

PHOTOGRAPHERS' FORMULARY

01-5075

Instructions for using Developer DI-13 with Kodak TMax 100

There is certainly no shortage of film developers on the market but new ones keep appearing regularly. In a few instances these new products really do offer some unique advantages but, in general, there are more similarities than differences in the way film developers work.

Basically this developer, too, is conventional; but it is not a general-purpose formula: It was designed specifically for extreme compaction development (for very contrasty subjects), and should be used *only* with Kodak's TMax 100 film.

TMax is an appropriate film for this purpose because its gradation characteristics can be modified to an unusual degree by the kind of development it receives. In most popular developers TMax 100's characteristic curves are fairly conventional; in some cases they exhibit a slight boost in highlight contrast, in other cases the curves are gently shouldered, indicating some reduction in contrast in the highlights. In almost all instances this fine film produces excellent shadow separation and its speed loss, even when developed to low contrast, is typically minimal.

In a few developers, though, the curves take on an unusually free form that typically shows up as a rather abrupt increase in slope at about mid-range. In some cases this is accompanied by a slight hump in the lower portion of the curve but these effects are seldom very pronounced in curves that represent normal or near-normal contrast. In a very few developers (TMax RS is one example) TMax produces classically ideal straight-line "curves" without appreciable local emphasis.

Why DI-13 is different

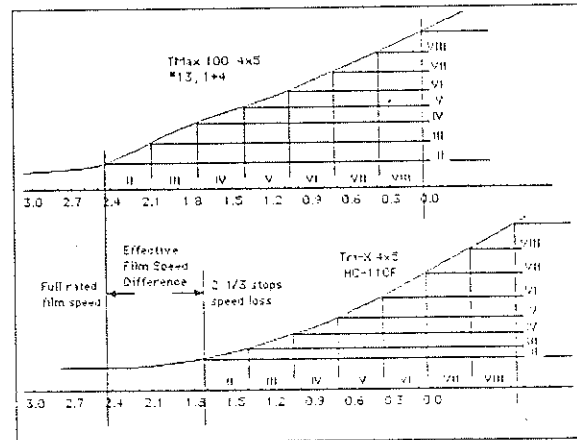
But straight-line curves are not always desirable: the natural tendency of the B&W photographic process is to decrease contrast in the extremes of tone and increase mid-range contrast rather dramatically. The printing paper's characteristics are to blame for much of this, but the film curve's contour contributes to this gradation problem, too.

To counteract this typical tone distortion the lower section of the film curve (the shadow region) should exhibit a relatively steep gradient; the mid-range gradient should flatten out to temper the normal harsh contrast in the middle grays, then the upper portion of the curve should take a modest upturn again to insure good highlight separation. Unfortunately, there are limits to our control of curve shape, but the combination of TMax 100 and DI-13 takes a modest step toward this ideal.

Two other design criteria have also been satisfactorily realized: TMax 100 can be used at its full rat-

ed film speed when developed to "normal" contrast in DI-13, and the speed loss resulting from reduced development is remarkably small. In addition, DI-13 works quite slowly so that development times for even extreme compactions are long enough to insure uniform development, and can be timed accurately.

Two actual film curves are shown here to illustrate the unique characteristics of TMax/DI-13.



In this admittedly "worst-case scenario" DI-13 and TMax 100 are compared with Tri-X and HC-110F—a combination that, when developed to low overall contrast, tends to produce weak shadows and harsh highlights, with a pronounced loss of film speed. The films were exposed at their normal rated speeds and given normal development. TMax has maintained its full rated speed of 100 (actually almost 125) but Tri-X has lost about 2 stops and is working at an effective speed of about 80.

The difference in curve shapes is also obvious in this illustration. The TMax curve has a distinct hump (suggesting increased local contrast) in the low range, but levels out a bit in mid-range before turning up a little in the highlights. The gradation effect is suggested by the zone spacing in the "negative" (on the vertical axis of the graph). Notice that zones II, III, VII, and VIII are quite wide, indicating moderately high contrast, while zones IV, V, and VI are relatively narrow, suggesting reduced contrast. By comparison, the Tri-X "negative" shows significantly reduced contrast in the deep shadows, with progressively increasing contrast toward the high values.

These characteristics are dramatized in the following illustration which compares the two "negatives" side by side. A significant feature of this illustration is the relative position of the middle values. The TMax rendering suggests rather light, subtly-detailed mid-tones compared with relatively dark and

SAFETY DATA SHEET

Version 5.7
Revision Date 11/24/2015
Print Date 06/10/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Benzotriazole
Product Number : 76457
Brand : Sigma-Aldrich
CAS-No. : 95-14-7

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

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Eye irritation (Category 2A), H319
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 + H332
H319
H412

Harmful if swallowed or if inhaled
Causes serious eye irritation.
Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P261
P264
P270
P271
P273

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.

| | |
|--------------------|--|
| P280 | Wear protective gloves/ eye protection/ face protection. |
| P301 + P312 | IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. |
| P304 + P340 | IF INHALED: Remove victim to fresh air and keep at rest in a position 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. |
| P312 | Call a POISON CENTER or doctor/ physician if you feel unwell. |
| P330 | Rinse mouth. |
| P337 + P313 | If eye irritation persists: Get medical advice/ attention. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

| | |
|------------------|--|
| Formula | : C ₆ H ₅ N ₃ |
| Molecular weight | : 119.12 g/mol |
| CAS-No. | : 95-14-7 |
| EC-No. | : 202-394-1 |

Hazardous components

| Component | Classification | Concentration |
|----------------------|---|---------------|
| Benzotriazole | | |
| | Acute Tox. 4; Eye Irrit. 2A; Aquatic Acute 2; Aquatic Chronic 2; H302, H319, H411 | <= 100 % |

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

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

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

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

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: powder Colour: beige |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 97 - 99 °C (207 - 210 °F) |
| f) Initial boiling point and boiling range | No data available |
| g) Flash point | 170 °C (338 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | 0.05 hPa (0.04 mmHg) at 20 °C (68 °F) |
| l) Vapour density | No data available |
| m) Relative density | No data available |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | log Pow: 1.44 |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |

- s) Explosive properties No data available
- t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Exposure to light may affect product quality.

