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Product Guide for LudgerZyme™ PNGase F Release Kit

Product # LZ-rPNGaseF-kit

Ludger Document # LZ-rPNGaseF-kit-Guide-v.1.0

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Specifications for LZ-rPNGaseF-kit

Application	LudgerZyme Peptide N-glycosidase F (PNGase F) is suitable for release of N-linked glycans in solution, and from immobilized samples. The enzyme cleaves between the innermost GlcNAc of the oligosaccharide moiety at its attachment point to the asparagine residue on the protein and subsequently converts the asparagine into aspartic acid. Released glycans with free reducing terminus can be labelled using LudgerTag labelling technology for fluorescence and high MS sensitivity detection.
Description	LudgerZyme PNGase F (EC 3.5.1.52) is a recombinant glycosidase cloned from <i>Elizabethkingia miricola</i> and expressed in <i>E. coli</i> . The enzyme is supplied glycerol free (for optimal performance in HPLC intensive methods) along with Reaction Buffer, Denaturation Solution and NP-40 Solution for efficient de-glycosylation. The methods described in this document have been developed and validated at Ludger.
Specificity	PNGase F is suitable for release of all types (high-mannose, hybrid and complex) N-glycans from glycoproteins and glycopeptides. Xaa-Asn-Xaa sequence is the minimal peptide substrate for this enzyme. Note that some non-mammalian glycans from sources such as plants, insects and parasites carrying α 1-3 linked core fucose will not be cleaved with PNGase F. For these samples PNGase A can be used.
Number of Samples	Kit contains 75,000 units of PNGase F at concentration of 500,000 units/ml. Sufficient for approximately 150 samples.
Amount of Sample	As a guideline up to 100 μ g of glycoprotein per sample.
Suitable Samples	Glycoproteins and glycopeptides containing N-linked glycans.
Storage	Store at 4°C. Protect from sources of heat and light.
Heat Inactivation	PNGase F is inactivated after 10 minutes at 75°C.
Shipping	The product should be shipped at 4°C.
Handling	Ensure that any glass, plastic ware or solvents used with this item are free of environmental carbohydrates and contaminating enzymes. Use powder-free gloves for all sample handling procedures and avoid contamination with environmental carbohydrate.

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 labelling reagents should be performed using appropriate personal safety protection – safety glasses, chemically resistant gloves (e.g. nitrile), lab coat, and when appropriate, in a laboratory fume cupboard.

Kit Contents

Each kit contains the following materials and reagents:

Cat. #	Item	Quantity
LZ-PNGF-150	PNGase F (<i>Elizabethkingia miricola</i>) supplied in 50 mM NaCl 5 mM EDTA 20 mM Tris-HCl pH 7.5	1 vial of 0.15 mL
LZ- 10X-REACT-01	10X Reaction Buffer 500 mM sodium phosphate (pH 7.5 at 1X dilution)	1 vial of 1.0 mL
LZ- 10X-DENAT-01	10X Denaturation Solution 5% SDS 400 mM DTT	1 vial of 1.0 mL
LZ- NP40SOL-01	NP-40 10% solution	1 vial of 1.0 mL

Additional Reagents and Equipment Required

- Pure water: resistivity above 18 MΩ-cm, particle free (>0.22 µm), TOC <10 ppb.
- Polypropylene reaction vials with caps.
- Water bath, oven or heating block with constant temperature maintenance at 37°C.
- Vortex or shaker.

Time Line for Procedure

Procedure	Approx. Time
Sample preparation	5 min
Protein denaturation	10 min
Addition of enzyme	5 min
Incubation	Approx. 1h

Method

Presented protocols are for in-solution release of N-glycans from glycoproteins/glycopeptides under denaturing and native conditions. Typical reaction conditions are demonstrated. The exact amount of enzyme and incubation times should be determined empirically for each glycoprotein and may require further optimisation.

De-glycosylation rate can be determined by analysis of remaining protein moiety using SDS-PAGE or alternatively, MS analysis of digested peptides. Released N-glycans can be analysed using chromatographic and mass spectrometric techniques in order to obtain their structural information.

Ludger sells an IgG glycoprotein standard (#GCP-IGG-100U) for use as a positive control in glycan release protocols.

Denaturing reaction conditions

For many glycoproteins, the conformation of the protein in its native form can create steric hindrance that restricts access of any PNGase F enzyme to certain glycosylation sites. For this reason we recommend denaturation of samples using SDS and DTT (which are components of the Denaturation Solution), prior to enzyme incubation to aid efficient de-glycosylation.

