safe and practical to do so, remove contact lenses and continue rinsing. Immediately consult medical advice.

If inhaled
Move the affected person to a source of fresh air. If not breathing, give artificial respiration. Immediately consult medical advice.

4.2 Most important symptoms and effects, both acute and delayed
Spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

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

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Select extinguishing media appropriate to the surrounding area. Compatible media for extinguishing fire are water spray, alcohol-resistant foam, dry chemical, or carbon dioxide. For this substance/mixture, no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nitrogen oxides (NOx).
Combustible.
Vapours are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for Firefighters
The product is highly flammable, and potentially explosive when under fire conditions. Wear self-contained breathing equipment. Use water spray to cool any unopened containers near the fire/source.

5.4 Further information
Remove the container from the danger zone and cool it with water. Suppress (knock down) gases/vapours/ mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the groundwater system.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapours or aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, and consult an expert.

6.2 Environmental Precautions
Prevent any further leakage or spillage, if safe to do so. Do not let the product enter the drainage system, as discharge into the environment must be avoided due to the potential environmental damage. Risk of

explosion.

6.3 methods and material for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions. Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of it properly. Clean up the affected area.

6.4 Reference to other sections
For more information on disposal of this product see section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale the substance/mixture. Avoid the generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substances.

7.2 Conditions for safe storage, including any incompatibilities
Store in a secure, cool, dry and well-ventilated cabinet. Opened containers must be re-sealed securely and kept upright to prevent leakage. If available, store it within a nitrogen-filled glove box. Do not store in direct sunlight. Keep locked up or in an area accessible only to qualified or authorized persons.

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
Hydrazine	302-01-2	STEL	0.1 ppm 0.13 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. Capable of causing cancer and/or heritable genetic damage		
		TWA	0.02 ppm 0.03 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. Capable of causing cancer and/or heritable genetic damage		

		TWA	0.01 ppm 0.013 mg/m3	Europe. Directive 2004/37/ EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work
		Skin Carcinogens or mutagens		

8.2 Exposure controls

Appropriate engineering controls
Wear PPE, wash hands before and after handling the product, and avoid contact with skin. If available handle within a nitrogen-filled glove box.

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
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves.
Full contact
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Butoject® (KCL 898)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves.
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 240 min
Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type ABEK
The user must ensure that maintenance, cleaning, and testing of respiratory protective devices are carried out according to the instructions of the producer.
These measures must be properly documented.

Control of environmental exposure
Do not let the product enter drains. Risk of explosion.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: oily Colour: Colourless
Odour	Strong – Ammonia like
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	2 °C
Initial boiling point and boiling range	113.5 °C at 1,013 hPa
Flash Point	38 °C – closed cup
Evaporation rate	No data available
Flammability	High
Upper/lower flammability or explosive limits	Upper explosion limit: 99.99 %(V) Lower explosion limit: 4.7 %(V)
Vapour Pressure	19.2 hPa at 25.0 °C
Vapour density	1.11 – (Air = 1.0)
Relative Density	1 g/cm³ at 25 °C
Solubility in water	completely miscible
Partition coefficient	log Pow: -0.16 at 25 °C - Bioaccumulation is not expected
Autoignition temperature	24°C at 1,013 hPa
Decomposition temperature	No data available
Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: 0.91 mPa.s at 25 °C
Explosive properties	No data available
Oxidising properties	No data available

9.2 Other information

Dissociation constant	6.05 at 25 °C
Relative vapour density	1.11 - (Air = 1.0)

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

Vapor/air mixtures are explosive at intense warming.

10.2 Chemical stability

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

10.3 Possibility of Hazardous Reactions

Risk of explosion with:
alkali compounds
perchlorates
barium oxide
nitrites
Calcium
amides
Calcium oxide
chromates/perchromates
chromium(VI) oxide
Fluorine
Salts of hydrazine
azides

Potassium
potassium dichromate
potassium permanganate
copper compounds
nitrates
Raney-nickel
metal catalysts
sodium
Organic Substances
mercury compounds
mercury(II) nitrate
mercury oxide
Nitric acid
Mild steel
nitrogen oxides
Tetryl (N-Methyl-N-2,4,6-tetranitroaniline)
hydrogen peroxide
zinc diethyl
tin (II) chloride
halogen oxides
Wood/Sawdust
metallic oxides
Steam
organic nitro compounds
metallic salts
Sulfides
phosphorus halides
silver compounds
Oxygen
liquid
silver
with
Catalyst
Nitromethane
with
Methanol
Ammonia
with
Alkali metals
Sodium hydroxide
with
Air
Methanol
with
Nitromethane
absorbents, filter materials, wiping cloths and protective clothing
with
Heavy metals
Risk of ignition or formation of inflammable gases or vapours with:
Chlorine
nitrogen dioxide
Rust
Air
Oxidizing agents
Exothermic reaction with:

chlorates
halogens
Acids
metals
metallic chlorides
Oxygen
Phosgene

10.4 Conditions to Avoid
Sources of ignition, high temperatures, above 150 °C, Moisture.

10.5 Incompatible materials
Oxidizing agents, Oxygen, Iron, Mild steel, Copper, Nickel, Lead, silver, metal alloys, glass, rubber