10.5 Incompatible materials

Strong oxidizing agents, Heavy metals

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male and female - 500 mg/kg
(OECD Test Guideline 423)

Inhalation: No data available

LD50 Dermal - Rat - > 1,000 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Irritating to eyes. - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitisation

Maximisation Test (GPMT) - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity

Ames test

Salmonella typhimurium

Result: negative

OECD Test Guideline 474

Mouse - male and female

Result: negative

Carcinogenicity

Carcinogenicity - Rat - Oral

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Brain and Coverings: Tumors.

Carcinogenicity - Mouse - Oral

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration: Tumors. Lungs, Thorax, or Respiration: Bronchiogenic carcinoma.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
- NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: DM1225000

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

12. ECOLOGICAL INFORMATION

12.1 Toxicity

- Toxicity to fish semi-static test LC50 - Danio rerio (zebra fish) - 180 mg/l - 96 h
(OECD Test Guideline 203)
- Toxicity to daphnia and Immobilization EC50 - Daphnia galeata (water flea) - 8.58 mg/l - 48 h
other aquatic (OECD Test Guideline 202)
invertebrates
- Toxicity to algae Growth inhibition EC50 - Selenastrum capricornutum (green algae) - 75 mg/l -
72 h
(OECD Test Guideline 201)

12.2 Persistence and degradability

- Biodegradability aerobic - Exposure time 28 d
Result: 0 % - Not readily biodegradable.
(OECD Test Guideline 301D)

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

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

| | CAS-No. | Revision Date |
|---------------|---------|---------------|
| Benzotriazole | 95-14-7 | 1993-04-24 |

Pennsylvania Right To Know Components

| | CAS-No. | Revision Date |
|---------------|---------|---------------|
| Benzotriazole | 95-14-7 | 1993-04-24 |

New Jersey Right To Know Components

| | CAS-No. | Revision Date |
|---------------|---------|---------------|
| Benzotriazole | 95-14-7 | 1993-04-24 |

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

| | |
|-----------------|--------------------------------|
| Acute Tox. | Acute toxicity |
| Aquatic Acute | Acute aquatic toxicity |
| Aquatic Chronic | Chronic aquatic toxicity |
| Eye Irrit. | Eye irritation |
| H302 | Harmful if swallowed. |
| H319 | Causes serious eye irritation. |

H332 Harmful if inhaled.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: 1
Flammability: 1
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 1
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.7

Revision Date: 11/24/2015

Print Date: 06/10/2016

SAFETY DATA SHEET

Version 4.4
Revision Date 07/01/2014
Print Date 05/28/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : 1-Phenyl-3-pyrazolidinone

Product Number : 127914
Brand : Aldrich
Index-No. : 606-022-00-2

CAS-No. : 92-43-3

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

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 3), H301
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301

Toxic if swallowed.

H411

Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264

Wash skin thoroughly after handling.

P270

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

P273

Avoid release to the environment.

P301 + P310

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P321

Specific treatment (see supplemental first aid instructions on this label).

P330

Rinse mouth.

P391

Collect spillage.

P405
P501

Store locked up.
Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Phenidone

Formula : C₉H₁₀N₂O
Molecular Weight : 162.19 g/mol
CAS-No. : 92-43-3
EC-No. : 202-155-1
Index-No. : 606-022-00-2

Hazardous components

| Component | Classification | Concentration |
|--------------------------------|--|---------------|
| 1-Phenyl-3-pyrazolidone | | |
| | Acute Tox. 3; Aquatic Acute 2; Aquatic Chronic 2; H301, H411 | - |

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, nitrogen oxides (NO_x)

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

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

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|---|
| a) Appearance | Form: crystalline Colour: beige |
| b) Odour | no data available |
| c) Odour Threshold | no data available |
| d) pH | no data available |
| e) Melting point/freezing point | Melting point/range: 119 - 121 °C (246 - 250 °F) - lit. |
| f) Initial boiling point and boiling range | no data available |
| g) Flash point | no data available |
| h) Evaporation rate | no data available |
| i) Flammability (solid, gas) | no data available |
| j) Upper/lower flammability or explosive limits | no data available |
| k) Vapour pressure | no data available |
| l) Vapour density | no data available |
| m) Relative density | no data available |
| n) Water solubility | no data available |
| o) Partition coefficient: n-octanol/water | no data available |
| p) Auto-ignition temperature | no data available |
| q) Decomposition temperature | no data available |
| r) Viscosity | no data available |
| s) Explosive properties | no data available |
| t) Oxidizing properties | no data available |

9.2 Other safety information

no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

Light.

