



Product Guide for
LudgerTag™ DMB Sialic Acid
Release and Labelling Kit

Product # LT-KDMB-A1

Ludger Document # LT-KDMB-A1-Guide-v6.3

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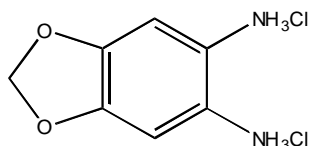
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Specifications for LT-KDMB-A1

Application For release of sialic acids from glycoproteins and labeling with 1,2-diamino-4,5-methylenedioxybenzene.2HCl (DMB).

Dye Properties Relative Molecular Mass = 225.07 gmol⁻¹
Fluorescence, λ_{ex} = 373 nm, λ_{em} = 448 nm.

Structure



Synonyms DMB; 1,2-Diamino-4,5-methylenedioxybenzene Dihydrochloride; 1,3-Benzodioxole-5,6-diamine Dihydrochloride; 5,6-Diamino-1,3-benzodioxole Dihydrochloride

Description The kit contains reagents for the release of sialic acids from glycoproteins. Released sialic acids are conjugated with DMB dye by an amination-cyclisation reaction.

Number of Samples The kit contains reagents and materials for up to 22 samples including the sialic acid reference panel, and the *N*-acetyl neuraminic acid and *N*-glycolyl neuraminic acid quantitative standards.

Amount of Sample Typically start with 50-200 μ g of glycoprotein per analysis. We recommend analysing samples in triplicate.

Suitable Samples Any sialic acid released from a glycoprotein, glycopeptide or glycan can be labelled.

Storage: Store at -18°C in the dark. Protect from sources of heat, light, and moisture. The reagents are stable for at least two years as supplied.

Shipping: The product can be shipped at ambient temperature.

Handling: Ensure that any glass, plasticware or solvents used are free of glycosidases and environmental carbohydrates. Use powder-free gloves for all sample handling procedures and avoid contamination with environmental carbohydrate.

Once individual vials of reagents are opened, their contents should be used immediately. Discard any excess according to local safety rules.

Safety: **For research use only. Not for human or drug use**

Please read the Safety Data Sheets (SDS's) for all chemicals used. All processes involving labeling reagents should be performed using appropriate personal safety protection - eyeglasses, chemically resistant gloves (e.g. nitrile), and where appropriate in a laboratory fume cupboard.

Kit Contents



Each kit contains one vial of each of the following:

Cat. #	Item	Quantity
LT-DMB-01	DMB Dye	0.7 mg
LT-ACETIC2M-01	Acetic Acid 2 Molar	2 x 1.1 mL
LT-MERCAPTO-01	Mercaptoethanol in Acetic acid (1.4 Molar)	500 μ L
LT-DITHIO-01	Sodium Dithionite (Reductant)	4 mg
CM-NEUAC-01	<i>N</i> -acetylneuraminic acid quantitative standard	1 nmol
CM-NEUGC-01	<i>N</i> -glycolylneuraminic acid quantitative standard	1 nmol
CM-SRP-01	Sialic Acid Reference Panel containing Neu5Ac, Neu5Gc, Neu5,7Ac ₂ , Neu5Gc,9Ac, Neu5,8Ac ₂ , Neu5,9Ac ₂ and Neu5,x,xAc ₃ (where x is an unknown acetyl position).	1.25 nmol (total sialic acids)

Additional Reagents and Equipment Required

- Heating block, oven or similar dry heater set at 80°C for sialic acid release; and at 50°C for the sialic acid labelling reaction
- Range of pipettes 1 to 1000 µL and tips
- Vacuum Centrifuge
- Reaction vials (e.g. 0.5 mL polypropylene vials)
- Analytical grade water eg. MilliQ
- Additional Sialic Acid Standards if replicates are required [*Optional*]: [CM-NEUAC-01](#); [CM-NEUGC-01](#)
- Additional Sialic Acid standard Neu5,9Ac₂ [*Optional*]: [CM-NEU5,9AC-01](#)
- Process positive controls [*Recommended*]: Ludger Fetuin glycoprotein [GCP-FET-50U](#)
 Ludger Bioquant glycopeptide [BQ-GPEP-A2G2S2-10U](#)

Time Line for Labelling

The LudgerTag™ labelling procedure, including drying time and the acid release of sialic acids from the analytical samples, typically takes 7 hours plus drying:

Procedure	Time
Preparation of Samples	10 min + drying (1-2 hrs) <i>this can be performed the day before</i>
Release of Sialic Acids	3 hrs
DMB labelling	3.5 hrs
Total Time:	7 hrs plus drying

Method

1 Preparation of Samples

- We recommend taking triplicate aliquots of samples through the analysis. Use 50 µg for highly sialylated glycoproteins or up to 200 µg for samples such as IgG which have low levels of sialylation.
- Note that some salts/buffers commonly used with proteins may interfere with the sialic acid analysis process. This is dependent on the amount of sample taken compared to the volume of buffer (as a large amount of buffer can affect the acidity of the solution during acid hydrolysis). In our experience buffers such as PBS are not a problem where the sample concentrations are above 1mg/mL and between 50 and 200 µg of sample is taken for analysis.
- We recommend taking a number of controls through the process with your samples:
 - Positive process control glycoprotein: Fetuin glycoprotein: [GCP-FET-50U](#)
 - Positive process quantitative control glycopeptide: [BQ-GPEP-A2G2S2-10U](#)
 - Negative process control: water
 - Negative process control: Sample buffer
- Aliquot samples and process controls (unless they are already dry) into 0.5 mL polypropylene vials, and dry in a vacuum centrifuge.

2 Sialic Acid Release

- Set oven to 80°C
- Add 25 µL of the 2 M acetic acid solution to the sample and process control vials.
NOT to the Sialic Acid Standards: Neu5Ac ([CM-NEUAC-01](#)), Neu5Gc ([CM-NEUGC-01](#)), Sialic acid Reference panel ([CM-SRP-01](#)) vials; or the Neu5,9Ac₂ ([CM-NEU5,9,AC-01](#)) if using.
- Vortex to dissolve and then briefly centrifuge.
- Place the samples and controls in an oven set at 80°C and incubate for 2 hours (± 5 min). Remove from the oven and cool to room temperature. Vortex and briefly centrifuge.
- Transfer 5 µL from each sample or process control into 0.5 mL polypropylene vials ready for labelling with DMB.

Acid released samples can be stored at -20°C for at least 2 days if required [Ref1].

3 DMB Labelling

- Set oven to 50°C.
- Add 440 µL of the mercaptoethanol solution **LT-MERCAPTO-01** to the vial of sodium dithionite **LT-DITHIO-01** and mix by pipette action until the solid is completely dissolved.
- Add the entirety of this solution to the vial of DMB Dye **LT-DMB-01** and mix by pipette action until the dye is dissolved.

Protect the labelling reagent from exposure to moisture and light and use within 60 minutes.

- Add 20 µL of labelling reagent to each sample and process control, cap the tube, mix thoroughly by vortexing and then briefly centrifuge to ensure the labelling solution is at the bottom of the vial.
- Add 20 µL of labelling reagent to each sialic acid standard (Neu5Ac, Neu5Gc, Sialic acid Reference Panel, plus Neu5,9Ac₂ if required), cap the tube, mix thoroughly by vortexing and then briefly centrifuge to ensure the labelling solution is at the bottom of the vial.

Place the samples, controls and standards in an oven set at 50°C and incubate for 3 hours in the dark.

During this incubation, you can start conditioning the LC ready for analysis – see section 4.

- Remove vials from the oven and terminate the reaction by adding:
475 µL of water to each sample and process control
480 µL of water to each sialic acid standard

4 LC Analysis

Dilute the Neu5Ac and Neu5Gc standards for the standard curves (using table 1 for guidance, as Neu5Gc is normally present in lower amounts than Neu5Ac, the range of the Neu5Gc curve is one step below that for Neu5Ac). Mix well.

