

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Name of the substance	Vilsmeier Reagent
Identification number	612-250-00-3 (Index number)
Registration number	01-0000017237-70-0002
Synonyms	Chloro-N,N-dimethylformiminium chloride
Issue date	07-August-2015
Version number	03
Revision date	01-March-2023
Supersedes date	31-March-2019

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Chemical intermediate.
Uses advised against	None known.

1.3. Details of the supplier of the safety data sheet

Supplier	VanDeMark Chemical Inc. BV
Address	Lichtenauerlaan 102-120 Rotterdam 3062 ME Netherlands
e-mail	sales@vdmchemical.com
Manufacturer	VanDeMark Chemical Inc.
Address	1 North Transit Road, Lockport, NY 14094 USA
Telephone	+1 716-433-6764
e-mail	sales@vdmchemical.com

1.4. Emergency telephone number	CHEMTREC +1-703-527-3887 (International)
Europe	112

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The mixture has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

Physical hazards

Corrosive to metals	Category 1	H290 - May be corrosive to metals.
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Health hazards

Acute toxicity, oral	Category 4	H302 - Harmful if swallowed.
Skin corrosion/irritation	Category 1A	H314 - Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Category 1	H318 - Causes serious eye damage.
Reproductive toxicity (the unborn child)	Category 1B	H360D - May damage the unborn child.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Hazard pictograms



Signal word	Danger
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Hazard statements

H290	May be corrosive to metals.
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H302	Harmful if swallowed.
H318	Causes serious eye damage.
H314	Causes severe skin burns and eye damage.
H360D	May damage the unborn child.

Precautionary statements

Prevention

P201	Obtain special instructions before use.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response

P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
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/doctor.

Storage

Not available.

Disposal

Not available.

Supplemental information on the label

EUH014 - Reacts violently with water.

2.3. Other hazards

This substance does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.

SECTION 3: Composition/information on ingredients

3.1. Substances

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
chloro-N, N-dimethylformiminium chloride	95 - 100	3724-43-4 425-970-6	01-0000017237-70-0002	612-250-00-3	
Classification: Met. Corr. 1;H290, Acute Tox. 4;H302, Skin Corr. 1A;H314, Eye Dam. 1;H318, Repr. 1B;H360D					

Impurities

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
N,N-dimethylformamide	0 - 5	68-12-2 200-679-5	-	616-001-00-X	#, *

List of abbreviations and symbols that may be used above

#: This substance has been assigned Community workplace exposure limit(s).

*Classification for this isolated impurity is: Flam. Liq. 3;H226, Acute Tox. 4;H312, Eye Irrit. 2;H319, Acute Tox. 4;H332, Repr. 1B;H360D.

Composition comments

The full text for all H-statements is displayed in section 16.
All concentrations are in percent by weight unless otherwise indicated.

SECTION 4: First aid measures

General information

IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

4.1. Description of first aid measures

Inhalation

Remove to fresh air and keep at rest in a position comfortable for breathing. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention immediately.

Skin contact

Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control centre immediately. Chemical burns must be treated by a physician.

Eye contact

Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control centre immediately.

Ingestion

Call a physician or poison control centre immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

4.2. Most important symptoms and effects, both acute and delayed

Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

4.3. Indication of any immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

SECTION 5: Firefighting measures

General fire hazards

Will burn if involved in a fire. Decomposes at elevated temperatures. Contact with certain metals liberates flammable gas. Reacts violently with water.

5.1. Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂). Dry powder. Dry chemicals.

Unsuitable extinguishing media

Water or Foam. Reacts with water.

5.2. Special hazards arising from the substance or mixture

During fire, gases hazardous to health may be formed. Combustion products may include: carbon oxides, nitrogen oxides, hydrogen chloride, N,N-dimethylformamide.

5.3. Advice for firefighters

Special protective equipment for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Special fire fighting procedures

Use standard firefighting procedures and consider the hazards of other involved materials. Collect runoff for recycling or disposal as potential hazardous waste.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Keep unnecessary personnel away.

