

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/29/2016

Reviewed on 07/29/2016

1 Identification

- **Product Identifier**
- **Trade name: Hydrofluoric & Nitric Acid Blend - Semiconductor Grade**
- **Product Number:** ng-22N31HF
- **Relevant identified uses of the substance or mixture and uses advised against:**
Semiconductor processing solution. For professional use only.
- **Product Description** Nitric & Hydrofluoric acid blend, semiconductor grade.
- **Application of the substance / the mixture:** Industry-specific application.
- **Details of the Supplier of the Safety Data Sheet:**
- **Manufacturer/Supplier:**
NuGeneration Technologies, LLC (dba NuGenTec)
1155 Park Avenue, Emeryville, CA 94608
salesteam@nugentec.com www.nugentec.com
1-888-996-8436 or 1-707-820-4080 for product information
- **Emergency telephone number:**
PERS Emergency Response: Domestic and Canada - 1-800-633-8253, International 1-801-629-0667

2 Hazard(s) Identification

- **Classification of the substance or mixture:**



GHS06 Skull and crossbones

Acute Tox. 3 H301 Toxic if swallowed.

Acute Tox. 1 H310 Fatal in contact with skin.



GHS05 Corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.

- **Label elements:**

- **GHS label elements**

The product is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms:**



GHS05 GHS06

- **Signal word:** Danger

- **Hazard-determining components of labeling:**

Hydrofluoric acid

Nitric Acid

- **Hazard statements:**

H301 Toxic if swallowed.

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H310 Fatal in contact with skin.

H314 Causes severe skin burns and eye damage.

Precautionary statements:

P260 Do not breathe dusts or mists.

P280 Wear protective gloves / protective clothing.

P280 Wear eye protection / face protection.

P262 Do not get in eyes, on skin, or on clothing.

P264 Wash thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P321 Specific treatment (see supplementary first aid instructions on this Safety Data Sheet).

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P363 Wash contaminated clothing before reuse.

P301+P330+P331 If swallowed: Rinse mouth. Do NOT induce vomiting.

P302+P352 IF ON SKIN: Wash with plenty of water.

P361+P364 Take off immediately all contaminated clothing and wash it before reuse.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)



HMIS-ratings (scale 0 - 4)

HEALTH	4	Health = 4
FIRE	0	Fire = 0
REACTIVITY	0	Reactivity = 0

Hazard(s) not otherwise classified (HNOC): None known

3 Composition/Information on Ingredients

Non-hazardous components:

7732-18-5	Water, distilled water, deionized water	25-50%
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Chemical characterization: Mixtures

Description: Mixture: consisting of non-regulated material.

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· Dangerous Components:

CAS: 7664-39-3 RTECS: MW 7875000	Hydrofluoric acid ⚠ Acute Tox. 2, H300; Acute Tox. 1, H310; Acute Tox. 2, H330; ⚠ Skin Corr. 1A, H314	25-50%
CAS: 7697-37-2	Nitric Acid ⚠ Ox. Liq. 2, H272; ⚠ Skin Corr. 1A, H314	15-35%

4 First-Aid Measures

· Description of first aid measures:

· General information:

Immediately remove any clothing soiled by the product.

Remove breathing apparatus only after contaminated clothing have been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

· After inhalation:

If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. Give oxygen or artificial respiration if needed. Lie victim down in the recovery position; cover to keep warm. Physicians should treat chronic exposure as chemical pneumonia. A 2.5% calcium gluconate solution in normal saline administered by nebulizer, or by ippb with 100% oxygen may decrease pulmonary damage. Bronchodilators may also be administered. Monitor for hypocalcemia.

· After skin contact:

Get immediate medical attention. Remove contaminated clothing immediately; wash before reuse. Promptly flush skin with water until all chemical is removed. Immediately apply Calcium Gluconate gel, 2.5%, and massage into the affected are using rubber gloves. Continue to massage while repeatedly applying gel until 15 minutes after pain is relieved. If fingers/finger nails are touched, even if there is not pain, dip them in a bath of 5% Calcium Gluconate for 15 to 20 minutes. More serious skin exposure may require subcutaneous Calcium Gluconate gel, except for digital areas (unless the physician is experienced in this technique) due to potential for tissue injury from increased pressure. Absorption can readily occur in subungual areas and should be considered during decontamination.