This can be done whilst the 'HPLC condition column' runs are in progress.

Ratio	Dilution Factor	Neu5Ac Std (µL)	Water (µL)	Neu5Gc Std (µL)	Water (µL)
1:0	1	200	0	-	-
1:1	2	100	100	100	100
1:4	5	40	160	40	160
1:9	10	20	180	20	180
1:49	50	10	490	10	490
1:99	100	10	990	10	990
1:999	1000	20 from 1:99 (premixed)	180	20 from 1:99 (premixed)	180
1:4999	5000	-	-	10 from 1:49 (premixed)	990

Table 1. Dilution scheme for standards

- Dilute the samples 1 in 10 (ratio 1:9) with water (20 µL sample plus 180 µL water).
- Dilute the Process Controls (and the Neu5,9Ac₂ if used) 1 in 10 (ratio 1:9) with water.
- DO NOT dilute the Sialic acid Reference Panel (SRP).

Note: If the samples are known to have low levels of sialylation (e.g. IgG) - then DO NOT dilute them with water. If you find that the areas of the LC peaks are not within the standard curve, then either make up more concentrated samples, or extend the standard curve.

Samples are stable in the auto-injector in the dark at 10°C for at least 72hr [Ref2].

- Prepare the LC system. Ensure that the solvent lines are primed.
 Solvent A = acetonitrile:methanol:water 9:7:84
 Solvent B = acetonitrile
 Fluorescence: Excitation: 373 nm; Emission: 448 nm
 Column temp = 30°C; Sample temp = 10°C

Time (min)	Flow mL/min	%A	%B
0	0.5	100	0
19	0.5	100	0
19.5	0.5	10	90
23.5	0.5	10	90
24	0.5	100	0
30	0.5	100	0

Table 2. 30 min running method for HPLC analysis using a LudgerSep-R1 column (4.6 x 150 mm, 3 µm particles) LS-R1-4.6x150.

Injection volume = 25 µL.

Time (min)	Flow mL/min	%A	%B
0	0.25	100	0
7	0.25	100	0
7.5	0.25	10	90
8	0.25	10	90
8.5	0.25	100	0
15	0.25	100	0

Table 3. 15 min running method for UHPLC analysis using a LudgerSep-uR2 column (2.1 x 100 mm, 1.9 µm particles) LS-UR2-2.1x100.

Injection volume = 5 µL.

- Condition the column by running the appropriate method (Table 2 for HPLC analysis with LudgerSep-R1 column or table 3 UHPLC analysis with LudgerSep-uR2 column) with no injection 2/3 times. Next inject a water system blank and check that the baseline is stable. If not, then keep running water injections until the baseline stabilises, or run a wash with 10% A and 90% B for 30 minutes before re-conditioning.

- Next run 2 or more injections of the SRP sialic acid reference panel until the profiles overlap. The profile should resemble figure 1 for HPLC or figure 2 for UHPLC. However, retention times will vary dependent on the LC system used.
- The LC system is now ready to run the sample set. We suggest the following order (table 4):

SRP
Neu5Gc dilutions for standard curve
Neu5Ac dilutions for standard curve
Process controls (Fetuin; GPEP; Water; Buffer)
Samples
Neu5Gc dilutions for standard curve
Neu5Ac dilutions for standard curve
SRP

Table 4. Sample Injection Order

5 Acceptance Criteria

- The profiles from the SRP at the start and end of the sample set should overlap with minimal drift e.g. ± 0.1 min.
- The calibration curve should give R^2 values of >0.99 for the Neu5Gc and Neu5Ac.
- The Ludger acceptance range for Fetuin analysed following in-house SOPs is 252 to 377 nmol/mg protein (where there is e.g. 34 μ g fetuin protein per 50U) [Ref3]. This acceptance criteria is updated as we gather more in-house data for GCP-FET-50U. The historical acceptance range is listed in Reference 3 complete with detailed explanation.
- The Ludger acceptance range for GPEP-A2G2S2 analysed using in-house SOPs is 5.6 to 8.4 nmol (which is the amount determined by quantitative NMR $\pm 20\%$)

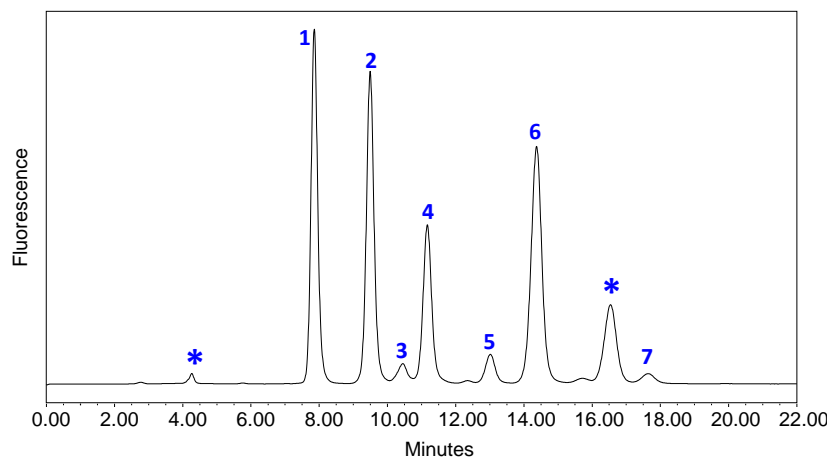


Figure 1: Chromatogram of DMB Labelled Sialic Acid Reference Panel (CM-SRP-01) run on the LudgerSep-R1 HPLC column.

Peaks: 1 = Neu5Gc; 2 = Neu5Ac; 3 = Neu5,7Ac₂; 4 = Neu5Gc,9Ac; 5 = Neu5,8Ac₂; 6 = Neu5,9Ac₂; 7 = Neu5,x,xAc₃ (where x is an unknown acetyl position); * = Reagent.

Note: This chromatogram is provided as an example only. Peak width, resolution and retention are dependent on the HPLC system setup in your laboratory.

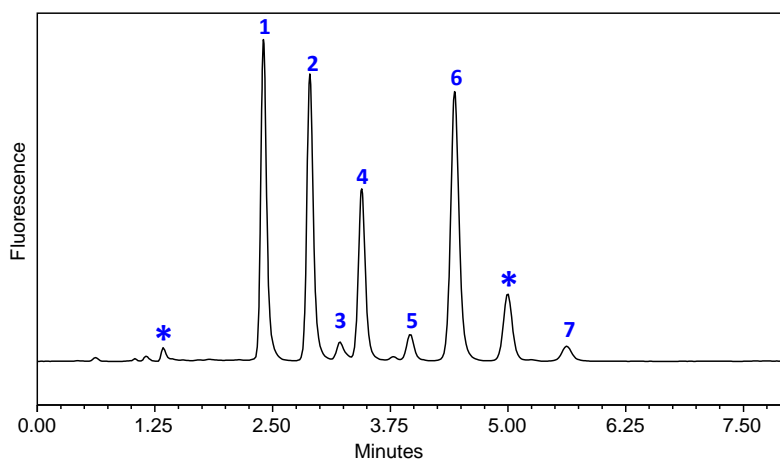


Figure 2: DMB Labelled Sialic Acid Reference Panel run on the LudgerSep-uR2 UHPLC column.

Peaks: 1 = Neu5Gc; 2 = Neu5Ac; 3 = Neu5,7Ac₂; 4 = Neu5Gc,9Ac; 5 = Neu5,8Ac₂; 6 = Neu5,9Ac₂; 7 = Neu5,x,xAc₃ (where x is an unknown acetyl position); * = Reagent.