10.5 Incompatible materials

Strong oxidizing agents, Strong acids, Strong bases

10.6 Hazardous decomposition products

Other decomposition products - no data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - rat - 200 mg/kg

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

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

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Additional Information

RTECS: UQ8750000

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

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

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

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (1-Phenyl-3-pyrazolidone)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (1-Phenyl-3-pyrazolidone)
Marine pollutant: No

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (1-Phenyl-3-pyrazolidone)

15. REGULATORY INFORMATION**SARA 302 Components**

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

| | CAS-No. | Revision Date |
|-------------------------|---------|---------------|
| 1-Phenyl-3-pyrazolidone | 92-43-3 | |

New Jersey Right To Know Components

| | CAS-No. | Revision Date |
|-------------------------|---------|---------------|
| 1-Phenyl-3-pyrazolidone | 92-43-3 | |

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

| | |
|-----------------|--|
| Acute Tox. | Acute toxicity |
| Aquatic Acute | Acute aquatic toxicity |
| Aquatic Chronic | Chronic aquatic toxicity |
| H301 | Toxic if swallowed. |
| H401 | Toxic to aquatic life. |
| H411 | Toxic to aquatic life with long lasting effects. |

HMIS Rating

| | |
|------------------------|---|
| Health hazard: | 2 |
| Chronic Health Hazard: | |
| Flammability: | 0 |
| Physical Hazard | 0 |

NFPA Rating

| | |
|--------------------|---|
| Health hazard: | 2 |
| Fire Hazard: | 0 |
| Reactivity Hazard: | 0 |

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.4

Revision Date: 07/01/2014

Print Date: 05/28/2016



Material Safety Data Sheet

Creation Date 20-Jan-2010

Revision Date 20-Jan-2010

Revision Number 1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name Sodium sulfite anhydrous

Cat No. BP355-500; S430-3; S430-10; S430-500; S447-3; S447-500

Synonyms Disodium sulfite; Sulfurous acid, disodium salt (Crystalline/Powder/Certified ACS/Low Phosphate)

Recommended Use Laboratory chemicals

Company Fisher Scientific
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 703-527-3887

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview

Contact with acids liberates toxic gas. May cause eye, skin, and respiratory tract irritation . May cause central nervous system effects.

Appearance Off-white

Physical State Solid

odor odorless

Target Organs Central nervous system (CNS)

Potential Health Effects

Acute Effects

Principle Routes of Exposure

Eyes

May cause irritation.

Skin

May cause irritation. May be harmful in contact with skin.

Inhalation

May cause irritation of respiratory tract. May be harmful if inhaled.

Ingestion

May be harmful if swallowed. May cause central nervous system effects. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic Effects

Mutagenic effects have occurred in experimental animals..

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Haz/Non-haz

| Component | CAS-No | Weight % |
|----------------|-----------|----------|
| Sodium sulfite | 7757-83-7 | 97 |

4. FIRST AID MEASURES

| | |
|---------------------------|---|
| Eye Contact | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention. |
| Skin Contact | Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur. |
| Inhalation | Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur. |
| Ingestion | Do not induce vomiting. Obtain medical attention. |
| Notes to Physician | Treat symptomatically. |

5. FIRE-FIGHTING MEASURES

| | |
|---|--|
| Flash Point | No information available. |
| Method | No information available. |
| Autoignition Temperature | No information available. |
| Explosion Limits | |
| Upper | No data available |
| Lower | No data available |
| Suitable Extinguishing Media | Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.. |
| Unsuitable Extinguishing Media | No information available. |
| Hazardous Combustion Products | No information available. |
| Sensitivity to mechanical impact | No information available. |
| Sensitivity to static discharge | No information available. |

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors.

Protective Equipment and Precautions for Firefighters

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

NFPA **Health** 1 **Flammability** 0 **Instability** 1 **Physical hazards** N/A

6. ACCIDENTAL RELEASE MEASURES

| | |
|---|---|
| Personal Precautions | Use personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes and clothing. |
| Environmental Precautions | Should not be released into the environment. |
| Methods for Containment and Clean Up | Avoid dust formation. Sweep up or vacuum up spillage and collect in suitable container for disposal. |

7. HANDLING AND STORAGE

| | |
|-----------------|---|
| Handling | Wear personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Do not breathe dust. Avoid contact with skin, eyes and clothing. Keep away from acids. |
| Storage | Keep containers tightly closed in a dry, cool and well-ventilated place. Do not store near acids. |

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

| | |
|-----------------------------|---|
| Engineering Measures | Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. |
| Exposure Guidelines | This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies. |

NIOSH IDLH: Immediately Dangerous to Life or Health

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|-------------------------------------|---------------------------|
| Physical State | Solid |
| Appearance | Off-white |
| odor | odorless |
| Odor Threshold | No information available. |
| pH | 8.5-10 5% aq.sol. |
| Vapor Pressure | No information available. |
| Vapor Density | No information available. |
| Viscosity | No information available. |
| Boiling Point/Range | No information available. |
| Melting Point/Range | >500°C / 932°F |
| Decomposition temperature °C | 500 |
| Flash Point | No information available. |
| Evaporation Rate | No information available. |
| Specific Gravity | 2.630 |
| Solubility | Partly soluble in water |
| log Pow | No data available |

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight 126.04
Molecular Formula Na₂SO₃

10. STABILITY AND REACTIVITY

Stability Air sensitive. Moisture sensitive.

Conditions to Avoid Incompatible products. Excess heat. Exposure to air. Exposure to moisture.

Incompatible Materials Strong oxidizing agents, Acids

Hazardous Decomposition Products Sulfur oxides, Sodium oxides

Hazardous Polymerization Hazardous polymerization does not occur

Hazardous Reactions . Contact with acids liberates toxic gas.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|----------------|-------------------|-------------|---|
| Sodium sulfite | 820 mg/kg (Rat) | Not listed | 22 mg/L (Rat) 1 h 5.5 mg/L (Rat) 4 h |

Irritation No information available.