1. Sample preparation

Ensure that samples are free of other contaminating glycoproteins prior to N-glycan release. Use up to 100 µg of glycoprotein per replicate. Dry samples down if the volume exceeds 9 µL.

- Make up sample volume to 9 µL with ultrapure water.

2. Denaturation of the protein

- Add 1 µL of 10X Denaturation Solution to each glycoprotein sample. Close the reaction vials, vortex thoroughly and briefly centrifuge to ensure the samples are completely dissolved.
- Incubate the samples at 100°C for 10 minutes.

Cool the samples to room temperature and briefly centrifuge before proceeding to the next step.

3. Incubation

- Add 2 µL of 10X Reaction Buffer to each glycoprotein sample.
- Add 2 µL of 10% NP-40 solution.

PNGase F is inhibited by SDS, therefore it is essential to have NP-40 in the reaction mixture when you have used denaturing conditions. Failure to include NP-40 into the denaturing protocol will result in loss of enzymatic activity.

- Adjust the reaction volume to 20 µL by adding 6 µL of water.
- Add 1 µL of PNGase F. Close the reaction vials, mix gently and briefly centrifuge.
- Incubate the samples at 37°C for 1h.

Different glycoprotein classes as well as heavily glycosylated proteins may require different incubation time typically varying from 10 minutes up to 3 hours. Make sure total incubation time does not exceed 24 hours as this may lead to sample degradation.

Non-denaturing reaction conditions

If the native protein needs to be recovered from the reaction the denaturation step can be omitted but deglycosylation may not be complete. When deglycosylating a native glycoprotein it is recommended that an aliquot of the glycoprotein is subjected to the denaturing protocol to provide a positive control for the fully deglycosylated protein. The non-denatured reaction can then be compared to the denatured reaction to determine the extent of reaction completion.

1. Sample preparation

Ensure that samples are free of other contaminating glycoproteins prior to N-glycan release. Use up to 100 µg of glycoprotein per replicate. Dry samples down if the volume exceeds 18 µL.

- Make up sample volume to 18 µL with ultrapure water.

2. Incubation

- Add 2 µL of 10X Reaction Buffer to each glycoprotein sample.
- Add 2-5 µL of PNGase F. Close the reaction vials, mix gently and briefly centrifuge.
- Incubate the samples at 37°C for 4-24h.

Analysis of released N-glycans

Released N-glycans can be analysed using chromatographic and mass spectrometric techniques. Refer to Ludger Guides for protocols and kits (www.ludger.com/products) for glycan clean-up (LC-EB10-A6 cartridges for MS applications), fluorophore labelling (for UHPLC and LC-MS analysis) and glycan permethylation (for MALDI-MS analysis).

Below is a reference trace for HILIC-UHPLC analysis of N-glycans released from a human IgG glycoprotein mix using PNGase F.

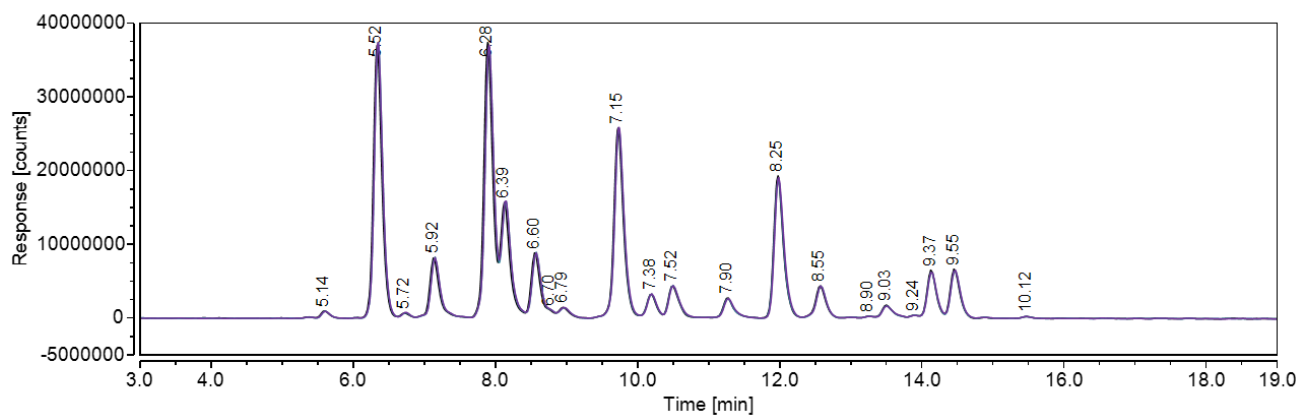


Figure 1 HILIC-UHPLC overlay of triplicate analysis of procainamide (#LT-KPROC-VP24) labelled N-glycans released from human IgG glycoprotein (#GCP-IGG-100U) using LZ-rPNGaseF-kit kit following 10 minute incubation with PNGase F under denaturing conditions. Peaks were labelled with corresponding GU values.