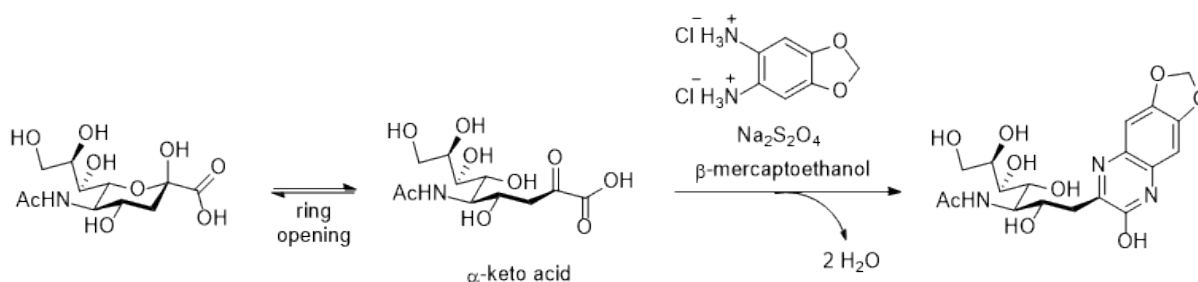
Note: This chromatogram is provided as an example only. Peak width, resolution and retention are dependent on the UHPLC system setup in your laboratory.

References and Related Literature

1. Ludger Document: [S-GP-0048-WG-50381-Report-v1.0](#). Determination of the effect of freezing of DMB Labelled Sialic Acids.
2. Ludger Document: [Fetuin Specifications for Sialic Acid Analysis-v2.0](#). Determination of Acceptance Criteria for Fetuin System Suitability Standard in Sialic Acid Analysis
3. Ludger Document: [DMB-kit-Validation-Report-GP-0057-v1.0](#). Validation of the DMB kit with Ludger Standards.
4. Ludger Document: Application note on 'Quantitative Sialic Acid Analysis' #APN002

Reaction Mechanism

The labelling reaction is a 2-step process.



1. The first step is the equilibration of the ring closed (cyclic) sialic acid to the ring open (acyclic) form.
2. The second step follows a multi-step mechanism wherein the primary amino group of the DMB dye reacts with the carbonyl of the α -keto acid to form an imine, this intermediate reacts with the reducing agent in solution and consequently with the other primary amine of the dye. Rearrangement gives the fluorescently labelled sialic acid (di-imine).

Troubleshooting

1. Low signals on HPLC.

- Incomplete acid hydrolysis: We recommend using an oven rather than a heating block for the acid hydrolysis step. Some heating blocks cause evaporation and condensation of the acid in the sample vial lid causing incomplete acid hydrolysis. We also recommend the use of small sample vials, no greater than 0.5 mL in volume, for the acid hydrolysis.
- Salts in the sample interfering with labelling: Salts and buffers can interfere with the sialic acid labelling method. If you suspect salt interference with your sample, dialyse the sample into a salt free solvent before analysis.

2. High levels of free dye peaks in chromatograms.

- This can be caused by too much light exposure. Ensure that incubation steps are performed in the dark. Once the samples are labelled it is ideal to run them immediately on the LC to avoid degradation as prolonged exposure of samples to light and heat causes an increase in non-sialic acid specific chromatogram peaks. The issue may also be caused by contamination of the LC column over time, see below.
- The amounts of Neu5Ac and Neu5Gc have been shown to be stable when the DMB labelled samples are stored at in the dark at 10°C for up to 72 hours, provided that the calibration standards have been stored in the same conditions and are analysed at the same time [Ref 3]. If this is not possible then the DMB labelled samples can be frozen for up to 2 days [Ref 1].

3. Variation in LC chromatogram peaks retention times; unstable baseline.

- Incorrect or old LC solvent. Always prepare the solvents in the same way (making a solvent up to one litre in a measuring cylinder, for example, by mixing two solvents together, is not the same as measuring out the two solvents separately and mixing in a bottle). Isocratic gradients are particularly sensitive to variations in solvent preparation. Solvent composition can change over time due to evaporation.
- Contamination of the column with excess free dye/ peptides etc can lead to retention time shifts and extra peaks on the chromatogram. This can be more of a problem for sample with low levels of sialylation where larger amounts of protein are injected onto the columns. Wash the column at the normal flow rate with a 10:90 mixture of normal running solvent and acetonitrile.
- The running conditions for the (U)HPLC system have not been optimised. One common variable to assess if you are using UHPLC, is the 'strong/weak wash'. These can have a dramatic effect on the chromatography. As a general rule, the 'weak wash' uses the weakest gradient condition and a 'strong wash' uses the strongest gradient condition. You will need to assess which of these provides an SRP trace that matches the product guide. We recommend beginning LC optimisation by using the weak wash.

4. Problem: There is precipitate in the labelling solution

- Although rare, it is possible that a slight precipitate may form during the preparation of the DMB labelling solution (mixture of sodium dithionite, mercaptoethanol and DMB dye). We have also observed this occurrence, have tested this mixture for its labelling efficiency and can confirm that the precipitate does not impact the labelling reaction.

5. The Sialic acid rReference Panel (SRP) (U)HPLC trace does not match that in the guide

- Ensure that this reference standard has not been treated with acid. Upon acid treatment, the SRP trace will only contain the peaks corresponding to Neu5Ac and Neu5Gc.

Warranties and Liabilities

Ludger warrants that the above product conforms to the attached analytical documents. Should the product fail for reasons other than through misuse Ludger will, at its option, replace free of charge or refund the purchase price. This warranty is exclusive and Ludger makes no other warranties, expressed or implied, including any implied conditions or warranties of merchantability or fitness for any particular purpose.

Ludger shall not be liable for any incidental, consequential or contingent damages.

This product is intended for in vitro research only.

Document Revision Number

Document # LT-KDMB-A1-Guide-v6.3

Appendix 1: Safety Data Sheets

SAFETY DATA SHEET

version 2.0

Date written: 10th November 2011

Date reviewed: 19th April 2017

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

Product Name **1, 2-Diamino-4,5-methylenedioxybenzene**

Product Catalogue Name **LT-DMB-01**

CAS-No. **81864-15-5**

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)
Specific target organ toxicity - single exposure (Category 3)

2.2 Label elements



Signal Word: Warning

Hazard Statement (s)

H315 Causes skin irritation
H319 Causes serious eye irritation
H335 May cause respiratory irritation

Precautionary Statement (s)

P261 Avoid breathing dust / fume / gas / mist / vapors / spray .
P305 + P351 + P338 IF IN EYES : Rinse thoroughly with water for several minutes . Remove Contact lenses, if easy to do. Continue rinsing.

2.3 Other hazard information:

none

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

3. Substances 1

Synonyms : MDB, 1,3-Benzodioxole-5,6-diamine, 5,6-diamino-1,3-benzodioxole, 4,5-Methylenedioxy-1,2-phenylenediamine

Formula : C7H8N2O2.2HCl

Molecular Weight : 225.07 g / mol

Component	Concentration
Name. 1, 2-Diamino-4,5-methylenedioxybenzene	100 %
CAS-No. 81864-15-5	

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General recommendations

Consult a doctor if the exposure causes adverse effects and if in doubt. Show this safety data sheet to doctor / first responder present.

Swallowing

Rinse mouth with water; Never give anything by mouth if the person has lost consciousness.

If the skin is exposed

Wash exposed area with soap and water.

If the eyes are exposed

Rinse thoroughly with water or eye wash solution for 15 minutes.

If inhaled

Move the person (s) made to a supply of fresh air. If not breathing, give artificial respiration.