10.6 Hazardous decomposition products
No data available.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 262 mg/kg
(OECD Test Guideline 401)
LC50 Inhalation - Rat - male - 4 h - 0.76 mg/l
Remarks: (ECHA)
Acute toxicity estimate Dermal - Not tested on animals - 300.1 mg/kg
Remarks: Expert judgment

Skin corrosion/irritation
Skin - Rabbit
Result: Corrosive - 4 h
(OECD Test Guideline 404)
Remarks: (55% solution)
(Regulation (EC) No 1272/2008, Annex VI)

Serious eye damage/irritation
Causes serious eye damage.

Respiratory or skin sensitisation
(Regulation (EC) No 1272/2008, Annex VI)

Germ cell mutagenicity
No data available

Carcinogenicity
This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP or EPA classification.
Possible human carcinogen.
IARC: 2B – Group 2B: Possible carcinogenic to humans (Hydrazine).

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 fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion	Toxic if swallowed. Causes burns.
Skin	May be fatal if absorbed through the skin. Causes skin burns.
Eyes	Causes eye burns.

Signs and symptoms of exposure
Spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

Additional Information
RTECS: MU7175000
spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Liver - Irregularities - Based on Human Evidence

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	static test LC50 - Poecilia reticulata (guppy) - 0.61 mg/l - 96 h Remarks: (ECHA)
Toxicity to daphnia and Other aquatic invertebrates	semi-static test EC50 - Daphnia pulex (Water flea) - 0.16 mg/l - 48 h (US-EPA) Remarks: (in analogy to similar products)
Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - 0.017 mg/l - 48 h (Regulation (EC) No. 440/2008, Annex, C.3)
Toxicity to bacteria	static test EC50 - activated sludge - 5.5 mg/l - 3 h (OECD Test Guideline 209)

12.2 Persistence and Degradability

Biodegradability	Biotic/Aerobic – Exposure time 20d Result: 28% - Not 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
Very toxic to aquatic life with long-lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
Product
Waste material must be disposed of following the national and loc No mixing with other waste. Handle uncleaned containers like the product See www.retrologistik.com for processes regarding the return of chemicals and containers or contact us there if you have further questions. Notice Directive on waste 2008/98/EC.

Contaminated packaging
Dispose of chemical-contaminated solid waste.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number
ADR/RID: 2029 IMDG: 2029 IATA: 2029

14.2 UN Proper Shipping Name
ADR/RID: HYDRAZINE, ANHYDROUS
IMDG: HYDRAZINE, ANHYDROUS
IATA: Hydrazine, anhydrous
Passenger aircraft: Not permitted for transport.
Special Provisions: “Keep away from heat” label required.

14.3 Transport hazard class(es)
ADR/RID: 8 (3, 6.1) IMDG: 8 (3, 6.1) IATA: 8 (3)(6.1)

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

14.5 Environmental hazards
ADR/RID: yes IMDG Marine pollutant: yes 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
Authorisations and/or restrictions on use
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : Hydrazine
REACH - Restrictions on the manufacture, placing on the market and using certain dangerous substances, preparations and articles (Annex XVII) :

REACH - Restrictions on the manufacture, placing on the market and using certain dangerous substances, preparations and articles (Annex XVII)	:
REACH - Restrictions on the manufacture, placing on the market and using certain dangerous substances, preparations and articles (Annex XVII)	: Hydrazine

National legislation
Seveso III: Directive 2012/18/EU of the European Parliament and the Council on the control of major accident hazards involving dangerous substances.

H2	ACUTE TOXIC
E1	ENVIRONMENTAL HAZARDS
33	Carcinogenic substances
P5c	FLAMMABLE LIQUIDS

Other regulations
Observe work restrictions regarding maternity protection following Dir 92/85/EEC or stricter national regulations where applicable.
Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment
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	**Octanol**
Product Catalogue Name	**LL-OCTANOL-01**
CAS-No.	**111-87-5**
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)
Eye irritation (Category 2)

2.2 Label elements

Signal Word: Warning

Hazard Statement(s)

H315	Causes skin irritation.
H319	Causes serious eye irritation.

Precautionary Statement(s)

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:	Octan-1-ol
Formula:	$C_8H_{18}O$
Molecular weight:	130.23 g/mol

Component		Concentration
Name	Octanol	-
CAS-No.	111-87-5	
EC-No.	203-917-6	

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; do not give anything by mouth if the person is unconscious.

