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

Product # LT-KDMB-A1

Ludger Document # LT-KDMB-A1-Guide-v6.4

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Contents

Specifications for LT-KDMB-A1

Application

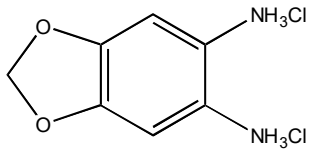
For release of sialic acids from glycoproteins and labeling with 1,2-diamino-4,5-methylenedioxybenzene.2HCl (DMB).

Dye Properties

Relative Molecular Mass = 225.07 gmol-1

Fluorescence, λex = 373 nm, λem = 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 µg 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 µL
LT-DITHIO-01	Sodium Dithionite (Reductant)	4 mg
CM-NEUAC-01	*N*-acetylneuraminic acid quantitative standard	1 nmol
CM-NEUGC-01	*N*-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 Neu5,9Ac_2 [*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) *this can be performed the day before*
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 Neu5,9Ac$_2$ (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 Neu5,9Ac$_2$ 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 then 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 Neu5,9Ac$_2$ 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 72 hours.

- 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

s updated

s listed in

8.4 nmol

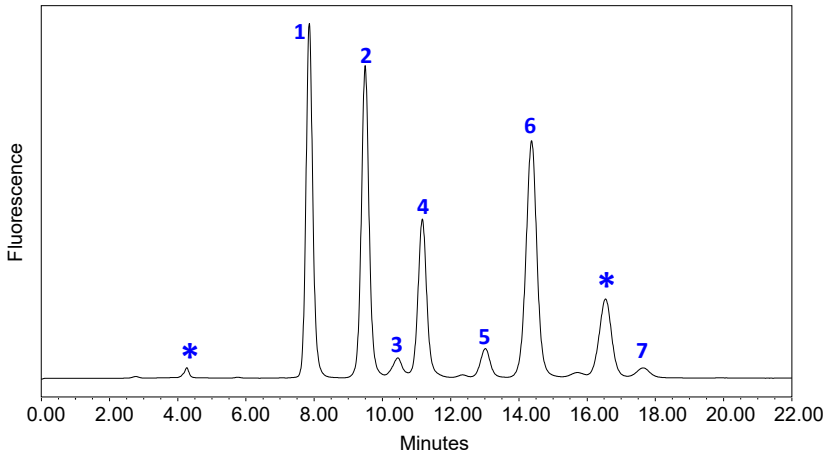


Figure 1: Chromatogram of DMB Labelled Sialic Acid Reference Panel (CM-SRP-01) run on the LudgerSep-R1 HPLC column.

*Peaks: 1 = Neu5Gc; 2 = Neu5Ac; 3 = Neu5,7Ac$_2$; 4 = Neu5Gc,9Ac; 5 = Neu5,8Ac$_2$; 6 = Neu5,9Ac$_2$; 7 = Neu5,x,xAc$_3$ (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

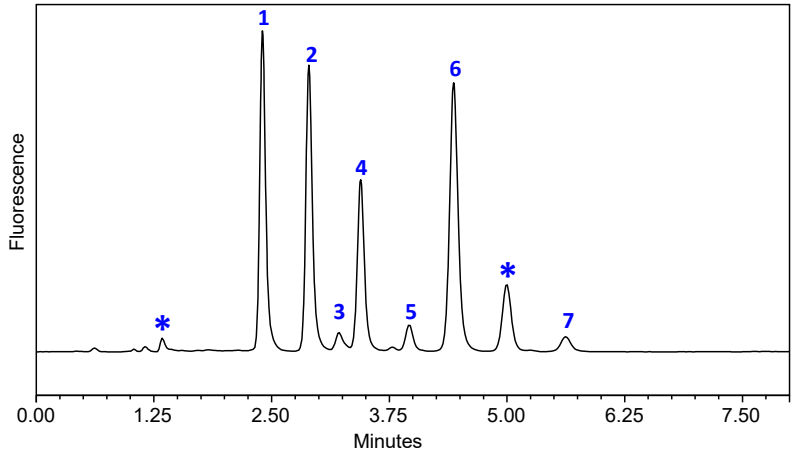


Figure 2: DMB Labelled Sialic Acid Reference Panel run on the LudgerSep-uR2 UHPLC column.

*Peaks: 1 = Neu5Gc; 2 = Neu5Ac; 3 = Neu5,7Ac$_2$; 4 = Neu5Gc,9Ac; 5 = Neu5,8Ac$_2$; 6 = Neu5,9Ac$_2$; 7 = Neu5,x,xAc$_3$ (where x is an unknown acetyl position); * = Reagent.*

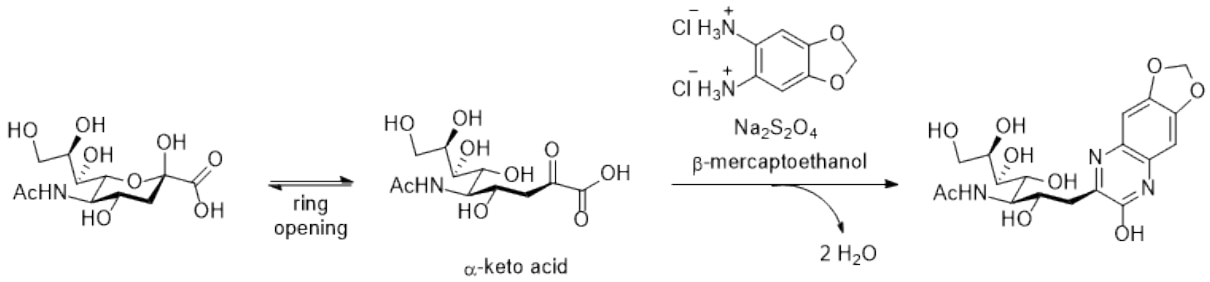
Note: This chromatogram is provided as an example only. Peak width, resolution and retention are dependent on the UHPLC system setup in your laboratory.

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-v3.0. Determination of Acceptance Criteria for Fetuin System Suitability Standard in Sialic Acid Analysis
3. 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 warrants, expressed or implied, including any implied conditions or warranties of merchantability or fitness for any particular purpose.

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

This product is intended for in vitro research only.

Document Revision Number

Document # LT-KDMB-A1-Guide-v6.4

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 H_2O**
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/m3	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/cm3 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	May be harmful if absorbed through the skin. Causes severe burns to skin.
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
Toxicty 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 it component(s). Consideration has been made regarding the quantities offered in the pre dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.

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:	$Na_2O_4S_2$
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 form 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 fro it.

Body Protection
User to wear a Laboratory coat or similar covering over there 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/cm3 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 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. 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 it component(s). Consideration has been made regarding the quantities offered in the pre dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.

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 and 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- Hydroxyethlmercaptan
BME
β-Mercaptoethanol
Acetic Acid
Glacial Acetic Acid
Water

Formula (2-Mercaptoethanol): C_2H_6OS
Formula (Acetic Acid): $C_2H_4O_2$
Formula (Water): H_2O
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	
2nd 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 form 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/m3	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: Conjective 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 it component(s). Consideration has been made regarding the quantities offered in the pre dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.

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:	C11H19NO9
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/tares 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 it component(s). Consideration has been made regarding the quantities offered in the pre dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.

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
NGNA
Formula: $C_{11}H_{19}NO_{10}$
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 (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.

6.10 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/tares 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 it component(s). Consideration has been made regarding the quantities offered in the pre dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.

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/tares 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
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
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 it component(s). Consideration has been made regarding the quantities offered in the pre dispensed container. The advice offered is, therefore not all inclusive nor should it be taken as the descriptive of the compound generally.