4.2 Most important symptoms and effects, both acute and delayed

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

4.3 Indication of immediate medical attention and special treatment

Data not available.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing

Use a water jet, alcohol-resistant foam, dry chemical or carbon dioxide when it comes to small fires.

5.2 Special hazards arising from the substance or mixture

Carbon dioxide, nitrogen oxides (NOx) and Hydrogen chloride gas.

5.3 Advice for firefighters

Wear breathing apparatus for fire fighting if large amounts of product are on fire.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures and

Wear PPE when handling the product. Ensure adequate ventilation to avoid breathing dust.

6.2 Environmental precautions

Do not let the product to the exhaust system.

6.3 Methods and materials for containment and cleaning

Carefully wipe spillage with a damp cloth to prevent dust from forming. Place the spill and contaminated materials in a suitable container with a lid. Keep sealed until disposal can be arranged and collected.

6.4 Reference to other sections

For disposal refer to section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide adequate ventilation exhaust for work areas where product is handled. Use normal fire prevention.

7.2 Conditions for safe storage , including any incompatibilities

It is recommended that the product is stored at -20°C. Keep containers tightly closed, as a product of air sensitive . Keep out of the light, as it is sensitive to light.

7.3 Specific end uses

Data not available.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

This product does not contain substances with occupational exposure limit value.

8.2 Exposure controls

Engineering controls

Wear PPE when handling the product. Handle in accordance with good laboratory practices, wash your hands before and after the proposed work in the laboratory.

Protective equipment for staff

Eye / face protection

Wear safety glasses with side protection according to EN 166. 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. Before using the gloves they should be inspected and proper glove removal technique is used to avoid contact with this product. Dispose of used gloves as contaminated solid waste, according to applicable regulations and good laboratory practice. Wash and dry hands.

Gloves must meet the requirements of Directive 89/686 / EEC and the standard EN 374 derived from EU.

Body protection

Wear a lab coat or similar covering on the body.

Respiratory protection

Work in a well-ventilated area, under an exhaust hood if not in a well-ventilated area.

Thermal hazards

Data not available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical

Appearance - At room temperature.	Form: Crystalline
	Color: Beige
Odour	No data available
Odor threshold	Not available data
pH	No data available
Freezing / Melting Point	Melting point / range: 247°C
Initial boiling point and boiling range	No data available
Flash point	No data available
Evaporation Rate Data	No data available
Flammability	No data available
Upper / lower flammability or explosive	No Data available
Vapor Pressure	No Data available
Relative density	No data available
Solubility in water and solvents	No Data available
Partition coefficient	No Data available
Auto ignition temperature	No data available
Decomposition temperature	No Data available
Viscosity	No data available
Explosive properties	No Data available
Oxidising properties	No Data available

9.2 Other information

Data not available

SECTION 10. Stability and reactivity

10.1 Reactivity

Data not available

10.2 Chemical stability

Data not available

10.3 Possibility of hazardous reactions

Data not available

10.4 Conditions to avoid

Data not available

10.5 Incompatible materials

Data not available

10.6 Hazardous decomposition products

Other decomposition products - No Data available

SECTION 11. TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects****High toxicity**

Data not available

Corrosion / irritation

Data not available

Serious eye damage / irritation

Data not available

Respiratory or skin sensitization

Data not available

Germ cell mutagenicity

Data not available

Carcinogenicity

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

Reproductive toxicity

Data not available

STOT-single exposure

Inhalation - May cause respiratory irritation.

STOT repeated exposure

Data not available

Risk of aspiration.

Data not available

The potential health risks

Inhalation: May be harmful if inhaled. It causes respiratory tract irritation.

Ingestion: May be harmful if swallowed.

Skin: May be harmful if absorbed through the skin. It causes skin irritation.

Eyes: Causes severe eye irritation.

Signs and Symptoms of Exposure

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

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Data not available

12.2 Persistence and degradability

Data not available

12.3 Bio accumulative potential

Data not available

12.4. Mobility in soil

Data not available

12.5. Results of PBT and vPvB

Data not available

12.6 . Other adverse effects

Data not available

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Methods of waste treatment

Dispose of waste product / paid contacting and use a licensed disposal company . The product can be dissolved in a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated Packaging

Dispose of packaging as used product/ contaminated solid waste.

SECTION 14. TRANSPORT INFORMATION

14.1 UN number

ADR / RID : -

IMDG : -

IATA : -

14.2 Proper Shipping Name

ADR / RID : Not dangerous goods

IMDG : Not dangerous goods

IATA : Not dangerous goods

14.3 hazard class(es)

ADR / RID : - IMDG : - IATA : -

14.4 Packaging group

ADR / RID : - IMDG : - IATA : -

14.5 Environmental hazards

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

14.6 Special precautions for users

Data not available

SECTION 15. REGULATORY INFORMATION

15.1. Health, safety and environmental regulations / legislation specific for the substance or mixture

This safety data sheet complies with the requirements of Regulation (EC) 1907/2006.

15.2 Chemical Safety Assessment

No data available

Please note that the label elements that used to be under 15 are now under heading 2.

SECTION 16. OTHER INFORMATION

The advice offered is derived from the current available information on hazardous materials in product and component (s). The consideration was made regarding the quantities offered pre-dispensed into the container. The advice offered is, therefore, not all inclusive and should not be taken as descriptive of the compound in general .

SAFETY DATA SHEET

version 1.1

Date written: 25th November 2011

Date reviewed: 19th April 2017

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

Product Name	2M ACETIC ACID IN H₂O
Product Catalogue Name	LT-ACETIC2M-01
CAS-No.	64-19-7
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

According to Regulation (EC) No 1272/2008

Flammable liquids (Category 3)

Skin Corrosion (Category 1A)

2.2 Label elements



Signal Word: Danger

Hazard Statement(s)

H314	Causes severe burns and eye damage.
H226	Flammable liquid and vapour.

Precautionary Statement(s)

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTRE or doctor/physician.

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: Glacial Acetic Acid
 Formula: $C_2H_4O_2$
 Molecular Weight: 60.05g/mol

Component		Classification	Concentration
Name	Acetic Acid	Flam. Liq. 3	11.5% Acetic Acid
CAS-No.	64-19-7	Skin Corr. 1A	
EC-No.	200-580-7	H314, H226	
Index-No.	607-002-00-6		
Name	Water		88.5% water
CAS-No.	7732-731-5		
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. Never give anything by mouth if person is unconscious. Rinse mouth with water.

If skin is exposed

Remove contaminated clothing and shoes immediately. Wash off with plenty of soap and water.

If eyes are exposed

Rinse thoroughly with plenty of water for at least 15 minutes.

If inhaled

Move person into fresh air. If not breathing give artificial respiration.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

For small fires; use an "alcohol" foam, dry chemical or carbon dioxide extinguisher.

For large fires: apply water from as far away as possible. Use very large quantities of water to flood the fire, as a mist or spray.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Use water spray to cool unopened containers, if present and to wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition.

6.2 Environmental Precautions

Do not let the product enter the drainage system.

6.3 Methods and material for containment and cleaning up

Contain the spillage, with a spill kit using non-combustible material, e.g. sand, diatomaceous earth, and vermiculite. Collect materials into a container with a tight fitting lid and arrange to be disposed of.

6.4 Reference to other sections

More about disposal of product in Section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid breathing in vapours or mist. Keep away from sources of ignition.

7.2 Conditions for safe storage, including any incompatibilities

Store in a dry, cool and well ventilated cabinet.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components	CAS-No.	Value	Control Parameters	Update	Basis
Acetic Acid	64-19-7	TWA	10ppm 25mg/m ³	191-07-05	Europe. Commission Directive 91/322/EEC on establishing indicative limit values.
Remarks	Indicative				

8.2 Exposure controls

Appropriate engineering controls

Wear PPE when handling the product, following good laboratory practice in hygiene and safety.