If the skin is exposed
Remove any clothing that has come into contact with the product. Wash the area well with plenty of soap and water.

If eyes are exposed
Rinse thoroughly with water or eye wash solution for at least 15 minutes. If present and safe to do so remove contact lenses and continue rinsing.

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
Nausea, headache, vomiting, narcosis, and central nervous system depression. 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
Select an extinguishing media appropriate to the surrounding area, such as dry chemical, carbon dioxide or alcohol-resistant foam.

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

5.3 Advice for Firefighters
Firefighters must wear self-contained breathing equipment if necessary. Cool any containers near to the source of the fire.

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, and ensure adequate ventilation. Remove any unnecessary staff from the area. Remove any sources of ignition and be aware that vapours from the product can accumulate in low areas and form explosive concentrations.

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

6.3 Methods and material for containment and cleaning up
Prevent further spillage by using a spill mat, vermiculite, or another type of inert absorbent material. Collect the contaminated material and store it in a secure container with a lid. Store in a well-ventilated area and arrange collection for disposal of solid chemical waste.

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

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin, eyes and breathing in vapour or mist. Keep away from sources of ignition – No smoking. Keep away from sources of electrostatic build-up.

7.2 Conditions for safe storage, including any incompatibilities
Store the product in a cool, dry, well-ventilated environment.

7.3 Specific end uses
No data available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

8.2 Exposure controls

Appropriate engineering controls
Wear PPE (Personal protective equipment), wash hands, and avoid contact with skin when handling the product. The product should be handled following good laboratory and safety practices.

Personal Protective Equipment
Eye/face protection
Wear safety glasses/ goggles with side shields. Safety eyewear should conform to the appropriate government 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 outside 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: clear, liquid Colour: colourless
Odour	No data available
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	Melting point/range: -15°C
Initial boiling point and boiling range	196°C at 1,013 hPa
Flash Point	80°c – closed cup
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	Lower explosion limit: 0.8 %(V)
Vapour Pressure	0.19 hPa at 25°C
Vapour density	4.5 – (Air = 1.0)
Relative Density	0.827 g/cm3
Solubility in water	No data available
Partition coefficient: n- octanol/water	log Pow: 2.80 – 3.15
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
Heat, flames and sparks.

10.5 Incompatible materials
Acids, Acid chlorides, oxidizing agents acids, Acid chlorides, Oxidizing 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 - > 3,200 mg/kg

Skin corrosion/irritation
Skin – Rabbit – Skin irritation.

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

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Genotoxicity in-vitro – Hamster – Lungs
SLN

Carcinogenicity
IARC: no component of this product present at levels greater 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. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through the skin. Causes skin irritation.
Eyes	Causes serious eye irritation.

Signs and symptoms of exposure
Nausea, Headache, Vomiting, Narcosis, Central nervous system depression. To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: RH6550000

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to Fish	Mortality LOEC – Pimephales promelas (Fathead minnow) – 1.19 mg/l – 7d
	Mortality NOEC – Pimephales promelas (Fathead minnow) – 1.19 mg/l – 7d
	LC50 –Oncorhynchus mykiss (Rainbow trout) – 17.7 mg/l – 96h
Toxicity to algae	EC50 – Desmodesmus subspicatus (Green algae) – 6.5 – 14.0 mg/l – 48h

12.2 Persistence and Degradability
No data available.

12.3 Bioaccumulative potential
Does not Bioaccumulate.

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.

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. 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 used product, with a licensed 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	**Trifluoroacetic acid, 5%, aqu.**
Product Catalogue Name	**LL-TFA-5PC-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)
Chronic aquatic toxicity (Category 3)
Serious eye damage (Category 1)

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.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.

2.3 Other hazard information:
None available.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms: TFA

Formula: TFA: $C_2HO_2F_3$
Water: H_2OH_2O

Molecular weight: TFA: 114.02 g/mol
Water: 18.02 g/mol

Component		Classification	Concentration
Name	Trifluoroacetic acid	Skin Corr.1A; Aquatic Chronic	5%
CAS-No.	76-05-1	3; Acute Tox. 4; Eye Dam. 1	
EC-No.	200-929-3	H314, H412, H332	
Index-No	607-091-00-1		
2nd Name	Water	-	95%
CAS-No.	7732-18-5		
EC-No.	231-791-2		

For the full text of the H-Statements and R-Phrases mentioned in this Section please see Sections 3 and 16.

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 to a person if unconscious.

If the skin is exposed
Remove contaminated clothing and shoes. Wash the affected area well with plenty of soap and water.