Appendix 1: Troubleshooting Guide

The following is a guide to the most likely problems associated with the use of the PNGase F kit for the release of glycans from glycoproteins and glycopeptides.

The positive control gives negative results.

The enzyme became inactive

Long-term storage of the PNGase F at a temperature different from that recommended can result in loss of enzymatic activity. For the best performance, store the kit components at 4°C.

Following the protein denaturation step ensure that the sample is cooled to room temperature before addition of the enzyme. Adding the enzyme to solution which has not been cooled down completely may cause enzyme denaturation and a decrease in release efficiency.

Post-release sample processing resulted in glycan loss

Make sure that your post-release glycan processing (including glycan clean-up methods) did not result in glycan loss or precipitation. For glycan preparation for chromatography and mass spectrometric applications refer to Ludger Guides (www.ludger.com/products).

The glycan release was not efficient.

The glycoproteins are not dissolved

If the solubilisation of glycoproteins is insufficient the glycan release will be incomplete. To ensure sample is dissolved properly, vortex sample longer or make up the release solution in a larger volume of reaction mixture.

The sample contained contaminants that interfered with PNGase F activity

Please ensure that the glycoprotein solution is free from contaminants before glycan release. PNGase F is compatible with wide range of buffers, however, some buffers additives can impact enzyme activity. Also avoid high ionic strength buffers in your sample as they can alter pH of the reaction mixture. Keep the pH of final reaction mixture within the PNGase F activity range (pH 6-10).

The incubation condition was incorrect

Ensure that the oven or heating block is equilibrated to the incubation temperature and that the reaction tube is subjected to this temperature for the entire period.

There was less starting glycoprotein material than was originally estimated

Please ensure sufficient amount of sample is used.

Skewing of the results was observed.

PNGase F incubation time was not sufficient

Some glycoforms or glycosylation sites of the protein can be less prone to de-glycosylation with PNGase F and for those, glycan release can occur with lower speed. Ensure that de-glycosylation time has been adjusted to your specific glycoprotein and its glycosylation level. Note that release will typically take longer under non-denaturing conditions.

Reagents were added in inadequate proportions

Ensure that appropriate proportion of reagents was used in the reaction. Failure in addition of Denaturation Solution may result in higher rate of sialylated glycans over neutrals being released, however, excessive amount of SDS will greatly impact enzymatic activity. Ensure that NP-40 (which stabilises the enzyme in the presence of denaturant) is present in the reaction mixture during PNGase F incubation under denaturing conditions.

Sample contains contaminating glycoproteins

PNGase F enzyme will remove N-glycans from all the proteins present in the reaction mixture. If you are interested in a specific glycoprotein, ensure that effective purification methods have been applied. Protein purity can be determined using SDS-PAGE analysis.

Warranties and liabilities

Ludger warrants that the above product conforms to the attached analytical documents. Should the product fail for reasons other than through misuse Ludger will, at its option, replace free of charge or refund the purchase price. This warranty is exclusive and Ludger makes no other 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 # LZ-rPNGaseF-kit, version v1.0

SAFETY DATA SHEET

Version: 1.0

Date written: 21 Aug 2017

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

Product Name **LudgerZyme recombinant Peptide N-glycosidase F
(*Elizabethkingia miricola*) supplied in 50mM NaCl 5mM EDTA
20mM Tris-HCl pH 7.5**

Product Catalogue Name **LZ-PNGF-150**

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]

The product is not classified as hazardous according to the CLP regulation.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008: Void

Hazard pictograms: Void

Signal word: Void

Hazard statements: Void

2.3 Other hazard information:

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3. 2 Mixtures

Description:

The product is a mixture of the hazardous substances listed below along with unlisted nonhazardous substances.

Components: Void

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice

Immediate medical attention is required. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). Remove from exposure, lie down. Do not breathe dust/fume/gas/mist/vapours/spray.

If Ingested

Clean mouth with water and drink afterwards plenty of water. If the patient feels unwell or is concerned, obtain medical advice.

If skin is exposed

Wash skin with soap and water.

If eyes are exposed

Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

If inhaled

Remove to fresh air. If the patient feels unwell or is concerned, obtain medical advice.

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of immediate medical attention and special treatment needed

Note to physicians

Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

CAUTION: Use of water spray when fighting fire may be inefficient.

5.2 Special hazards arising from the substance or mixture

None known.

5.3 Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

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

Ensure adequate ventilation, especially in confined areas.

For emergency responders

Use personal protection recommended in Section 8.

6.2 Environmental Precautions

See Section 12 for additional Ecological Information.

6.3 Methods and material for containment and cleaning up**Methods for containment**

Prevent further leakage or spillage if safe to do so.

Methods for cleaning up

Soak up with inert absorbent material. Pick up and transfer to properly labelled containers. This material and its container must be disposed of as hazardous waste.

6.4 Reference to other sections

No dangerous substances are released.

See Section 7 for information on safe handling

See Section 13 for disposal information.

SECTION 7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Handle in accordance with good industrial hygiene and safety practice.

7.2 Conditions for safe storage, including any incompatibilities

Storage temperature

Refer to www.ludger.com for specific information.

Storage Conditions

Keep/store only in original container.

Incompatible materials

None known based on information supplied.

7.3 Specific end uses**Risk management methods [RMM]**

The information required is contained in this Safety Data Sheet.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters****Exposure Limits**

This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Derived No Effect Level (DNEL)

No information available

Predicted No Effect Concentration (PNEC)

No information available

8.2 Exposure controls**Engineering controls**

Showers. Eyewash stations.

Individual protection measures, such as personal protective equipment**Eye/face protection**

Wear safety glasses with side shields (or goggles).

Skin and body protection

Wear suitable protective clothing and gloves.

Respiratory protection

Use in well ventilated areas.

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls

See Section 12: ECOLOGICAL INFORMATION.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

Appearance	Liquid
Colour	Colourless
Odour	Mild
Odour threshold	No data available
pH value at 20°C	Refer to www.ludger.com for specific information
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
Ignition temperature	No data available
Decomposition temperature	No data available
Self-igniting	No data available
Lower	No data available
Upper	No data available
Vapour pressure	No data available
Density	No data available
Relative density	No data available
Vapour density	No data available
Evaporation rate	No data available
Solubility in / Miscibility with Water	Fully miscible.
Partition coefficient (n-octanol/water)	No data available
Viscosity	
Dynamic	No data available
Kinematic	No data available

9.2 Other information

No further relevant information available.

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Can react briskly with oxidizers - danger of explosion.

10.4 Conditions to avoid

Incompatible materials. Ignition sources. Heat.

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous decomposition products

Thermal decomposition can lead to release of irritating and toxic gases and vapours. Carbon monoxide. Carbon dioxide (CO₂).

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Product information

Product does not present an acute toxicity hazard based on known or supplied information.

Inhalation

Avoid breathing vapours or mists. May cause irritation of respiratory tract.

Eye contact

Redness. May cause slight irritation.

Skin contact

Prolonged contact may cause redness and irritation. Repeated exposure may cause skin dryness or cracking.

Ingestion

May cause drowsiness or dizziness. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Symptoms include burning sensation, coughing, wheezing, shortness of breath, headache, nausea, and vomiting.

Unknown acute toxicity

0.24 % of the mixture consists of ingredient(s) of unknown toxicity.

The following values are calculated based on chapter 3.1 of the GHS document mg/kg mg/l

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Water	> 90 mL/kg (Rat)	-	-
Sodium Chloride	= 3 g/kg (Rat)	> 10 g/kg (Rabbit)	> 42 g/m ³ (Rat) 1 h
Ethylenediamine tetraacetic acid	= 1700 mg/kg (Rat)	-	-

Skin corrosion/irritation

Mild

Serious eye damage/eye irritation

Mild

Sensitization

Not applicable

Germ cell mutagenicity

Not applicable

Carcinogenicity

No information available

Reproductive toxicity

No information available

Developmental toxicity

No information available

Teratogenicity

No information available

STOT - single exposure	No information available
STOT - repeated exposure	No information available
Neurological effects	No information available
Target organ effects	Eyes, Kidneys, Respiratory system, Skin.
Other adverse effects	No information available
Symptoms	No information available
Aspiration hazard	No information available

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

0.24 % of the mixture consists of component(s) of unknown hazards to the aquatic environment.

12.2 Persistence and degradability

Not available.

12.3 Bioaccumulative potential

Not known.

12.4 Mobility in soil

Not available.

12.5 Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

12.6 Other adverse effects

No further relevant information available.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Relevant Information

Keep out of drains, sewers, ditches and waterways.

Waste from Residues/Unused Products

Disposal should be in accordance with applicable regional, national and local laws and regulations. Send to a licensed recycler, reclaimer or incinerator.