Personal Protective Equipment

Eye / face protection

Wear laboratory glasses with side-shields conforming to EN166. Use eye protection equipment tested and approved under the appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection

Wear gloves when handling the product. Prior to use, the gloves must be inspected and proper glove removal technique is used, to avoid contact with this product. Dispose of gloves as solid contaminated waste, according to applicable regulations and good laboratory practice. 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 the body.

Respiratory protection

Handling/ use the product in a well ventilated area, if required use a fume hood, when the work area has little ventilation.

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	2.4 at 60.05g/l
Melting Point	16.2°C – lit.
Initial boiling point and boiling range	117 -118°C – lit.
Flash Point	40.0°C – closed cup
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	4% (V), lower 19.9% (V), upper
Vapour Pressure	73.3hPa at 50.0°C 15.2hPa at 20.0°C
Relative Density	1.049 g/cm ³ at 25°C
Solubility in water	completely miscible
Partition coefficient	log Pow: - 0.17
Auto ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

9.2 Other information

No data available

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available.

10.2 Chemical stability

Stable under the recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available.

10.4 Conditions to Avoid

Heat, flames and sparks.

10.5 Incompatible materials

Oxidizing agents, soluble carbonates and phosphates, Hydroxides, Metals, Peroxides, permanganates, e.g. potassium permanganate, Amines, Alcohols.

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions – Carbon oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral – Rat – 3,310 mg/kg

LD50 Inhalation – Mouse – 1h – 5620ppm

Remarks: Sense organs and special senses (nose, eye, ear and taste): Eye: Conjunctive irritation.

Sense organs and special senses (nose, eye, ear and taste): Eye: Other. Blood: Other changes.

LD50 Dermal – Rabbit – 1,112 mg/kg

Skin corrosion/irritation

Skin – Rabbit – Mild skin irritation – 24h

Serious eye damage/irritation

Eyes – Rabbit – Corrosive to eyes.

Respiratory or skin sensitisation

May cause sensitisation by skin contact.

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater then 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. Material is harmful to the tissue of the mucous membranes and upper respiratory tract.

Ingestion

May be harmful if swallowed. Causes severe burns.

Skin

skin.

May be harmful if absorbed through the skin. Causes severe burns to

Eyes

Causes severe eye burns.

Signs and symptoms of exposure

No data available

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish

LC50 - Leuciscus (Golden orfe) – 410.00 mg/l – 48h

LC50 – Cyprinus carpio (Carp) – 49.00 mg/l – 48h

LC50 - Pimephales promelas (fathead minnow) – 79.00-88.00 mg/l –

96h

LC50 – Lepomis macrochirus – 75 mg/l – 96h

Toxicity to daphnia and
Other aquatic invertebrates EC50 – Daphina magna (water flea) – 65.00 mg/l – 48 h

12.2 Persistence and degradability

Biodegradability Remarks: Expected to be bio degradable.

12.3 Bio accumulative 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 on ecological information.

Biochemical Oxygen Demand is 880 mg/l.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Contact a licensed professional waste disposal service for the disposal of waste product. This product can be burned in a chemical incinerator with an afterburner and scrubber.

Contaminated packaging

Dispose of packaging as used product/ contaminated solid waste.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number

ADR/RID: 2789 IMDG: 2789 IATA: 2789

14.2 UN Proper Shipping Name

ADR/RID: ACETIC ACID, GLACIAL

IMDG: ACETIC ACID, GLACIAL

IATA: Acetic Acid, Glacial

14.3 Transport hazard class (es)

ADR/RID: Class 8 (3) IMDG: Class 8 (3) IATA:

Class 8 (3)

14.4 Packing group

ADR/RID: Group II IMDG: Group II IATA:

Group II

14.5 Environmental hazards

ADR/RID: No IMDG Marine pollutant: EMS-No F-E, S-C IATA: No

14.6 Special precautions for user

No data available

SECTION 15. REGULATORY INFORMATION

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

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical Safety Assessment

No data available

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

SECTION 16. OTHER INFORMATION

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

SAFETY DATA SHEET

version 1.1

Date written: 19th November 2011

Date reviewed: 19th April 2017

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

Product Name	Sodium Dithionite
Product Catalogue Name	LT-DITHIO-01
CAS-No.	7775-14-6
Company:	Ludger Ltd Culham Science Centre Abingdon Oxfordshire OX14 3EB
Telephone:	01865 408554
Emergency Telephone:	01865 408554
Email:	info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [EU-GHS/CLP]

Self-heating substances (Category 1)

Acute toxicity, Oral (Category 4)

2.2 Label elements



Signal Word: Danger

Hazard Statement(s)

H251 Self-heating; may catch fire.

H305 Harmful if swallowed.

Precautionary Statement(s)

P235+P410 Keep cool. Protect from sunlight.

2.3 Other hazard information:

Supplemental Hazard information (EU)

EUH031 Contact with acids liberates toxic gas.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms: Sodium Hydrosulfite
Sodium Hypodisulfite

Formula: $\text{Na}_2\text{O}_4\text{S}_2$

Molecular Weight 174.11 g/mol

Component		Concentration
Name	Sodium Dithionite	100 %
CAS-No.	7775-14-6	
EC-No.	231-890-0	
Index-No.	016-028-00-1	

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice

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

If Ingested

Rinse mouth well with water; if person has lost consciousness do not give anything. Consult a physician.

If skin is exposed

Wash with plenty of water and soap the exposed area. Consult a physician.

If eyes are exposed

Rinse eyes well with water or eye wash, if available and if possible removed contact lenses and rinse well again. Consult a physician.

If inhaled

Move affected person(s) to a source of fresh air. If not breathing, give artificial respiration. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

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

4.3 Indication of immediate medical attention and special treatment needed

No data available.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable media for extinguishing fire, Dry powder, Carbon dioxide (CO_2)
Unsuitable media for extinguishing fire, Water.

5.2 Special hazards arising from the substance or mixture

Sulphur oxides, Sodium/sodium oxides,

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighters, if necessary. Do not use water.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation, breathing in vapours, mist or gas. Ensure adequate ventilation when clearing. Wear respiration protection in an emergency if little ventilation, evacuate personnel to safe areas.

6.4 Environmental Precautions

Prevent any further leakage of spillage if safe to do so. Do not let the product enter the drainage system; discharge into the environment must be avoided.

6.5 Methods and material for containment and cleaning up

Contain the spillage; collect up by using either an electrically protected vacuum cleaner or by wet brushing, put spilled product into a container with a lid. Arrange for the container to be disposed of (see section 13).

6.4 Reference to other sections

See section 13 for more details for disposal of product.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where product is in use. Keep away from sources of ignition – No smoking.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool place. Keep container tightly closed in a dry and well ventilated place. Never allow product to get into contact with water during storage. Do not store near acids. Air and moisture sensitive.

7.3 Specific end uses

No data available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters.

Contains no substances with occupational exposure limit values.

8.3 Exposure controls

Appropriate engineering controls

Handle in accordance with good laboratory safety and hygiene practice. Wash hands before and after handling the product, even with the use of gloves.

Personal Protective Equipment

Eye / face protection

User to wear safety glasses. Use equipment for eye protection to be tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection

Handle with gloves. Gloves must be inspected before used for tears etc, prior to use. Remove gloves using the proper gloves removal technique (without touching the gloves outer surface) to avoid skin contact. Gloves are to be disposed of as contaminated waste. Wash and dry hands. Gloves to satisfy the specifications of EU directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection

User to wear a Laboratory coat or similar covering over their outside clothing.

Respiratory protection

Product to be used under extraction.