If eyes are exposed
Rinse thoroughly for at least 15 minutes with plenty of water/ eye wash solution. Remove contacts if safe to do so and continue rinsing.

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

4.2 Most important symptoms and effects, both acute and delayed
The product can be destructive to tissue of the mucous membranes, 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 extinguishing media appropriate to the surrounding area, compatible extinguishing materials for the product are Water spray, alcohol-resistant foam, dry chemical, and carbon dioxide.

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

5.3 Advice for Firefighters
If necessary, wear self-contained breathing equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: avoid breathing in vapours, mist or gas by ensuring adequate ventilation. Avoid substance contact. Move any unnecessary staff away from the spill.
For personal protection see section 8.

6.2 Environmental Precautions
Contain the spillage; prevent any product from entering the drainage system as discharge into the environment is to be avoided.

6.3 Methods and material for containment and cleaning up
Contain the spillage with a spill mat or inert material such as vermiculite. Carefully collect the contaminated material into a suitable container with a lid; arrange collection and disposal of the hazardous solid waste.

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
Work under hood. Do not inhale a substance/mixture. Avoid the generation of vapours/aerosols.

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

7.2 Conditions for safe storage, including any incompatibilities
Store the product in a cool, dry, well-ventilated place.

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
This product contains no substances with occupational exposure limits values.

8.2 Exposure controls

Appropriate engineering controls
Handle the product using good laboratory and safety practices, wearing gloves, safety glasses and laboratory coat. Wash and dry hands before and after handling the product, even while wearing 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 2016/425 and the standard EN 374 derived from it.

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

Respiratory protection
Handle the material under an extraction cabinet or fume hood, as part of the kit. 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: Clear, liquid Colour: Colourless
Odour	Slight
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	Not Flammable
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Relative Density	No data available
Solubility in water and solvents	Yes
Partition coefficient	No data available
Autoignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	None
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
The product is chemically stable under standard ambient conditions (room temperature)

10.3 Possibility of Hazardous Reactions
Risk of explosion with lithium aluminium hydride
Exothermic reaction with alkalines
Generates dangerous gases or fumes in contact with acids

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), Aluminium, Reacts violently with Alkali metals.

10.6 Hazardous decomposition products
Other decomposition products – 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
Cause serious eye damage

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% are 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. Material can be destructive to the tissue of the mucous membranes and the upper respiratory tract.
Ingestion	May be harmful if swallowed. Causes burns.
Skin	May be harmful if absorbed through the skin. Causes burns.
Eyes	Causes burns to the eyes.

Signs and symptoms of exposure
The product can be destructive to tissue of the mucous membranes, upper respiratory tract, eyes and skin.

11.2 Further information

Components: Trifluoroacetic acid

Acute inhalation toxicity LC50 rat: 10 mg/l; 4 h
Skin irritation rabbit Result: Causes burns.
Germ cell mutagenicity:
Ames test
Salmonella typhimurium
Result: negative
In vitro mammalian cell gene mutation test
mouse lymphoma cells
Result: negative
Chromosome aberration test in vitro

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Damage to:
Kidney
Other dangerous properties cannot be excluded.
Handle following good industrial hygiene and safety practices.
Liver - Irregularities - Based on Human Evidence

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
Harmful to aquatic life.

Components: trifluoroacetic acid

Toxicity
Toxicity to fish static test LC50 - Danio rerio (zebra fish) - > 999 mg/l - 96 h
(OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates: static test EC50 - Daphnia magna (Water flea) - > 999 mg/l - 48 h
(OECD Test Guideline 202)

Toxicity to algae: static test ErC50 - Pseudokirchneriella subcapitata - 237.07 mg/l - 72 h
(OECD Test Guideline 201)

Toxicity to bacteria: EC50 - activated sludge - > 832 mg/l - 3 h
(OECD Test Guideline 209)

Persistence and degradability
Biodegradability: aerobic - Exposure time 127 d
Result: 11 % - Not inherently biodegradable.
(OECD Test Guideline 301D)

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
Contact waste professional waste disposal company that is licensed to carry such waste material, liquid and solids, 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
ADR/RID: 2699 IMDG: 2699 IATA: 2699

14.2 UN Proper Shipping Name
ADR/RID: TRIFLUOROACETIC ACID, SOLUTION
IMDG: TRIFLUOROACETIC ACID, SOLUTION
IATA: Trifluoroacetic acid, SOLUTION

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

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

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.

Text of H-codes and P-phrases mentioned in Section 3.

Acute Tox.	Acute Toxicity.
Aquatic Chronic	Chronic aquatic toxicity.
Skin Corr.	Skin corrosion.
Eye Dam	Serious eye damage
H314	Causes severe skin burns and eye damage.
H332	Harmful if inhaled.
H412	Harmful to aquatic life with long-lasting effects.