For emergency responders

Keep unnecessary personnel away. For personal protection, see Section 8 of the SDS.

6.2. Environmental precautions

Prevent entry into waterways, sewer, basements or confined areas.

6.3. Methods and material for containment and cleaning up

Avoid the generation of dusts during clean-up. Cover powder spill with plastic sheet or tarp to minimise spreading. DO NOT USE WATER. Collect dust using a vacuum cleaner equipped with HEPA filter. Collect in suitable and properly labeled containers. Clean contaminated surface thoroughly. After cleaning, flush away traces with water.

Never return spills to original containers for re-use.

6.4. Reference to other sections

For personal protection, see Section 8 of the SDS. For waste disposal, see Section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimise dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Do not breathe dust. Do not get in eyes, on skin, or on clothing. Immediately change contaminated clothes. Isolate contaminated clothing and wash before reuse. Do not taste or swallow. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.

7.2. Conditions for safe storage, including any incompatibilities

Store locked up. Store in a cool, dry place out of direct sunlight. Keep away from heat. Store in corrosive resistant container with a resistant inner liner. Store in tightly closed container. Keep only in the original container. Store under nitrogen. Store in a well-ventilated place. Store away from incompatible materials (see section 10 of the SDS). Avoid contact with water and moisture. Keep out of reach of children. Store in a cool place below 41°F (5°C). Shelf life 6 months.

7.3. Specific end use(s)

Chemical intermediate. Observe industrial sector guidance on best practices.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

UK. EH40 Workplace Exposure Limits (WELs)

Impurities

Type

Value

N,N-dimethylformamide
(CAS 68-12-2)

STEL

30 mg/m³

10 ppm

TWA

15 mg/m³

5 ppm

Biological limit values

No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures Follow standard monitoring procedures.

Derived no effect levels (DNELs) Not available.

Predicted no effect concentrations (PNECs) Not available.

Exposure guidelines

UK EH40 WEL: Skin designation

N,N-dimethylformamide (CAS 68-12-2)

Can be absorbed through the skin.

8.2. Exposure controls

Appropriate engineering controls

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

General information

Personal protective equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.

Eye/face protection

Use chemical goggles / face shield. Eye wash station should be located in immediate work area.

Skin protection

- Hand protection

Chemical resistant protective gloves consistent with Standard EN 374 Suitable materials with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):

Neoprene rubber - 0.6 mm coating thickness.

Neoprene - 0.6 mm coating thickness.

Notice: The selection of a specific glove for an application and duration of use in a workplace should also take in to account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection) potential body reactions to the glove material as well as instructions/specifications provided by the glove manufacturer.

- Other

Selection of specific items such as face shield, boots, apron, or full body suit will depend on task and potential for exposure. Polyethylene coatings of 10 mils provide a barrier for splash protection. Safety shower should be located in the immediate work area. Remove contaminated clothing immediately, wash skin area with soap and water. Launder clothing before reuse.

Respiratory protection

Respiratory protections should be worn when there is a potential to exceed the exposure limit requirements or guidelines. Material readily decomposes to create hydrochloric acid and dimethyl formamide in the presences of atmospheric moisture. When respiratory protection is required, use a full face model with approved cartridge for organic vapors/acid gases with particulate filtration properties (ABEK2-P2 for concentration up to 5.000 pmm, air powered ABEK3-P3 for concentration up to 10.000 ppm). In higher concentrations or in case of insufficient data on concentration wear a positive-pressure supplied-air respirator.

Thermal hazards

When material is heated, wear gloves to protect against thermal burns.

Hygiene measures

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Observe any medical surveillance requirements.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. Fume scrubbers, filters or engineering modifications to the process equipment may be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state

Solid.

Form

Crystalline solid.

Colour

White.

Odour

Acrid.

Odour threshold

Not determined.

pH

0.5 10% Concentration

Melting point/freezing point

132 °C (269.6 °F)

Initial boiling point and boiling range

Not applicable.