· After eye contact:

Get immediate medical attention. Immediately flush eyes with large amounts of water for at least 15 minutes, lifting eyelids occasionally to facilitate irrigation. Rinse to eyes with a calcium gluconate, 1% solution in physiological serum (10 ml of Calcium Gluconate 10% in 90 ml of physiological serum). In the case of difficulty of opening eyelids, administer an analgesic eye wash (oxybuprocaine).

· After swallowing:

Call a physician immediately. Take victim immediately to hospital. Prevention of absorption of the Fluoride ion can be obtained by giving a source of Calcium or Magnesium.

If victim is conscious: If swallowed, rinse mouth with water (only if the person is conscious). Give to drink one of the following: 3-4 glasses of milk, chewable calcium carbonate tablets, Milk of Magnesia or a 1% aqueous Calcium Gluconate solution. Do NOT induce vomiting. Artificial respiration and/or oxygen may be necessary.

If victim in unconscious, but breathing: Artificial respiration and/or oxygen may be necessary.

· Information for doctor:

Hydrofluoric (HF) acid burns require immediate and specialized first aid and medical treatment. Symptoms may be delayed up to 24 hours depending on the concentration of HF. After initial decontamination with water, subsequent damage can occur due to penetration/absorption of the fluoride (F-) ion. Treatment should be directed toward binding the Fluoride ion as well as the effects of exposure. Show this Safety Data Sheet to the doctor in attendance. If possible, call ahead to hospital or paramedics and make them aware of the Hydrofluoric acid exposure risk to themselves, and so they

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may prepare the proper first aid treatments ahead of time. Conditions such as hypocalcemia, hypomagnesemia, cardiac arrhythmias and hyperkalemia should be monitored for, since they can occur after exposure. Renal dialysis may be necessary in some cases.

• Most important symptoms and effects, both acute and delayed:

Ingestion: Can cause irritation and severe corrosive burns to mouth, throat, and stomach, and may be fatal if swallowed.

Inhalation: Gases or acid mist can cause severe irritation or corrosive burns to the upper respiratory system, including nose, mouth, and throat. Lung irritation, nitrogen oxide poisoning, and pulmonary edema can also occur. May cause severe breathing difficulties which may be delayed in onset.

Skin: Can cause severe corrosive burns or irritation. May stain the skin bright yellow.

Eyes: Can cause irritation, corneal burns, conjunctivitis, and may cause blindness. Contact lenses should not be worn when working with this material.

Summary of Chronic Health Hazards: Long-term exposure to concentrated vapors may cause erosion of teeth and lung damage. Long-term exposures seldom occur due to the corrosive properties of the acid.

• Indication of any immediate medical attention and special treatment needed:

Note to Physicians: Nitric Acid vapors contain nitrogen oxides. Acute overexposure by inhalation can result in delayed pulmonary edema. Observe affected patients for delayed effects up to 48 hours after exposure. Screen patients with chest x-ray, arterial blood gas, methemoglobinemia level, and pulmonary function tests. Bronchiolitis obliterans may develop weeks after exposure.

5 Fire-Fighting Measures

• Extinguishing media:**• Suitable extinguishing agents:**

CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

• Special hazards arising from the substance or mixture:

If incinerated, product will release the following toxic fumes: Oxides of Nitrogen (NO_x) and Hydrofluoric acid gas.

• Advice for firefighters:**• Protective equipment:**

Mouth respiratory protective device.

As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear to prevent contact with skin and eyes.

6 Accidental Release Measures

• Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation.

Keep people at a distance and stay upwind.

Use respiratory protective device against the effects of fumes/dust/aerosol.

Avoid contact with skin, eyes and clothing.

Do not breathe vapor.

Wear protective equipment. Keep unprotected persons away.

• Environmental precautions:

Dilute with plenty of water.

Do not allow to enter sewers/surface or ground water.

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- **Methods and material for containment and cleaning up:**
 Absorb with liquid-binding material (i.e. sand, diatomite, acid binders, universal binders, sawdust).
 Use neutralizing agent.
 Dispose contaminated material as waste according to section 13.
 Ensure adequate ventilation.
 Dispose of the collected material according to regulations.
- **Reference to other sections:**
 See Section 7 for information on safe handling.
 See Section 8 for information on personal protection equipment.
 See Section 13 for disposal information.