Toxicologically Synergistic Products No information available.

Chronic Toxicity

Carcinogenicity There are no known carcinogenic chemicals in this product

Sensitization No information available.

Mutagenic Effects Mutagenic effects have occurred in experimental animals.

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

Other Adverse Effects See actual entry in RTECS for complete information.

Endocrine Disruptor Information No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

| Component | Freshwater Algae | Freshwater Fish | Microtox | Water Flea |
|----------------|------------------|-----------------|----------------------|--------------------|
| Sodium sulfite | Not listed | Not listed | EC50 = 770 mg/L 17 h | LC50 24 h 330 mg/L |

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available

Mobility

| Component | log Pow |
|----------------|---------|
| Sodium sulfite | -4 |

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

| Component | TSCA | DSL | NDSL | EINECS | ELINCS | NLP | PICCS | ENCS | AICS | CHINA | KECL |
|----------------|------|-----|------|-----------|--------|-----|-------|------|------|-------|---------------|
| Sodium sulfite | X | X | - | 231-821-4 | - | | X | X | X | X | KE-31612 X |

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Not applicable

SARA 311/312 Hazardous Categorization

| | |
|-----------------------------------|----|
| Acute Health Hazard | No |
| Chronic Health Hazard | No |
| Fire Hazard | No |
| Sudden Release of Pressure Hazard | No |
| Reactive Hazard | No |

Clean Water Act

Not applicable

Clean Air Act

Not applicable

OSHA

Not applicable

CERCLA

Not Applicable

California Proposition 65

This product does not contain any Proposition 65 chemicals.

State Right-to-Know

Not applicable

U.S. Department of Transportation

| | |
|-----------------------------|---|
| Reportable Quantity (RQ): | N |
| DOT Marine Pollutant | N |
| DOT Severe Marine Pollutant | N |

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

Non-controlled

16. OTHER INFORMATION

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Tel: (412) 490-8929

Creation Date 20-Jan-2010

Print Date 20-Jan-2010

Revision Summary "****", and red text indicates revision

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of MSDS



| | | | |
|--------------|-------|-----------------------------|-----------------------|
| Infosafe No™ | 1CH6F | Issue Date : September 2014 | RE-ISSUED by CHEMSUPP |
|--------------|-------|-----------------------------|-----------------------|

Product Name : **SODIUM HYDROXIDE**

Classified as hazardous

1. Identification

| | | |
|--|---|---------------------|
| GHS Product Identifier | SODIUM HYDROXIDE | |
| Company Name | CHEM-SUPPLY PTY LTD (ABN 19 008 264 211) | |
| Address | 38 - 50 Bedford Street GILLMAN SA 5013 Australia | |
| Telephone/Fax Number | Tel: (08) 8440-2000 Fax: (08) 8440-2001 | |
| Recommended use of the chemical and restrictions on use | Acid neutralisation, chemical manufacture, rayon, cellophane, petroleum refining, pulp and paper, aluminium, detergents, soap, cellulose, textile processing, vegetable oil refining, plastics, explosives, dyestuffs, paint and paint remover, metal cleaning, etching and electroplating, reclaiming rubber, regenerating ion exchange resins, organic fusions, peeling of fruits and vegetables in food industry, cleaning products, food additive and laboratory reagent. | |
| Other Names | <u>Name</u> | <u>Product Code</u> |
| | SODIUM HYDROXIDE Mini Pearl LR | SL000 |
| | SODIUM HYDROXIDE Pellet AR | SA178 |
| | SODIUM HYDROXIDE Mini Pearl AR | SA000 |
| | SODIUM HYDROXIDE Pellet LR | SL178 |
| | Caustic soda, Sodium hydrate, Lye | |
| | SODIUM HYDROXIDE Mini Pearl TG | ST000 |
| Other Information | EMERGENCY CONTACT NUMBER: +61 08 8440 2000 Business hours: 8:30am to 5:00pm, Monday to Friday. | |

Chem-Supply Pty Ltd does not warrant that this product is suitable for any use or purpose. The user must ascertain the suitability of the product before use or application intended purpose. Preliminary testing of the product before use or application is recommended. Any reliance or purported reliance upon Chem-Supply Pty Ltd with respect to any skill or judgement or advice in relation to the suitability of this product of any purpose is disclaimed. Except to the extent prohibited at law, any condition implied by any statute as to the merchantable quality of this product or fitness for any purpose is hereby excluded. This product is not sold by description. Where the provisions of Part V, Division 2 of the Trade Practices Act apply, the liability of Chem-Supply Pty Ltd is limited to the replacement of supply of equivalent goods or payment of the cost of replacing the goods or acquiring equivalent goods.

2. Hazard Identification

| | |
|--|---|
| GHS classification of the substance/mixture | Corrosive to Metals: Category 1 Skin Corrosion/Irritation: Category 1A |
| Signal Word (s) | DANGER |
| Hazard Statement (s) | H290 May be corrosive to metals. H314 Causes severe skin burns and eye damage. |
| Pictogram (s) | Corrosion |



| | |
|---|---|
| Precautionary statement – Prevention | P234 Keep only in original container. P261 Avoid breathing dust/fume/gas/mist/vapours/spray. P264 Wash thoroughly after handling. P280 Wear protective gloves/protective clothing/eye protection/face protection. |
| Precautionary statement – Response | P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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 CENTER or doctor/physician. |



| | | | |
|--------------|-------|-----------------------------|-----------------------|
| Infosafe No™ | 1CH6F | Issue Date : September 2014 | RE-ISSUED by CHEMSUPP |
|--------------|-------|-----------------------------|-----------------------|

Product Name : **SODIUM HYDROXIDE**

Classified as hazardous

Precautionary statement – Storage P363 Wash contaminated clothing before reuse.
Store locked up.
Store in corrosive resistant/... container with a resistant inner liner.