Flash point	Not determined.
Evaporation rate	Not determined.
Flammability (solid, gas)	Non combustible.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Property has not been measured.
Explosive limit – upper (%)	Property has not been measured.
Vapour pressure	1 Not determined. (20 °C (68 °F))
Vapour density	Property has not been measured.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Reacts with water.
Solubility (other)	Soluble in chloroform.
Partition coefficient (n-octanol/water)	
Auto-ignition temperature	Property has not been measured.
Decomposition temperature	Property has not been measured.
Viscosity	Not applicable.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

9.2. Other information

Density	0.7559 g/cm ³ estimated
Kinematic viscosity	Property has not been measured.
Molecular formula	C ₃ H ₇ CIN.Cl
Molecular weight	128 g/mol
Specific gravity	0.756

SECTION 10: Stability and reactivity

10.1. Reactivity	Reacts with water. May be corrosive to metals.
10.2. Chemical stability	Stable under normal temperature conditions and recommended use.
10.3. Possibility of hazardous reactions	Reacts violently with water. Hydrogen chloride may be formed by reaction with water and moisture in air.
10.4. Conditions to avoid	Excessive heat. Exposure to air. The substance is hygroscopic and will absorb water by contact with the moisture in the air.
10.5. Incompatible materials	Water. Alcohols. Amines. Bases.
10.6. Hazardous decomposition products	Contact with moisture: Hydrogen chloride. When the product is heated: Hydrogen chloride.

SECTION 11: Toxicological information

General information Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

Inhalation	Causes respiratory tract burns.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.

Symptoms Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

11.1. Information on toxicological effects

Acute toxicity Harmful if swallowed.

Product	Species	Test Results
chloro-N, N-dimethylformiminium chloride (CAS 3724-43-4)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg

Product	Species	Test Results
Oral LD50	Rat	200 - 466 mg/kg
Impurities	Species	Test Results
N,N-dimethylformamide (CAS 68-12-2)		
Acute		
Oral LD50	Rat	3040 mg/kg
Skin corrosion/irritation	Causes severe skin burns.	
Serious eye damage/eye irritation	Causes serious eye damage.	
Respiratory sensitisation	Due to lack of data the classification is not possible.	
Skin sensitisation	Based on available data, the classification criteria are not met.	
Germ cell mutagenicity	Based on available data, the classification criteria are not met.	
Carcinogenicity	Based on available data, the classification criteria are not met.	
IARC Monographs. Overall Evaluation of Carcinogenicity		
N,N-dimethylformamide (CAS 68-12-2)		2A Probably carcinogenic to humans.
Reproductive toxicity	May damage the unborn child.	
Specific target organ toxicity - single exposure	Due to lack of data the classification is not possible.	
Specific target organ toxicity - repeated exposure	Based on available data, the classification criteria are not met.	
Aspiration hazard	No data available.	
Mixture versus substance information	The product is a substance.	
Other information	May be absorbed through the skin in harmful amounts.	

SECTION 12: Ecological information

12.1. Toxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Impurities	Species	Test Results
N,N-dimethylformamide (CAS 68-12-2)		
Aquatic		
<i>Acute</i>		
Algae	EC50	Scenedesmus subspicatus > 1000 mg/l, 96 Hours
Crustacea	EC50	Daphnia magna > 100 mg/l, 48 Hours
Fish	LC50	Lepomis macrochirus 7100 mg/l, 96 Hours
<i>Chronic</i>		
Crustacea	NOEC	Daphnia magna 1500 mg/l, 21 days

12.2. Persistence and degradability N,N-Dimethylformamide: BOD5 = 0.9 mg.

12.3. Bioaccumulative potential The product is not bioaccumulating.
N,N-Dimethylformamide: BCF 0.3-1.2 (fish, 56 days @ 25 °C).

Partition coefficient n-octanol/water (log Kow)

N,N-dimethylformamide (CAS 68-12-2) -1.01

Bioconcentration factor (BCF) Not available.

12.4. Mobility in soil Water reactive material.

Mobility in general Reacts with water and forms dimethylformamide and hydrochloric acid.

12.5. Results of PBT and vPvB assessment This substance does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.

12.6. Other adverse effects None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste	Dispose in accordance with local regulations. Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.
Contaminated packaging	Since emptied containers retain product residue, follow label warnings even after container is emptied.
EU waste code	The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Disposal methods/information	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.

SECTION 14: Transport information

ADR

14.1. UN number	UN3261
14.2. UN proper shipping name	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (chloro-N, N-dimethylformiminium chloride)
14.3. Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Hazard No. (ADR)	80
Tunnel restriction code	E
14.4. Packing group	II
14.5. Environmental hazards	No
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

RID

14.1. UN number	UN3261
14.2. UN proper shipping name	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (chloro-N, N-dimethylformiminium chloride)
14.3. Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
14.4. Packing group	II
14.5. Environmental hazards	No
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

ADN

14.1. UN number	UN3261
14.2. UN proper shipping name	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (chloro-N, N-dimethylformiminium chloride)
14.3. Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
14.4. Packing group	II
14.5. Environmental hazards	No
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

14.1. UN number	UN3261
14.2. UN proper shipping name	Corrosive solid, acidic, organic, n.o.s. (chloro-N, N-dimethylformiminium chloride)
14.3. Transport hazard class(es)	
Class	8
Subsidiary risk	-
14.4. Packing group	II
14.5. Environmental hazards	No
ERG Code	8L
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

14.1. UN number	UN3261
14.2. UN proper shipping name	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (chloro-N, N-dimethylformiminium chloride)

14.3. Transport hazard class(es)

Class 8

Subsidiary risk -

14.4. Packing group II

14.5. Environmental hazards

Marine pollutant No

EmS F-A, S-B

14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable. This product is a solid. Therefore, bulk transport is governed by IMSBC code.

SECTION 15: Regulatory information

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

Retained direct EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended

Not listed.

Regulation (EU) 2019/1021 On persistent organic pollutants (recast), as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

N,N-dimethylformamide (CAS 68-12-2)

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

chloro-N, N-dimethylformiminium chloride (CAS 3724-43-4)

N,N-dimethylformamide (CAS 68-12-2)

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

chloro-N, N-dimethylformiminium chloride (CAS 3724-43-4)

Other regulations

This product is classified and labelled in accordance with the retained CLP Regulation (EU) No 1272/2008, as amended for Great Britain. This Safety Data Sheet is compiled in accordance with REACH Regulation (EC) No 1907/2006, as amended by UK REACH Regulations SI 2019/758.

Use of this product by young persons under the age of 18 is not allowed in accordance with the Management of Health and Safety at Work Regulations 1999 [SI 1999/3242], as amended. New or expectant mothers should not work with this product if there is a risk due to exposure, in accordance with the Management of Health and Safety at Work Regulations 1999 [SI 1999/3242], as amended. Follow the requirements of the Control of Substances Hazardous to Health Regulations 2002 [SI 2002/2677], as amended, when using this material.

15.2. Chemical safety assessment No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

ADN: European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways.

ADR: European Agreement Concerning the International Carriage of Dangerous Goods by Road.

CAS: Chemical Abstract Service.

CEN: European Committee for Standardization (Comité Européen de Normalisation).
ECHA: European Chemical Agency.
IATA: International Air Transport Association.
IBC: Intermediate Bulk Container.
IMDG: International Maritime Dangerous Goods.
MARPOL: International Convention for the Prevention of Pollution from Ships.
PBT: Persistent, bioaccumulative, toxic.
RID: Regulations concerning the International Carriage of Dangerous Goods by Rail.
vPvB: very Persistent, very Bioaccumulative.

References

ECHA registered substances database
GESTIS Substance Database
HSDB® - Hazardous Substances Data Bank
International Chemical Safety Cards (ICSC)

Information on evaluation method leading to the classification of mixture

The mixture is classified based on test data for physical hazards. The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available. For details, refer to Sections 9, 11 and 12.

Full text of any statements, which are not written out in full under sections 2 to 15

H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H360D May damage the unborn child.
EUH014 Reacts violently with water.

Training information

Follow training instructions when handling this material.

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment. VanDeMark Chemical Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.