7 Handling and Storage

- **Handling**
- **Precautions for safe handling:**
 Ensure good ventilation/exhaustion at the workplace.
 Open and handle receptacle with care.
 Prevent formation of aerosols.
- **Information about protection against explosions and fires:**
 Keep protective respiratory device available.
- **Conditions for safe storage, including any incompatibilities:**
 Store away from bases, halides, strong reducing agents, organic materials, carbides, fulminates, nitrates, picrates, cyanides, chlorates, alkali halides, Zinc salts, permanganates, hydrogen peroxide, azides, perchlorates, nitromethane, phosphorus, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorus(III) oxide, powdered metals, silicates, silicon-containing materials and metals.
- **Storage**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Keep receptacle tightly sealed.
- **Specific end use(s):** No further relevant information available.

8 Exposure Controls/Personal Protection

- **Additional information about design of technical systems:** No further data; see section 7.
- **Control parameters:**
 All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure Limits in Air below TLV & PEL limits.

· **Components with occupational exposure limits:**

7664-39-3 Hydrofluoric acid	
PEL	Long-term value: 3 ppm as F

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REL	Long-term value: 2.5 mg/m ³ , 3 ppm Ceiling limit value: 5* mg/m ³ , 6* ppm *15-min, as F
TLV	Long-term value: 0.41 mg/m ³ , 0.5 ppm Ceiling limit value: 1.64 mg/m ³ , 2 ppm as F; Skin, BEI

7697-37-2 Nitric Acid

PEL	Long-term value: 5 mg/m ³ , 2 ppm
REL	Short-term value: 10 mg/m ³ , 4 ppm Long-term value: 5 mg/m ³ , 2 ppm
TLV	Short-term value: 10 mg/m ³ , 4 ppm Long-term value: 5.2 mg/m ³ , 2 ppm

• Ingredients with biological limit values:

7664-39-3 Hydrofluoric acid

BEI	3 mg/g creatinine urine prior to shift Fluorides (background, nonspecific)
	10 mg/g creatinine urine end of shift Fluorides (background, nonspecific)

• **Additional information:** The lists that were valid during the creation of this SDS were used as basis.

• **Exposure controls:**

• **Personal protective equipment:**

• **General protective and hygienic measures:**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing and wash before reuse.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Avoid contact with the eyes and skin.

• **Breathing equipment:**



Suitable respiratory protective device recommended.

• **Protection of hands:**



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

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Select glove material based on penetration times, rates of diffusion and degradation.

· **Material of gloves:**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

· **Penetration time of glove material:**

The exact break-through time has to be determined and observed by the manufacturer of the protective gloves.

· **Eye protection:**



Tightly sealed goggles

· **Body protection:**



Protective work clothing

9 Physical and Chemical Properties

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

Form:	Liquid
Color:	Light yellow
Odor:	Acrid
Odor threshold:	Not determined.

· **pH-value @ 20 °C (68 °F):** < 1

· **Change in condition**

Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	83 °C (181 °F)

· **Flash point:** None

· **Flammability (solid, gaseous):** Not applicable.

· **Ignition temperature:** Not determined.

· **Decomposition temperature:** Not determined.

· **Auto igniting:** Product is not self-igniting.

· **Danger of explosion:** Product does not present an explosion hazard.

· **Explosion limits:**

Lower:	Not determined.
Upper:	Not determined.

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- **Vapor pressure @ 20 °C (68 °F):** 40 hPa (30 mm Hg)
- **Density @ 20 °C (68 °F):** 1.105 g/cm³ (9.221 lbs/gal)
- **Relative density:** Not determined.
- **Vapor density:** Not determined.
- **Evaporation rate:** Not determined.
- **Solubility in / Miscibility with:**
 - Water:** Fully miscible.
- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
 - Dynamic:** Not determined.
 - Kinematic:** Not determined.
- **Solvent content:**
 - Organic solvents:** 0.0 %
 - Water:** 47.0 %
- **Other information:** No further relevant information available.

10 Stability and Reactivity

- **Reactivity:** No further relevant information available.
- **Chemical stability:** Stable under normal conditions.
- **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
- **Possibility of hazardous reactions:** No dangerous reactions known.
- **Conditions to avoid:** No further relevant information available.
- **Incompatible materials:**
Most metals, metallic powders, alcohol, charcoal, turpentine, hydrogen sulfide, wood excelsior, paper, cotton and similar organic materials. Alkalies, carbon, carbonates, cyanides, diborane organic chemicals, fluorine, phosphine, sulfides, thiocyanates. Nitric Acid is corrosive or incompatible with many common materials including mild steel, PVC, Viton®, and rubber.
Viton® is a registered trademark of DuPont Dow Elastomers.
Bases, halides, strong reducing agents, organic materials, carbides, fulminates, nitrates, picrates, cyanides, chlorates, alkali halides, Zinc salts, permanganates, hydrogen peroxide, azides, perchlorates, nitromethane, phosphorus, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorus(III) oxide, powdered metals, silicates, silicon-containing materials and metals.
- **Hazardous decomposition products:** Oxides of Nitrogen (NO_x) and Hydrofluoric acid gas.

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11 Toxicological Information

- **Information on toxicological effects:**
- **Acute toxicity:**

- **LD/LC50 values that are relevant for classification:**

7664-39-3 Hydrofluoric acid

Oral	LD50	1276 mg/kg (rat)
	LD50 Oral	80 ml/kg (Guinea Pig)
Inhalative	LC50/4 h	2240 mg/l (rat)

7697-37-2 Nitric Acid

Oral	LD50	>90 mg/kg (rat)
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- **Primary irritant effect:**
- **On the skin:** Strong caustic effect on skin and mucous membranes.
- **On the eye:**
Corrosive effect.
Causes serious eye irritation.
- **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Corrosive
Very toxic
Danger through skin absorption.
Swallowing will lead to a corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
- **Carcinogenic categories:**
- **IARC (International Agency for Research on Cancer):**
Group 1 - Carcinogenic to humans
Group 2A - Probably carcinogenic to humans
Group 2B - Possibly carcinogenic to humans
Group 3 - Not classifiable as to its carcinogenicity to humans
Group 4 - Probably not carcinogenic to humans

None of the ingredients are listed.

- **NTP (National Toxicology Program):**

None of the ingredients are listed.

- **OSHA-Ca (Occupational Safety & Health Administration):**

None of the ingredients are listed.

12 Ecological Information

- **Toxicity:**

- **Aquatic toxicity:**

7664-39-3 Hydrofluoric acid

EC50	270 mg/l (Fathead Minnow)
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- **Persistence and degradability:** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential:** No further relevant information available.
- **Mobility in soil:** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
 Do not allow product to reach ground water, water course or sewage system.
 Must not reach bodies of water or drainage ditch undiluted or unneutralized.
 Danger to drinking water if even small quantities leak into the ground.
 Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
- **Results of PBT and vPvB assessment:**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects:** No further relevant information available.

13 Disposal Considerations

- **Waste treatment methods:**
- **Recommendation:**
 Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
 Observe all federal, state and local environmental regulations when disposing of this material.
- **Uncleaned packagings**
- **Recommendation:** Dispose of as unused product.
- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport Information

- | | |
|-----------------------------------|--|
| · UN-Number: | UN2922 |
| · DOT, ADR, IMDG, IATA | |
| · UN proper shipping name: | Corrosive liquids, toxic, n.o.s. (Nitric acid, Hydrogen fluoride) |
| · DOT, IATA | |
| · ADR | UN2922 Corrosive liquids, toxic, n.o.s. (Nitric acid, Hydrogen fluoride) |
| · IMDG | CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE) |

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· **Transport hazard class(es):**