Contaminated packaging

Empty containers must be tripled rinsed prior to disposal.

SECTION 14. TRANSPORT INFORMATION
IMDG

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Marine pollutant	Not applicable
14.6 Special Provisions	None
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information available

RID

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ADR

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ICAO (air)

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

IATA

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated

14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

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

National Regulations

Occupational Illnesses (R-463-3, France)

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

International Inventories

All of the components in the product are on the following Inventory lists TSCA (United States), Canada (DSL/NDSL), Europe (EINECS/ELINCS), Australia (AICS), South Korea (KECL), China (IECSC), Philippines (PICCS).

TSCA	Complies
EINECS	Complies
ELINCS	-
DSL	Complies
NDSL	Complies
PICCS	Complies
ENCS	-
IECSC	Complies
AICS	Complies
KECL	Complies

15.2 Chemical Safety Assessment

No information available.

SECTION 16. OTHER INFORMATION

The safety data sheet contains information that is the copyright of New England Biolabs® and was reproduced with their permission.

The information in this SDS is provided in good faith based on our knowledge as of the issue date (or subsequent revision date, if any), and is to be used only as a guide. This SDS does not constitute a guarantee (express or implied) of any kind and we make no warranties or merchantability or fitness for a particular purpose. This

information relates only to the designated product as shipped and may not be valid if the product is used in combination with any other materials or is not used in accordance with our instructions. It is the responsibility of the buyer/user to ensure that its activities comply with all applicable governmental requirements. Since conditions of use of the product are not under the control of Ludger, it is the duty of the buyer/user to determine the necessary conditions for the safe use of the product. Ludger will not be liable for any damages resulting from handling or contact with the product.

SAFETY DATA SHEET

Version: 1.0

Date written: 21 Aug 2017

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

Product Name **10X Reaction Buffer (500mM sodium phosphate pH 7.5)**

Product Catalogue Name **LZ-10X-REACT-01**

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

Telephone: 01865 408554

Emergency Telephone: 01865 408554

Email: info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Regulation (EC) No 1272/2008

This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [GHS].

2.2 Label elements

Product identifier

This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [GHS]

Signal word

None

2.3 Other hazard information:

None

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3. 1 Substances

Not applicable

3. 2 Mixtures

Full text of H- and EUH-phrases: see section 16

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Immediate medical attention is required. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). Remove from exposure, lie down. Do not breathe dust/fume/gas/mist/vapours/spray.

Eye contact

Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact

Wash skin with soap and water.

Inhalation

Remove to fresh air.

Ingestion

Clean mouth with water and drink afterwards plenty of water.

4.2 Most important symptoms and effects, both acute and delayed

No information available

4.3 Indication of immediate medical attention and special treatment needed

Note to physicians

Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

CAUTION: Use of water spray when fighting fire may be inefficient.

5.2 Special hazards arising from the substance or mixture

No information available

5.3 Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions

Ensure adequate ventilation, especially in confined areas.

For emergency responders

Use personal protection recommended in Section 8.

6.2 Environmental Precautions

See Section 12 for additional Ecological Information.

6.3 Methods and material for containment and cleaning up

Methods for containment

Prevent further leakage or spillage if safe to do so.

Methods for cleaning up

Soak up with inert absorbent material. Pick up and transfer to properly labelled containers. This material and its container must be disposed of as hazardous waste.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice.

7.2 Conditions for safe storage, including any incompatibilities

Storage temperature

Refer to www.ludger.com for specific information.

Storage Conditions

Keep/store only in original container.

Incompatible materials

None known based on information supplied.

7.3 Specific end uses

Risk management methods [RMM]

The information required is contained in this Safety Data Sheet.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Exposure Limits	This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies
Derived No Effect Level (DNEL)	No information available
Predicted No Effect Concentration (PNEC)	No information available

8.2 Exposure controls

Engineering controls

Showers. Eyewash stations.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles).

Skin and body protection

Wear suitable protective clothing and gloves.

Respiratory protection

Use in well ventilated areas.

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls

See Section 12: ECOLOGICAL INFORMATION.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Liquid
Colour	Colourless
Odour	Mild
pH	Refer to www.ludger.com for specific information
Odour threshold	No data available
Melting point/freezing point	No data available
Initial boiling point and boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (solid, gas)	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
Water solubility	Soluble
Partition coefficient: noctanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidizing properties	No data available

9.2 Other information

No further relevant information available.

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Can react briskly with oxidizers - danger of explosion.

10.4 Conditions to avoid

Incompatible materials. Ignition sources. Heat.

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous decomposition products

Thermal decomposition can lead to release of irritating and toxic gases and vapours. Carbon monoxide. Carbon dioxide (CO₂).

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Product information

Product does not present an acute toxicity hazard based on known or supplied information.

Inhalation

Avoid breathing vapours or mists. May cause irritation of respiratory tract.

Eye contact

Redness. May cause slight irritation.

Skin contact

Prolonged contact may cause redness and irritation. Repeated exposure may cause skin dryness or cracking.

Ingestion

May cause drowsiness or dizziness. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Symptoms include burning sensation, coughing, wheezing, shortness of breath, headache, nausea, and vomiting.

Unknown acute toxicity

7.1 % of the mixture consists of ingredient(s) of unknown toxicity.

The following values are calculated based on chapter 3.1 of the GHS document mg/kg

Skin corrosion/irritation	Mild
Serious eye damage/eye irritation	Mild
Sensitization	Not applicable
Germ cell mutagenicity	Not applicable
Carcinogenicity	No information available
Reproductive toxicity	No information available
Developmental toxicity	No information available
Teratogenicity	No information available
STOT - single exposure	No information available
STOT - repeated exposure	No information available
Neurological effects	No information available
Target organ effects	Kidneys, Respiratory system, Eyes, Skin.
Other adverse effects	No information available
Symptoms	No information available
Aspiration hazard	No information available

SECTION 12. ECOLOGICAL INFORMATION
12.1 Toxicity

7.1 % of the mixture consists of component(s) of unknown hazards to the aquatic environment.

12.2 Persistence and degradability

No data available.

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other adverse effects

No further relevant information available.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Relevant Information

Keep out of drains, sewers, ditches and waterways.

Waste from Residues/Unused Products

Disposal should be in accordance with applicable regional, national and local laws and regulations. Send to a licensed recycler, reclaimer or incinerator.

Contaminated packaging

Empty containers must be tripled rinsed prior to disposal.

SECTION 14. TRANSPORT INFORMATION

IMDG

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Marine pollutant	Not applicable
14.6 Special Provisions	None
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information available

RID

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated

14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ADR

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ICAO (air)

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

IATA

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

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

National Regulations

Occupational Illnesses (R-463-3, France)

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at Work

International Inventories

All of the components in the product are on the following Inventory lists TSCA (United States), Canada (DSL/NDSL), Europe (EINECS/ELINCS), Australia (AICS), South Korea (KECL), China (IECSC), Philippines (PICCS).

TSCA	Complies
EINECS	Complies
ELINCS	-
DSL	Complies
NDSL	Complies
PICCS	Complies
ENCS	-
IECSC	Complies
AICS	Complies
KECL	Complies

15.2 Chemical Safety Assessment

No information available.

SECTION 16. OTHER INFORMATION

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The information in this SDS is provided in good faith based on our knowledge as of the issue date (or subsequent revision date, if any), and is to be used only as a guide. This SDS does not constitute a guarantee (express or implied) of any kind and we make no warranties or merchantability or fitness for a particular purpose. This information relates only to the designated product as shipped and may not be valid if the product is used in combination with any other materials or is not used in accordance with our instructions. It is the responsibility of the buyer/user to ensure that its activities comply with all applicable governmental requirements. Since conditions of use of the product are not under the control of Ludger, it is the duty of the buyer/user to determine the necessary conditions for the safe use of the product. Ludger will not be liable for any damages resulting from handling or contact with the product.

3. 2 Mixtures

Full text of H- and EUH-phrases: see section 16

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Immediate medical attention is required. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). Remove from exposure, lie down. Do not breathe dust/fume/gas/mist/vapours/spray.

Eye contact

Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact

Wash skin with soap and water.

Inhalation

Remove to fresh air.

Ingestion

Clean mouth with water and drink afterwards plenty of water.

4.2 Most important symptoms and effects, both acute and delayed

No information available

4.3 Indication of immediate medical attention and special treatment needed

Note to physicians

Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

CAUTION: Use of water spray when fighting fire may be inefficient

5.2 Special hazards arising from the substance or mixture

No information available

5.3 Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions

Ensure adequate ventilation, especially in confined areas.

For emergency responders

Use personal protection recommended in Section 8.

6.2 Environmental Precautions

See Section 12 for additional Ecological Information.

6.3 Methods and material for containment and cleaning up

Methods for containment

Prevent further leakage or spillage if safe to do so.

Methods for cleaning up

Soak up with inert absorbent material. Pick up and transfer to properly labelled containers. This material and its container must be disposed of as hazardous waste.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice.

7.2 Conditions for safe storage, including any incompatibilities

Storage temperature

Refer to www.ludger.com for specific information.

Storage Conditions

Keep/store only in original container.

Incompatible materials

None known based on information supplied

7.3 Specific end uses

Risk management methods [RMM]

The information required is contained in this Safety Data Sheet.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Exposure Limits

This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Derived No Effect Level (DNEL)

No information available

Predicted No Effect Concentration (PNEC)

No information available

8.2 Exposure controls

Engineering controls

Showers. Eyewash stations.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles).

Skin and body protection

Wear suitable protective clothing and gloves.

Respiratory protection

Use in well ventilated areas.

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls

See Section 12: ECOLOGICAL INFORMATION.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Liquid
Colour	Colourless
Odour	Mild
Odour Threshold	No data available
pH	Refer to www.ludger.com for specific information
Melting point/freezing point	No data available
Initial boiling point and boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (solid, gas)	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

Water solubility	Soluble
Partition coefficient: noctanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidizing properties	No data available

9.2 Other information

No further relevant information available.

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Can react briskly with oxidizers - danger of explosion.

10.4 Conditions to avoid

Incompatible materials. Ignition sources. Heat.

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous decomposition products

Thermal decomposition can lead to release of irritating and toxic gases and vapours. Carbon monoxide. Carbon dioxide (CO₂).

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Product information

Product does not present an acute toxicity hazard based on known or supplied information.

Inhalation

Avoid breathing vapours or mists. May cause irritation of respiratory tract.

Eye contact

Redness. May cause slight irritation.

Skin contact

Prolonged contact may cause redness and irritation. Repeated exposure may cause skin dryness or cracking.

Ingestion

May cause drowsiness or dizziness. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Symptoms include burning sensation, coughing, wheezing, shortness of breath, headache, nausea, and vomiting.

Unknown acute toxicity

11.2 % of the mixture consists of ingredient(s) of unknown toxicity

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	25,760.00 mg/kg
ATEmix (dermal)	11,600.00 mg/kg
ATEmix (inhalation-dust/mist)	19.50 mg/l
ATEmix (inhalation-vapour)	78,000.00 mg/l

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Water	> 90 mL/kg (Rat)	-	-
Sodium Dodecyl Sulfate	= 1288 mg/kg (Rat)	= 580 mg/kg (Rabbit)	> 3900 mg/m ³ (Rat) 1 h

Skin corrosion/irritation	Mild
Serious eye damage/eye irritation	Mild
Sensitization	Not applicable
Germ cell mutagenicity	Not applicable
Carcinogenicity	No information available
Reproductive toxicity	No information available
Developmental toxicity	No information available
Teratogenicity	No information available
STOT - single exposure	No information available
STOT - repeated exposure	No information available
Neurological effects	No information available
Target organ effects	Kidneys, Respiratory system, Eyes, Skin.
Other adverse effects	No information available
Symptoms	No information available
Aspiration hazard	No information available

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Ecotoxicity

Harmful to aquatic life with long lasting effects

6.2 % of the mixture consists of component(s) of unknown hazards to the aquatic environment

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****Relevant Information**

Keep out of drains, sewers, ditches and waterways.

Waste from Residues/Unused Products

Disposal should be in accordance with applicable regional, national and local laws and regulations. Send to a licensed recycler, reclaimer or incinerator.

Contaminated packaging

Empty containers must be tripled rinsed prior to disposal.

SECTION 14. TRANSPORT INFORMATION**IMDG**

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Marine pollutant	Not applicable
14.6 Special Provisions	None
14.7 Transport in bulk according to Annex II	

of MARPOL 73/78 and the IBC Code No information available

RID

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ADR

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ICAO (air)

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

IATA

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

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

National Regulations
Occupational Illnesses (R-463-3, France)
European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

International Inventories

All of the components in the product are on the following Inventory lists TSCA (United States), Canada (DSL/NDSL), Europe (EINECS/ELINCS), Australia (AICS), China (IECSC), Philippines (PICCS).

TSCA	Complies
EINECS	Complies
ELINCS	-
DSL	Complies
NDSL	Complies
PICCS	Complies
ENCS	-
IECSC	Complies
AICS	Complies
KECL	-

15.2 Chemical Safety Assessment

No information available

SECTION 16. OTHER INFORMATION

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SAFETY DATA SHEET

Version: 1.0

Date written: 21 Aug 2017

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

Product Name **NP-40 10% solution**

Product Catalogue Name **LZ-NP40SOL-01**

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

Telephone: 01865 408554

Emergency Telephone: 01865 408554

Email: info@ludger.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Regulation (EC) No 1272/2008

This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [GHS].

2.2 Label elements

Product identifier

This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [GHS].

Signal word

None

2.3 Other hazard information

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Not applicable

3. 2 Mixtures

Full text of H- and EUH-phrases: see section 16.

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

No hazards which require special first aid measures.

Eye contact

None under normal use conditions.

Skin contact

None under normal use conditions.

Inhalation

None under normal use conditions.

Ingestion

None under normal use conditions.

4.2 Most important symptoms and effects, both acute and delayed

None known

4.3 Indication of immediate medical attention and special treatment needed

Note to physicians

Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

None

5.2 Special hazards arising from the substance or mixture

None in particular.

5.3 Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions

No information available.

For emergency responders

Use personal protection recommended in Section 8.

6.2 Environmental Precautions

See Section 12 for additional Ecological Information.

6.3 Methods and material for containment and cleaning up

Methods for containment

Not applicable.

Methods for cleaning up

Collect spillage.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice.

7.2 Conditions for safe storage, including any incompatibilities

Storage temperature

No information available.

Storage Conditions

Keep/store only in original container.

Incompatible materials

None known based on information supplied..

7.3 Specific end uses

Risk management methods [RMM]

The information required is contained in this Safety Data Sheet.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Exposure Limits

This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the

	region specific regulatory bodies
Derived No Effect Level (DNEL)	No information available
Predicted No Effect Concentration (PNEC)	No information available

8.2 Exposure controls

Engineering controls

Showers. Eyewash stations.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles).

Skin and body protection

Wear suitable protective clothing and gloves.

Respiratory protection

Not applicable.

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls

See Section 12: ECOLOGICAL INFORMATION.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Liquid
Colour	Colourless
Odour	Mild
Odour Threshold	No data available
pH	Not applicable
Melting point/freezing point	No data available
Initial boiling point and boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (solid, gas)	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
Water solubility	Soluble
Partition coefficient: 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
Oxidizing properties	No data available

9.2 Other information

No further relevant information available.

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

None under normal processing.

10.4 Conditions to avoid

None known based on information supplied.

10.5 Incompatible materials

None known based on information supplied.

10.6 Hazardous decomposition products

None known based on information supplied.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Product information

Product does not present an acute toxicity hazard based on known or supplied information.

Inhalation

No known effect

Eye contact

No known effect based on information supplied

Skin contact

No known hazard in contact with skin

Ingestion

No known effect based on information supplied

Unknown acute toxicity

10 % of the mixture consists of ingredient(s) of unknown toxicity

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Water	> 90 mL/kg (Rat)	-	-
4-Nonylphenyl-polyethylene glycol	= 1310 mg/kg (Rat) = 2590 mg/kg (Rat)	= 1780 µL/kg (Rabbit) = 2 mL/kg (Rabbit)	-

Skin corrosion/irritation	Not applicable
Serious eye damage/eye irritation	Not applicable
Sensitization	Not applicable
Germ cell mutagenicity	Not applicable
Carcinogenicity	No information available
Reproductive toxicity	No information available
Developmental toxicity	No information available
Teratogenicity	No information available
STOT - single exposure	No information available
STOT - repeated exposure	No information available
Neurological effects	No information available
Target organ effects	None known
Other adverse effects	No information available
Symptoms	No information available
Aspiration hazard	No information available

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

10 % of the mixture consists of component(s) of unknown hazards to the aquatic environment.

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

Waste from Residues/Unused Products

Disposal should be in accordance with applicable regional, national and local laws and regulations. Send to a licensed recycler, reclaimer or incinerator.

Contaminated packaging

Empty containers must be tripled rinsed prior to disposal.

SECTION 14. TRANSPORT INFORMATION

IMDG

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Marine pollutant	Not applicable
14.6 Special Provisions	None
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information available

RID

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ADR

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable

14.6 Special Provisions Done

ICAO (air)

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

IATA

14.1 UN/ID No	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard class	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

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

National Regulations

Occupational Illnesses (R-463-3, France)

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

International Inventories

All of the components in the product are on the following Inventory lists TSCA (United States), Canada (DSL/NDSL), Europe (EINECS/ELINCS), Australia (AICS), South Korea (KECL);, China (IECSC), Philippines (PICCS).

TSCA	Complies
EINECS	-
ELINCS	-
DSL	Complies
NDSL	Complies
PICCS	Complies
ENCS	-

IECSC	Complies
AICS	Complies
KECL	Complies

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out.

SECTION 16. OTHER INFORMATION

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