3. Composition/information on ingredients

Chemical Characterization Solid

| Ingredients | Name | CAS | Proportion | Hazard Symbol | Risk Phrase |
|-------------|------------------|-----------|------------|---------------|-------------|
| | Sodium hydroxide | 1310-73-2 | 100 % | C | R35 |

4. First-aid measures

Ingestion Rinse mouth thoroughly with water immediately. Give water to drink. DO NOT induce vomiting. If vomiting occurs, have victim lean forward to reduce risk of aspiration. If vomiting occurs give further water to achieve effective dilution. Seek immediate medical assistance.

Skin Wash affected areas with copious quantities of water immediately. Remove contaminated clothing and wash before re-use. Seek urgent medical assistance.
Cover skin with an emollient.

Eye contact Immediately irrigate with copious quantity of water for at least 15 minutes. Eyelids to be held open. Seek immediate medical assistance.
If available, a neutral saline solution may be used to flush the contaminated eye/s an additional 30 minutes.

First Aid Facilities Maintain eyewash fountain and safety shower in work area.

Advice to Doctor Treat symptomatically as for strong alkalis. Consult Poisons Information Centre.
In severe cases, where excessive amounts of sodium hydroxide has been ingested, endoscopy should be performed to determine the severity of the oesophageal burns.

Other Information For advice, contact the National Poisons Information Centre (Phone Australia 13 11 26; New Zealand 0800 764 766) or a doctor.

5. Fire-fighting measures

Hazards from Combustion Products May liberate toxic fumes in fire (sodium oxide).

Specific Methods Use extinguishing media most appropriate for the surrounding fire.
Small fire: Use dry chemical, CO₂ or water spray.
Large fire: Use water spray, fog or foam - Do NOT use water jets.
If safe to do so, move undamaged containers from the fire area. Cool containers with flooding quantities of water until well after the fire is out. Avoid getting water inside the containers.

Specific hazards arising from the chemical Material does not burn. Fire or heat will produce irritating, poisonous and/or corrosive gases.

Hazchem Code 2W

Precautions in connection with Fire Wear SCBA and chemical splash suit. Fully encapsulating, gas-tight suits should be worn for maximum protection. Structural firefighter's uniform is NOT effective for these materials.

6. Accidental release measures

Personal Precautions Do not allow hot material to contact water or other liquids. Avoid contact with skin. Avoid contact with eyes.

Personal Protection Wear protective clothing specified for normal operations (see Section 8)

Clean-up Methods - Small Spillages Sweep up (avoid generating dust) and remove to a suitable, clearly labelled container for disposal in accordance with local regulations.

Clean-up Methods - Large Spillages Seek expert advice on handling and disposal.

Environmental Precautions Avoid release to the environment.

7. Handling and storage

Precautions for Safe Handling Avoid generation or accumulation of dusts. Contaminated clothing should be removed and washed before reuse. Application of skin-protective barrier cream is recommended. Wash hands and face thoroughly after working with material. Use in well ventilated areas away from all ignition sources. In case of insufficient ventilation, wear suitable respiratory equipment. When diluting or preparing solution,



| | | | |
|--------------|-------|-----------------------------|-----------------------|
| Infosafe No™ | 1CH6F | Issue Date : September 2014 | RE-ISSUED by CHEMSUPP |
|--------------|-------|-----------------------------|-----------------------|

Product Name : **SODIUM HYDROXIDE**

Classified as hazardous

| | |
|---|--|
| Conditions for safe storage, including any incompatibilities | add caustic to water in small amounts to avoid boiling and splattering. Store in a cool,dry place. Store away from acids. Keep containers securely sealed and protected against physical damage. |
| Corrosiveness | Corrosive to aluminum, tin, zinc. Corrosive to steel at elevated temperatures. |
| Storage Regulations | Refer Australian Standard AS 3780 - 1994 'The Storage and Handling of Corrosive Substances'. |
| Other Information | Containers made of nickel alloys are preferred. Steel containers are acceptable if temperatures are not elevated. |

8. Exposure controls/personal protection

| Occupational exposure limit values | Name | STEL | | TWA | | Footnote |
|---|---|-------|-----|-------|-----|-----------------|
| | | mg/m3 | ppm | mg/m3 | ppm | |
| | Sodium hydroxide | | | 2 | | Peak limitation |
| Other Exposure Information | A time weighted average (TWA) has been established for Sodium hydroxide (Safe Work Australia) of 2 mg/m3. The corresponding STEL level is 2 mg/m3 - Peak Limitation - a ceiling concentration which should not be exceeded over a measurement period which should be as short as possible but not exceeding 15 minutes. The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. In industrial situations maintain the concentrations values below the TWA. This may be achieved by | | | | | |
| Appropriate engineering controls | process modification, use of local exhaust ventilation, capturing substances at the source, or other methods. | | | | | |
| Respiratory Protection | Where ventilation is not adequate, respiratory protection may be required. Avoid breathing dust, vapours or mists. Respiratory protection should comply with AS 1716 - Respiratory Protective Devices and be selected in accordance with AS 1715 - Selection, Use and Maintenance of Respiratory Protective Devices. Filter capacity and respirator type depends on exposure levels. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. | | | | | |
| Eye Protection | The use of a face shield, chemical goggles or safety glasses with side shield protection as appropriate. Must comply with Australian Standards AS 1337 and be selected and used in accordance with AS 1336. | | | | | |
| Hand Protection | Avoid skin contact when removing gloves from hands, do not touch the gloves outer surface. Dispose of gloves as hazardous waste. Hand protection should comply with AS 2161, Occupational protective gloves - Selection, use and maintenance. Recommendation: Rubber or plastic gloves. | | | | | |
| Personal Protective Equipment | Final choice of personal protective equipment will depend on individual circumstances and/or according to risk assessments undertaken. | | | | | |
| Footwear | Safety boots in industrial situations is advisory, foot protection should comply with AS 2210, Occupational protective footwear - Guide to selection, care and use. | | | | | |
| Body Protection | Clean clothing or protective clothing should be worn, preferably with and apron. Clothing for protection against chemicals should comply with AS 3765 Clothing for Protection Against Hazardous Chemicals. | | | | | |
| Hygiene Measures | Do not eat, drink or smoke in work areas. Wash hands thoroughly after handling this material. Maintain good housekeeping. | | | | | |