Thermal hazards

No data available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: Powder
	Colour: White
Odour	No data available
Odour threshold	No data available
pH	7.0 - 9 at 50 g/l at 20°C
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
Vapour density	No data available
Relative Density	2.500 g/cm ³ at 20°C
Solubility in water and solvents (mg/l)	No data available
Partition coefficient	log Pow: < -4.7
Autoignition temperature	The substance or mixture is classified as self heating with the subcategory 1.
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 1,250 kg/m³

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

Do not allow water to enter container because of violent reaction. Avoid moisture. Heat.

10.5 Incompatible materials

Strong oxidizing agents, acids, water

10.6 Hazardous decomposition products

Other decomposition products – no data available.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Skin corrosion/irritation

No data available

Serious eye damage/irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product 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 cause respiratory tract irritation.

Ingestion Harmful if swallowed.

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

Eyes May cause eye irritation.

Signs and symptoms of exposure

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

RTESC: Not available

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 – *Leuciscus idus* (Golden Orfe) – 10-100 mg/l – 96h

Toxicity to daphnia and other aquatic invertebrates. EC50 – *Daphnia magna* (Water flea) – 10-100 mg/l – 48h

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

Toxic to aquatic life. No other data available

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Contact a licensed professional waste disposal service to dispose of any waste material. The waste can be burnt in a chemical incinerator equipped with an afterburner and scrubber. Caution must be used as the product is highly flammable.

Contaminated packaging

Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number

ADR/RID: 1384

IMDG: 1384

IATA: 1384

14.2 UN Proper Shipping Name

ADR/RID: SODIUM DITHIONITE

IMDG: SODIUM DITHIONITE

IATA: Sodium dithionite

14.3 Transport hazard class (es)

ADR/RID: 4.2

IMDG: 4.2

IATA: 4.2

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

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

No data available.

15.2 Chemical Safety Assessment

No data available.

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

SECTION 16. OTHER INFORMATION

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

SAFETY DATA SHEET

version 1.1

Date written: 20th December 2011

Date reviewed: 19th April 2017

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

Product Name	Mercaptoethanol in Acetic Acid		
Product Catalogue Name	LT-MERCAPTO-01		
CAS-No.	2-Mercaptoethanol	60-24-2	
	Acetic Acid	64-19-7	
	Water	7732-18-5	
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

Acetic Acid: - According to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
 Flammable liquids (Category 3)
 Skin Corrosion (Category 1A)

2-Mercaptoethanol: - According to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
 Acute toxicity, Oral (Category 3)
 Acute toxicity, Inhalation (Category 2)
 Acute toxicity, Dermal (Category 2)
 Skin irritation (Category 2)
 Serious eye damage (Category 1)
 Skin sensitization (Category 1)
 Acute aquatic toxicity (Category 1)
 Chronic aquatic toxicity (Category 1)

2.2 Label elements



Signal Word: Danger

Hazard Statement(s)

H301+H331	Toxic if swallowed or inhaled
H310	Fatal if in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.

H318	Causes serious eye damage.
H226	Flammable liquid and vapour.
H330	Fatal if inhaled.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statement(s)

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/eye protection/ face protection.
P284	Wear respiratory protection.
P301+P310	IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
P302+P350	IF ON SKIN: Gently wash with plenty of soap and water.
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:

Stench, rapidly absorbed through skin.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3. 1 Substances

Synonyms:

2-Mercaptoethanol
 Thioethylene glycol
 2- Hydroxyethylmercaptan
 BME
 β-Mercaptoethanol
Acetic Acid
 Glacial Acetic Acid
Water

Formula (2-Mercaptoethanol):	C ₂ H ₆ OS
Formula (Acetic Acid):	C ₂ H ₄ O ₂
Formula (Water):	H ₂ O
Molecular weight (2-Mercaptoethanol):	78.13 g/mol
Molecular weight (Acetic Acid):	60.05 g/mol
Molecular weight (Water):	18.02 g/mol

Component		Concentration
Name	2-Mercaptoethanol	5%
CAS-No.	60-24-2	
EC-No.	200-464-6	
2 nd Name	Acetic Acid	8%
CAS-No.	64-19-7	
EC-No.	200-580-7	
Index-No.	607-002-00-6	

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. Do not give anything by mouth if person is unconscious. Rinse mouth well with water. Consult a physician.

If skin is exposed

Wash exposed skin with plenty of soap and water, seek medical advice. Consult a physician.

If eyes are exposed

Rinse thoroughly with plenty of water/eye wash solution for at least 15 minutes. Consult a physician.

If inhaled

Move effected person to a source of fresh air. If not breathing, give artificial respiration. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Burning sensation, Cough, Wheezing, Laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Weakness, Unconsciousness, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes and skin, spasm, inflammation and edema of the larynx, inflammation and edema of the bronchi, pulmonary edema.

4.3 Indication of immediate medical attention and special treatment needed

No data available.

SECTION 5. FIRE-FIGHTING MEASURES**5.1 Extinguishing media**

Use an extinguisher such as "alcohol" foam, dry chemical or carbon dioxide. Large fires water can be used but must be applied from as far as possible. Flood the area as a mist or spray, keep any containers near the fire cool.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Sulphur oxides.

5.3 Advice for firefighters

If necessary wear self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

If no fume hood/ extraction wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation and remove any sources of ignition. Beware of vapours accumulating to form explosive concentrations as they can accumulate in low areas.

6.6 Environmental Precautions

Prevent any further leakage/spillage if safe to do so. Do not let the product enter the drainage system and discharge into the environment must be avoided.

6.7 Methods and material for containment and cleaning up

Contain the spillage; collect the product with a non-combustible absorbent material such as sand, earth, or vermiculite. Sweep/shovel the material into a container with a secure fitting lid and arrange the material to be picked up and disposed of, according to local regulations.

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 and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition – No smoking. Take measures to prevent electrostatic charge.

7.2 Conditions for safe storage, including any incompatibilities

Store in a dry, cool and well ventilated place. Protect container from being damaged. Recommended storage temperature 2 - 8 °C Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end uses

No data available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

ACETIC ACID

CAS-No.	Value	Control Parameters	Update	Basis
64-19-7	TWA	10ppm 25mg/m ³	1991-07-05	Europe. Commission Directive 91/322/EEC on establishing indicative limit on values.
Remarks	Indicative			

2-Mercaptoethanol and water contain no substances with occupational exposure limits values.

8.4 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before and after handling the product. Handle under extraction.

Personal Protective Equipment

Eye / face protection

Tightly fitted safety glasses/ goggles. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection

Handle with gloves. Gloves must be inspected before use and proper removal technique to be used, so that the gloves outer surface does not touch the skin, so the product does not touch the skin. Gloves to be disposed of as contaminated solid laboratory waste, using a licensed disposal company. Wash and dry hands. The gloves used must satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection

Choose suitable protection according to the amount and concentration of the product used a laboratory coat or similar covering for outside clothing.

Respiratory protection

Use external fixed extraction unit when handling, if unavailable use a respirator, complying with government standards such as HIOSH (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	Stench
Odour threshold	No data available
pH	4.0 – 6.0 at 20°C
Freezing/Melting Point	< -18°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 and solvents (mg/l)	Completely miscible
Partition coefficient: n-octanol/water	No data available
Auto ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

9.2 Other information

No data available

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under the recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to Avoid

Heat, flames and sparks

10.5 Incompatible materials

Metals, Oxidizing agents, Soluble carbonates and phosphates, Hydroxides, Peroxides, permanganates, e.g. potassium permanganate, Amines and Alcohols.

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions – Carbon dioxides.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Acetic Acid:

LD50 – Rat – 3,310 mg/kg

LC50 Inhalation – Mouse – 1h – 5620 ppm

Remarks: Sense organs and special senses (Nose, Eye, Ear and Taste): Eye: Conjunctive irritation.
Sense organs and special senses (Nose, Eye, Ear and Taste): Eye: Other. Blood: Other changes.