· **DOT**



- **Class:** 8 Corrosive substances
- **Label:** 8, 6.1

· **ADR**



- **Class:** 8 (CT1) Corrosive substances
- **Label:** 8+6.1

· **IMDG**



- **Class:** 8 Corrosive substances
- **Label:** 8/6.1

· **IATA**



- **Class:** 8 Corrosive substances
- **Label:** 8 (6.1)
- **Packing group:** II
- **DOT, ADR, IMDG, IATA:** II
- **Environmental hazards:** Not applicable.
- **Special precautions for user:** Warning: Corrosive substances
- **Danger code (Kemler):** 86
- **EMS Number:** F-A,S-B
- **Segregation groups:** Acids
- **Stowage Category:** B
- **Stowage Code:** SW2 Clear of living quarters.
- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.
- **Transport/Additional information:**
- **DOT**
- **Quantity limitations:** On passenger aircraft/rail: 1 L
On cargo aircraft only: 30 L

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- **ADR**
- **Excepted quantities (EQ):** Code: E2
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 500 ml

- **IMDG**
- **Limited quantities (LQ):** 1 L
- **Excepted quantities (EQ):** Code: E2
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 500 ml

- **UN "Model Regulation":** UN 2922 CORROSIVE LIQUIDS, TOXIC, N.O.S.
(NITRIC ACID, HYDROGEN FLUORIDE), 8 (6.1), II

15 Regulatory Information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture:**
- **SARA (Superfund Amendments and Reauthorization):**

- **Section 355 (extremely hazardous substances):**

7664-39-3	Hydrofluoric acid
7697-37-2	Nitric Acid

- **Section 313 (Specific toxic chemical listings):**

7664-39-3	Hydrofluoric acid
7697-37-2	Nitric Acid

- **TSCA (Toxic Substances Control Act):**

All ingredients are listed or exempt from listing.

- **California Proposition 65:**

- **Chemicals known to cause cancer:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

- **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

- **New Jersey Right-to-Know List:**

7664-39-3	Hydrofluoric acid
7697-37-2	Nitric Acid

- **New Jersey Special Hazardous Substance List:**

7664-39-3	Hydrofluoric acid			CO, R1
7697-37-2	Nitric Acid			CO, R2

- **Pennsylvania Special Hazardous Substance List:**

7664-39-3	Hydrofluoric acid			E
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7697-37-2 Nitric Acid

E

• **Carcinogenic categories:**

• **EPA (Environmental Protection Agency):**

None of the ingredients are listed.

• **TLV (Threshold Limit Value established by ACGIH):**

None of the ingredients are listed.

• **NIOSH-Ca (National Institute for Occupational Safety and Health):**

None of the ingredients are listed.

• **GHS label elements**

The product is classified and labeled according to the Globally Harmonized System (GHS).

• **Hazard pictograms:**



GHS05 GHS06

• **Signal word:** Danger

• **Hazard-determining components of labeling:**

Hydrofluoric acid
Nitric Acid

• **Hazard statements:**

H301 Toxic if swallowed.
H310 Fatal in contact with skin.
H314 Causes severe skin burns and eye damage.

• **Precautionary statements:**

P260 Do not breathe dusts or mists.
P280 Wear protective gloves / protective clothing.
P280 Wear eye protection / face protection.
P262 Do not get in eyes, on skin, or on clothing.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplementary first aid instructions on this Safety Data Sheet).
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P363 Wash contaminated clothing before reuse.
P301+P330+P331 If swallowed: Rinse mouth. Do NOT induce vomiting.
P302+P352 IF ON SKIN: Wash with plenty of water.
P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
P405 Store locked up.

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P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

• National regulations:

The product is subject to be classified according with the latest version of the regulations on hazardous substances.

• **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other Information

The information and recommendations in this safety data sheet are, to the best of our knowledge, accurate as of the date of issue. Nothing herein shall be deemed to create warranty, expressed or implied, and shall not establish a legally valid contractual relationship. It is the responsibility of the user to determine applicability of this information and the suitability of the material or product for any particular purpose.

• **Date of preparation / last revision:** 07/29/2016 / -

• Abbreviations and acronyms:

ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road

ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

BEI: Biological Exposure Limit

Ox. Liq. 2: Oxidizing liquids – Category 2

Acute Tox. 2: Acute toxicity – Category 2

Acute Tox. 3: Acute toxicity – Category 3

Acute Tox. 1: Acute toxicity – Category 1

Skin Corr. 1A: Skin corrosion/irritation – Category 1A

Eye Dam. 1: Serious eye damage/eye irritation – Category 1

• *** Data compared to the previous version altered.**

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