9. Physical and chemical properties

| | |
|---------------------------------------|--|
| Form | Solid |
| Appearance | White, deliquescent flakes, pellets or minipeal. |
| Odour | Odourless. |
| Melting Point | 318 - 323 °C |
| Boiling Point | 1390 °C @ 760 mm Hg |
| Solubility in Water | Soluble. |
| Solubility in Organic Solvents | Soluble in alcohol and glycerol. Insoluble in acetone and ether. |



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|--------------|-------|-----------------------------|-----------------------|
| Infosafe No™ | 1CH6F | Issue Date : September 2014 | RE-ISSUED by CHEMSUPP |
|--------------|-------|-----------------------------|-----------------------|

Product Name : **SODIUM HYDROXIDE**

Classified as hazardous

| | |
|--------------------------|--|
| Specific Gravity | 2.130 @ 20 °C |
| pH | 12 (0.05% soln); 13 (1% soln); 14 (5% soln) |
| Odour Threshold | Odourless. |
| Flammability | Non-combustible. |
| Molecular Weight | 40.01 |
| Other Information | Absorbs water and carbon dioxide from the air. |

10. Stability and reactivity

| | |
|---|--|
| Chemical Stability | Stable under normal use conditons. Hygroscopic Slowly absorbs moisture from air, reacting with carbon dioxide and forming sodium carbonate. |
| Conditions to Avoid | Exposure to moisture. Exposure to air. Dust generation. Incompatibles. |
| Incompatible Materials | Strong acids, ally alcohol, ally chloride, phophorous, metals (aluminium, magnesium, tin, zinc), nitro compounds (nitroethane, nitromethane, nitroparaggins, nitropropane) and chloro organic compounds, organic halogen compounds (trichloroethylene), water. |
| Hazardous Decomposition Products | Sodium oxide. |
| Possibility of hazardous reactions | May react violently with strong acids. In contact with water, reaction may generate enough heat to ignite combustible materials. In contact with metals, reaction may produce flammable and explosive hydrogen gas. May react with organohalogen compounds to form spontaneously combustible compounds. May react explosively in contact with nitro and chloro organic compounds. May form explosive products with ammonia plus silver nitrate, benzene and benzene sulfonyl chloride, tetrahydrofuran, sodium tetrahydroborate, and trichlorophenol sodium salt plus methyl alcohol plus tichlorobenzene plus heat. |
| Hazardous Polymerization | Will not occur. |

11. Toxicological Information

| | |
|------------------------|--|
| Ingestion | Corrosive. Swallowing may cause severe burns of mouth, throat, and stomach. Severe scarring of tissue and death may result. Similar symptoms may be experienced as for inhalation with, severe pain, severe scarring of tissue, diarrhea, bleeding, vomiting, fall in blood pressure, collapse and death. Damage may appear days after exposure. Risk of perforation in the oesophagus and stomach. |
| Inhalation | Severe irritant. Effects from inhalation of dust or mist vary from mild irritation to serious damage or burns of the mucous membranes of the upper respiratory tract, depending on severity of exposure. Symptoms may include coughing, wheezing, laryngitis, shortness of breath, nausea, vomiging, sneezing, sore throat or runny nose. Severe chemical pneumonitis and pulmonary edema may occur. |
| Skin | Corrosive. Contact with skin causes severe burns and scarring. Can penetrate deeply. Burns are not immediately painful, onset of pain and irritation may be minutes to hours. |
| Eye | Corrosive. Causes severe burns. Can penetrate deeply. In severe cases, ulceration, permanent impairment of vision and permanent blindness may occur. |
| Carcinogenicity | Not listed in the IARC Monographs. |
| Chronic Effects | Prolongecd contact with dilute solution or dust has destructive effects upon tissue. |
| Mutagenicity | No evidence of mutagenic properties. |

12. Ecological information

| | |
|--------------------------------------|---|
| Ecotoxicity | Toxic for aquatic organisms. Harmful effect due to pH shift. |
| Persistence and degradability | Methods for the determination of biodegradability are not applicable to inorganic substances. |
| Acute Toxicity - Fish | LC50 Gambusia affins (mosquito fish) - 125mg/L - 96 h. |
| Acute Toxicity - Daphnia | EC50 (Daphina magna): 76 mg/l/24h. |

13. Disposal considerations

| | |
|--------------------------------|---|
| Disposal Considerations | Whatever cannot be saved for recovery or recycling should be disposed of according to relevant local, state and federal government regulations. |
|--------------------------------|---|