LD50 dermal – Rabbit – 1,112 mg/kg

2-Mercaptoethanol:

LD50 Oral – Rat – 98-162 mg/kg

LC50 Inhalation – Rat – 4h – 2 mg/l

LD50 Dermal – Rabbit – 112-224 mg/kg

Skin corrosion/irritation

Acetic Acid:

Skin – Rabbit – Mild skin irritation – 24h

2-Mercaptoethanol:

Skin – Rabbit – Mild skin irritation – Draize Test

Serious eye damage/irritation

Eyes – Rabbit – Corrosive to eyes, a risk of serious damage to eyes.

Respiratory or skin sensitisation

Maximisation Test – Guinea pig – OECD Test Guideline 406 – May cause sensitization by skin contact.

Germ cell mutagenicity

Experiments showed mutagenic effects in cultured bacteria cells.

Carcinogenicity

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

Reproductive toxicity

No data available.

STOT-single exposure

No data available.

STOT-repeated exposure

No data available.

Aspiration hazard.

No data available.

Potential Health Hazards

Inhalation May be harmful if inhaled. Causes damage to the respiratory system.

Ingestion Harmful if swallowed. Causes severe burns.

Skin Harmful if absorbed through the skin. Causes severe skin irritation/burns.

Eyes Causes eye burns.

Signs and symptoms of exposure

Burning sensation, Cough, Wheezing, Laryngitis, and Shortness of breath, Headache, Nausea, Vomiting, Weakness, Unconsciousness, and Material is extremely destructive to tissue of the

mucous membranes and upper respiratory tract, eyes and skin, spasm, inflammation and edema of the larynx, inflammation and edema of the bronchi, pulmonary edema.
To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

Additional Information

RTECS: KL5600000 (2-Mercaptoethanol)

RTECS: AF1225000 (Acetic Acid)

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to Fish - Acetic Acid

LC50 – *Leuciscus idus* (Golden Orfe) – 410.00mg/l – 48h

LC50 – *Cyprinus carpio* (Carp) – 49.00mg/l – 48h

LC50 – *Pimephales promelas* (Fathead minnow) – 79.00 - 88.00mg/l – 96h

LC50 – *Lepomis macrochirus* – 75mg/l – 96h

Toxicity to Daphnia and other aquatic invertebrates.

EC50 – *Daphnia magna* (Water flea) – 65.00mg/l – 48h

Toxicity to Fish – 2-Mercaptoethanol

LC50 - *Leuciscus idus* (Golden Orfe) – 46-100 mg/l – 96.0h

Toxicity to Daphnia and other aquatic invertebrates.

EC50 – *Daphnia* – 1.52mg/l – 48h

EC50 – *Daphnia* – 0.89 mg/l -48h Method: OECD Test Guideline 202

Toxicity to Algae

EC50 – *Desmodesmus subspicatus* (green algae) – 12 mg/l – 72h

Toxicity to Bacteria

LC50 – Bateria – 125 mg/l – 17h

12.2 Persistence and degradability

Biodegradability: Not really biodegradable.

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

Acetic Acid: Biochemical Oxygen demand (BOD): 880mg/g

2-Mercaptoethanol: Very Toxic to aquatic life with long lasting effects.

Biochemical Oxygen Demand (BOD): 105mg/g

Chemical Oxygen Demand (COD): 1.894mg/g

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

This product may be burned, when mixed with other combustible materials in a chemical incinerator equipped with an afterburner and scrubber. If not possible use a licensed professional waste disposal company to collect and dispose of the waste material.

Contaminated packaging

Treat as an unused/unopened product.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number

Acetic Acid:	ADR/RID: 2789	IMDG: 2789	IATA: 2789
2-Mercaptoethanol:	ADR/RID: 2966	IMDG: 2966	IATA: 2966

14.2 UN Proper Shipping Name

Acetic Acid: ADR/RID: ACETIC ACID, GLACIAL
 IMDG: ACETIC ACID, GLACIAL
 IATA: Acetic acid, glacial
 2-Mercaptoethanol: ADR/RID: THIOGLYCOL
 IMDG: THIOGLYCOL
 IATA: Thioglycol

14.3 Transport hazard class (es)

Acetic Acid:	ADR/RID: Class 8(3)	IMDG: Class 8(3)	IATA:
Class 8(3)			
2-Mercaptoethanol:	ADR/RID: Class 6(1)	IMDG: Class 6(1)	IATA:
Class 6(1)			

14.4 Packing group

Acetic Acid:	ADR/RID: II	IMDG: II	IATA: II
2-Mercaptoethanol:	ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

Acetic Acid:	ADR/RID: No	IMDG Marine pollutant: No	IATA: No
2-Mercaptoethanol:	ADR/RID: Yes	IMDG Marine pollutant: Yes	IATA: No

14.6 Special precautions for user

Do not let the product enter the drainage system.

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 for the substance or mixture

No data available

15.2 Chemical Safety Assessment

No data available

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

SECTION 16. OTHER INFORMATION

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

SAFETY DATA SHEET

version 2.1

Date written: 4th January 2012

Date reviewed: 19th April 2017

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

Product Name	N-acetylneuraminic acid, 5-N-Acetyl-9-O-acetyl neuraminic acid
Product Catalogue Names	CM-NEUAC-01, CM-NEUAC-100, CM-NEU5,9AC2-01
CAS-No.	131-48-6 and 55717-54-9
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]

Eye irritation (Category 2)

2.2 Label elements



Signal Word: Warning

Hazard Statement(s)

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

N-acetylneuraminic acid

Synonyms:	NANA, Lactaminic acid, Sialic acid, NAN, 5-Acetamido-3,5-dideoxy-D-glycero-D-galactononulosonic acid
Formula:	C ₁₁ H ₁₉ NO ₉
Molecular weight:	309.27 g/mol

5-N-Acetyl-9-O-acetyl neuraminic acid

Formula: Please see CofA for the product or contact Ludger for more information.

Molecular Weight: Please see CofA for the product or contact Ludger for more information.

Component		Concentration
Name	Neu5Ac standard	100%
CAS-No.	131-48-6	
EC-No.	205-023-1	

Component		Concentration
Name	Neu5,9Ac2 standard	100%
CAS-No.	55717-54-9	
EC-No.	-	

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

If inhaled

Remove effected person(s) to a source of fresh air. If person is 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 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

Water spray, dry chemical, 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

Emits toxic fumes of Nitrogen oxides (NOx), Carbon oxides under fire conditions.

5.3 Advice for firefighters

Fire fighters to wear self-contained breathing apparatus, if deemed necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid breathing in any material, dust mask if appropriate. Wear laboratory gloves and protective clothing, such as a laboratory coat.

6.8 Environmental Precautions

Do not let the product enter the drainage system.

6.9 Methods and material for containment and cleaning up

Collect the spillage with an absorbent material, such as paper towel, vermiculite, sand. Collect and store the spillage/waste material in an appropriately labelled container, arrange collection for disposal. Wash 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, in accordance with good laboratory practice and wash hands before and after handling the material.

7.2 Conditions for safe storage, including any incompatibilities

Store below - 18°C. The material is to be stored in original packaging or similar tightly closing packaging.

7.3 Specific end uses

No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with work place control parameters

This product contains no substances with occupational exposure limit values.

8.5 Exposure controls

Appropriate engineering controls

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

Body Protection

Wear laboratory coat or similar coverings.

Respiratory protection

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

Thermal hazards

No data available

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Opaque crystalline powder
Odour	None
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	No data available
Initial boiling point and boiling range	No data available
Flash Point	No data available
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Relative Density	No data available
Solubility in water and solvents	Freely soluble
Partition coefficient	No data available
Autoignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

9.2 Other information

No data available

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable when stored at recommended temperature. Store at -18°C.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to Avoid

Avoid exposure to sources of heat and humidity.