14. Transport information



| | | | |
|--------------|-------|-----------------------------|-----------------------|
| Infosafe No™ | 1CH6F | Issue Date : September 2014 | RE-ISSUED by CHEMSUPP |
|--------------|-------|-----------------------------|-----------------------|

Product Name : **SODIUM HYDROXIDE**

Classified as hazardous

| | |
|-----------------------------------|---|
| Transport Information | Dangerous goods of Class 8 (Corrosive) are incompatible in a placard load with any of the following: Class 1, Class 4.3, Class 5, Class 6, if the Class 6 dangerous goods are cyanides and the Class 8 dangerous goods are acids, Class 7; and are incompatible with food and food packaging in any quantity. Not to be loaded on the same vehicle with strong acids. |
| U.N. Number | 1823 |
| UN proper shipping name | SODIUM HYDROXIDE, SOLID |
| Transport hazard class(es) | 8 |
| Hazchem Code | 2W |
| Packaging Method | 3.8.8 |
| Packing Group | II |
| EPG Number | 8A1 |
| IERG Number | 37 |

15. Regulatory information

| | |
|-------------------------------|---|
| Regulatory Information | Listed in the Australian Inventory of Chemical Substances (AICS). |
| Poisons Schedule | S6 |

16. Other Information

| | |
|--|--|
| Date of preparation or last revision of SDS | September 2009. |
| Literature References | 'Standard for the Uniform Scheduling of Medicines and Poisons No. 4', Commonwealth of Australia, June 2013. Lewis, Richard J. Sr. 'Hawley's Condensed Chemical Dictionary 13th. Ed.', Rev., John Wiley and Sons, Inc., NY, 1997. National Road Transport Commission, 'Australian Code for the Transport of Dangerous Goods by Road and Rail 7th. Ed.', 2007. 'Labelling of Hazardous Workplace Chemicals, Code of Practice' Safe Work Australia. Standards Australia, 'SAA/SNZ HB 76:2010 Dangerous Goods - Initial Emergency Response Guide', Standards Australia/Standards New Zealand, 2010. Safe Work Australia, 'Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)]'. Safe Work Australia, 'Hazardous Substances Information System, 2005'. Safe Work Australia, 'National Code of Practice for the Labelling of Safe Work Hazardous Substances (2011)'. Safe Work Australia, 'National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)]'. |
| Contact Person/Point | Paul McCarthy Ph. (08) 8440 2000 DISCLAIMER STATEMENT: All information provided in this data sheet or by our technical representatives is compiled from the best knowledge available to us. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse, are beyond our control, we make no warranty either expressed or implied, with respect to the completeness or accuracy to the information contained herein. Chem-Supply accepts no responsibility whatsoever for its accuracy or for any results that may be obtained by customers from using the data and disclaims all liability for reliance on information provided in this data sheet or by our technical representatives. |
| Empirical Formula & Structural Formula | NaOH ...End Of MSDS... |

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Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 16-Nov-2010

Revision Date 12-May-2016

Revision Number 3

1. Identification

Product Name Sodium tetraborate decahydrate

Cat No. : B80; B175500; S24612; S246212; S246250LB; S246500; S249500; S249500LC; NC9821542

Synonyms Sodium borate decahydrate; Borax

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number

CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Serious Eye Damage/Eye Irritation
Reproductive Toxicity

Category 2
Category 1B

Label Elements

Signal Word

Danger

Hazard Statements

Causes serious eye irritation
May damage fertility. May damage the unborn child



Precautionary Statements

Prevention

Obtain special instructions before use
 Do not handle until all safety precautions have been read and understood
 Use personal protective equipment as required
 Wash face, hands and any exposed skin thoroughly after handling
 Wear eye/face protection

Response

IF exposed or concerned: Get medical attention/advice

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 If eye irritation persists: Get medical advice/attention

Storage

Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

3. Composition / information on ingredients

| Component | CAS-No | Weight % |
|---|-----------|----------|
| Borates, tetra, sodium salts, decahydrate | 1303-96-4 | 100 |

4. First-aid measures

| | |
|---|--|
| Eye Contact | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention. |
| Skin Contact | Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention. |
| Inhalation | Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention. |
| Ingestion | Do not induce vomiting. Obtain medical attention. |
| Most important symptoms/effects Notes to Physician | No information available. Treat symptomatically |

5. Fire-fighting measures

| | |
|---|--|
| Suitable Extinguishing Media | Water spray. Carbon dioxide (CO ₂). Dry chemical. Chemical foam. |
| Unsuitable Extinguishing Media | No information available |
| Flash Point Method - | No information available No information available |
| Autoignition Temperature Explosion Limits | No information available |
| Upper Lower | No data available No data available |
| Oxidizing Properties | Not oxidising |
| Sensitivity to Mechanical Impact Sensitivity to Static Discharge | No information available No information available |

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products

Oxides of boron

Protective Equipment and Precautions for Firefighters

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

NFPA

Health
2

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions

Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.

Environmental Precautions

Should not be released into the environment. See Section 12 for additional ecological information.

Methods for Containment and Clean Up

Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling

Avoid contact with skin and eyes. Do not breathe dust. Avoid contact with clothing. Ensure adequate ventilation. Wear personal protective equipment.