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous decomposition products

Exposure to high temperatures, decomposition material emits toxic fumes of NOx.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Skin corrosion/irritation

No data available

Serious eye damage/irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

NTP, IARC and OSHA: 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 Causes eye irritation.

Signs and symptoms of exposure

Possible hypersensitivity to 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

No data available

12.6. Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Any waste substances should be disposed of by a licensed professional disposal company.

Contaminated packaging

Dispose of as a used product/material.

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number

ADR/RID: -

IMDG: -

IATA: -

14.2 UN Proper Shipping Name

ADR/RID: Not Dangerous Goods

IMDG: Not Dangerous Goods

IATA: Not Dangerous Goods

14.3 Transport hazard class(es)

ADR/RID: -

IMDG: -

IATA: -

14.4 Packing group

ADR/RID: -

IMDG: -

IATA: -

14.5 Environmental hazards

ADR/RID: No

IMDG Marine pollutant: No

IATA: No

14.6 Special precautions for user

No data available

SECTION 15. REGULATORY INFORMATION

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

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

Regulatory information: EINECS# 205-023-1

15.2 Chemical Safety Assessment

No data available

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

SECTION 16. OTHER INFORMATION

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

SAFETY DATA SHEET

version 1.1

Date written: 15th August 2012

Date reviewed: 19th April 2017

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

Product Name	N-glycolylneuraminic acid
Product Catalogue Name	CM-NEUGC-01/100
CAS-No.	1113-83-3
Company:	Ludger Ltd Culham Science Centre Abingdon Oxfordshire OX14 3EB
Telephone:	01865 408554
Emergency Telephone:	01865 408554
Email:	info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [EU-GHS/CLP]

Eye irritation (Category 2)

2.2 Label elements



Signal Word: Warning

Hazard Statement(s)

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:	NeuGc sialic acid 3,5-dideoxy-5-((hydroxyacetyl)amino)-D-glycero-D-galacto-2-Nonulosonic acid Neu5Gc
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Formula: NGNA
 $C_{11}H_{19}NO_{10}$
 Molecular Weight: 325.3 g/mol

Component		Concentration
Name	Neu5Gc	100%
CAS-No.	1113-83-3	
EC-No.	No data available	

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice

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

If Ingested

Rinse mouth well with water.

If skin is exposed

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

If eyes are exposed

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

If inhaled

Remove effected person(s) to a source of fresh air. If person is 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 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

Water spray, dry chemical, 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

Emits toxic fumes of Nitrogen oxides (NO_x), Carbon oxides under fire conditions.

5.3 Advice for firefighters

Fire fighters to wear self-contained breathing apparatus, if deemed necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid breathing in any material, dust mask if appropriate. Wear laboratory gloves and protective clothing, such as a laboratory coat.

6.10 Environmental Precautions

Do not let the product enter the drainage system.

6.11 Methods and material for containment and cleaning up

Collect the spillage with an absorbent material, such as paper towel, vermiculite, sand. Collect and store the spillage/waste material in an appropriately labelled container, arrange collection for disposal. Wash 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, in accordance with good laboratory practice and wash hands before and after handling the material.

7.2 Conditions for safe storage, including any incompatibilities

Store below - 18°C. The material is to be stored in original packaging or similar tightly closing packaging.

7.3 Specific end uses

No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with work place control parameters

This product contains no substances with occupational exposure limit values.

8.6 Exposure controls

Appropriate engineering controls

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

Body Protection

Wear laboratory coat or similar coverings.

Respiratory protection

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

Thermal hazards

No data available

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Opaque crystalline powder
Odour	None
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	No data available
Initial boiling point and boiling range	No data available
Flash Point	No data available
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Relative Density	No data available
Solubility in water and solvents	Freely soluble
Partition coefficient	No data available
Autoignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

9.2 Other information

No data available

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable when stored at recommended temperature. Store at -18°C.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to Avoid

Avoid exposure to sources of heat and humidity.

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous decomposition products

Exposure to high temperatures, decomposition material emits toxic fumes of NO_x.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Skin corrosion/irritation

No data available

Serious eye damage/irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

NTP, IARC and OSHA: 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 Causes eye irritation.

Signs and symptoms of exposure

Possible hypersensitivity to 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

No data available

12.6. Other adverse effects

No data available

SAFETY DATA SHEET

version 1.1

Date written: 4th January 2012

Date reviewed: 19th April 2017

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

Product Name	Sialic Acid Reference Panel
Product Catalogue Name	CM-SRP-01
CAS-No.	None
Company:	Ludger Ltd Culham Science Centre Abingdon Oxfordshire OX14 3EB
Telephone:	01865 408554
Emergency Telephone:	01865 408554
Email:	info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [EU-GHS/CLP]

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

2.2 Label elements

The substance does not require any labelling in accordance with EC directives or respective national laws.

Signal Word: None

Hazard Statement(s)

None

Precautionary Statement(s)

None

2.3 Other hazard information:

None

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms: Sialic Acid Reference Panel, SRP

Component		Concentration
Name	Sialic Acid Reference Panel	100%
CAS-No.	Not required	
EC-No.	No data available	

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice

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

If Ingested

Rinse mouth well with water.

If skin is exposed

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

If eyes are exposed

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

If inhaled

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

4.2 Most important symptoms and effects, both acute and delayed

No data available

4.3 Indication of immediate medical attention and special treatment needed

No data available

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

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

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Fire fighters to wear self-contained breathing apparatus, if deemed necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid breathing in any material, dust mask if appropriate. Wear laboratory gloves and protective clothing, such as a laboratory coat.

6.12 Environmental Precautions

No data available

6.13 Methods and material for containment and cleaning up

Collect the spillage with an absorbent material, such as paper towel, vermiculite, sand. Collect and store the spillage/waste material in an appropriately labelled container, arrange collection for disposal. Wash 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. Wear laboratory gloves, coat and glasses, in accordance with good laboratory practice and wash hands before and after handling the material.

7.2 Conditions for safe storage, including any incompatibilities

Store below - 18°C. The material is to be stored in original packaging or similar tightly closing packaging.

7.3 Specific end uses

No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with work place control parameters

This product contains no substances with occupational exposure limit values.

8.7 Exposure controls

Appropriate engineering controls

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

Body Protection

Wear laboratory coat or similar coverings.

Respiratory protection

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

Thermal hazards

No data available

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Opaque crystalline powder
Odour	None
Odour threshold	No data available
pH	No data available
Freezing/Melting Point	No data available

Initial boiling point and boiling range	No data available
Flash Point	No data available
Evaporation rate	No data available
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Vapour Pressure	No data available
Relative Density	No data available
Solubility in water and solvents	Soluble
Partition coefficient	No data available
Autoignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

9.2 Other information

No data available

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable when stored at recommended temperature. Store at -18°C.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to Avoid

Avoid exposure to sources of heat and humidity.

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

No data available

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Skin corrosion/irritation

No data available

Serious eye damage/irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

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

Reproductive toxicity

No data available

STOT-single exposure

No data available

STOT-repeated exposure

No data available

Aspiration hazard.

No data available

Potential Health Hazards

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

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

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

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

Signs and symptoms of exposure

Possible hypersensitivity to material.

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**

Any waste substances should be disposed of by a licensed professional disposal company.

Contaminated packaging

Dispose of as a used product/material.

SECTION 14. TRANSPORT INFORMATION**14.1 UN Number**

ADR/RID: -

IMDG: -

IATA: -

14.2 UN Proper Shipping Name

ADR/RID: Not Dangerous Goods