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

| Component | ACGIH TLV | OSHA PEL | NIOSH IDLH |
|---|---|-------------------------------------|---|
| Borates, tetra, sodium salts, decahydrate | TWA: 2 mg/m ³ STEL: 6 mg/m ³ | (Vacated) TWA: 10 mg/m ³ | TWA: 5 mg/m ³ |
| Component | Quebec | Mexico OEL (TWA) | Ontario TWAEV |
| Borates, tetra, sodium salts, decahydrate | TWA: 5 mg/m ³ | TWA: 5 mg/m ³ | TWA: 2 mg/m ³ STEL: 6 mg/m ³ |

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment**Eye/face Protection**

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

| | |
|--|---|
| Physical State | Powder Solid |
| Appearance | White |
| Odor | Odorless |
| Odor Threshold | No information available |
| pH | 9 5% aq.sol. 20°C |
| Melting Point/Range | 75 °C / 167 °F |
| Boiling Point/Range | No information available |
| Flash Point | No information available |
| Evaporation Rate | Not applicable |
| Flammability (solid,gas) | No information available |
| Flammability or explosive limits | |
| Upper | No data available |
| Lower | No data available |
| Vapor Pressure | No information available |
| Vapor Density | Not applicable |
| Specific Gravity | 1.7300 |
| Solubility | No information available |
| Partition coefficient; n-octanol/water | No data available |
| Autoignition Temperature | No information available |
| Decomposition Temperature | > 100°C |
| Viscosity | Not applicable |
| Molecular Formula | B ₄ Na ₂ O ₇ · 10 H ₂ O |
| Molecular Weight | 381.36 |

10. Stability and reactivity

| | |
|----------------------------------|---|
| Reactive Hazard | None known, based on information available |
| Stability | Stable under normal conditions. |
| Conditions to Avoid | Exposure to air. Incompatible products. Avoid dust formation. |
| Incompatible Materials | Strong oxidizing agents, Strong acids, Powdered metal salts |
| Hazardous Decomposition Products | Oxides of boron |
| Hazardous Polymerization | Hazardous polymerization does not occur. |
| Hazardous Reactions | None under normal processing. |

11. Toxicological information

Acute Toxicity

Product Information

Component Information

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|--------------------|-------------------------|-----------------|
| Borates, tetra, sodium salts, decahydrate | 5660 mg/kg (Rat) | > 2000 mg/kg (Rabbit) | 2.03 mg/l (Rat) |

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

| | |
|-----------------|--|
| Irritation | Irritating to eyes May cause irritation of respiratory tract |
| Sensitization | No information available |
| Carcinogenicity | The table below indicates whether each agency has listed any ingredient as a carcinogen. |

| Component | CAS-No | IARC | NTP | ACGIH | OSHA | Mexico |
|------------------------|-----------|------------|------------|------------|------------|------------|
| Borates, tetra, sodium | 1303-96-4 | Not listed | Not listed | Not listed | Not listed | Not listed |

| | | | | | |
|---|--|--|--|--|--|
| salts, decahydrate | | | | | |
| Mutagenic Effects | No information available | | | | |
| Reproductive Effects | Experiments have shown reproductive toxicity effects on laboratory animals. | | | | |
| Developmental Effects | No information available. | | | | |
| Teratogenicity | May cause harm to the unborn child. | | | | |
| STOT - single exposure | None known | | | | |
| STOT - repeated exposure | None known | | | | |
| Aspiration hazard | No information available | | | | |
| Symptoms / effects, both acute and delayed | No information available | | | | |
| Endocrine Disruptor Information | No information available | | | | |
| Other Adverse Effects | The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information. | | | | |

12. Ecological information

Ecotoxicity

| Component | Freshwater Algae | Freshwater Fish | Microtox | Water Flea |
|---|---|---|----------|----------------------------|
| Borates, tetra, sodium salts, decahydrate | 2.6-21.8 mg/L EC50 96h 158 mg/L EC50 = 96h | 340 mg/L LC50 96 h 708 mg/L LC50 96 h (Pimephales promelas) | - | 1085 - 1402 mg/L LC50 48 h |

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

| Component | log Pow |
|---|---------|
| Borates, tetra, sodium salts, decahydrate | - 0.757 |

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

| | |
|-----------------|---------------|
| DOT | Not regulated |
| TDG | Not regulated |
| IATA | Not regulated |
| IMDG/IMO | Not regulated |

15. Regulatory information

International Inventories

| Component | TSCA | DSL | NDSL | EINECS | ELINCS | NLP | PICCS | ENCS | AICS | IECSC | KECL |
|---|------|-----|------|-----------|--------|-----|-------|------|------|-------|------|
| Borates, tetra, sodium salts, decahydrate | X | X | - | 215-540-4 | - | | X | X | X | X | X |

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated

polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories

| | |
|-----------------------------------|-----|
| Acute Health Hazard | Yes |
| Chronic Health Hazard | Yes |
| Fire Hazard | No |
| Sudden Release of Pressure Hazard | No |
| Reactive Hazard | No |

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

| Component | Massachusetts | New Jersey | Pennsylvania | Illinois | Rhode Island |
|---|---------------|------------|--------------|----------|--------------|
| Borates, tetra, sodium salts, decahydrate | X | X | X | X | X |

U.S. Department of Transportation

| | |
|-----------------------------|---|
| Reportable Quantity (RQ): | N |
| DOT Marine Pollutant | N |
| DOT Severe Marine Pollutant | N |

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

| | |
|--------------------|---|
| WHMIS Hazard Class | D2A Very toxic materials D2B Toxic materials |
|--------------------|---|



16. Other information

| | |
|-------------------------|--|
| Prepared By | Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com |
| Creation Date | 16-Nov-2010 |
| Revision Date | 12-May-2016 |
| Print Date | 12-May-2016 |
| Revision Summary | This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) |

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS