# Material Safty Data Sheet

| Product | IGS420(Part B) |
|---|---|

## 1. PRODUCT AND COMPANY IDENTIFICATION

| | |
|---|---|
| 1.1 Product Name | IGS420(Part B) |
| 1.2 Recommended use of the chemical and restrictions on use | |
| Recommended use of the product | Silicone sealant Part(B) for pair glass |
| Restrictions on use of the product | No data |
| 1.3 Company information | |
| Company Name | DAEHEUNG CHEMICAL CO., LTD. |
| Address | 52, Sandan-ro15beon-gil,Pyeongtaeksi,Gyeonggi-do |
| Emergency telephone number | +82-31-663-5251 |

## 2. HAZARD IDENTIFICATION

2.1 Hazard, Risk classification

Self-heating substances and mixtures: Category 1
Acute toxicity (oral): Category 4
Skin corrosion / irritation: Category 1
Severe eye damage / eye irritation: Category 1
Skin sensitization: Category 1
Carcinogenicity: Category 2
Germ cell mutagenicity: Category 2
Reproductive toxicity: Category 1B
Specific target organ toxicity (single exposure): Category 2
Specific target organ toxicity (single exposure): Category 3 (respiratory tract irritation)
Specific target organ toxicity (repeated exposure): Category 2
Chronic aquatic toxicity: Category 3

2.2 GHS label elements

Symbol

| | |
|---|---|
| Signal word | Danger |
| Harmful Risk phrases | H251 Self-heating; May cause fire<br>H302 Harmful if swallowed<br>H314 Causes severe skin burns and eye damage.<br>H317 May cause an allergic skin reaction<br>H318 Causes serious eye damage.<br>H335 May cause respiratory irritation<br>H341 Suspected of causing genetic defects<br>H351 Suspected to cause cancer<br>H360 May cause damage to fertility or the reproductive system.<br>H371 May cause damage to (...) in the body.<br>H373 Prolonged or repeated exposure may cause damage to (...) in the body.<br>H412 Harmful to aquatic life with long lasting effects. |
| Precautions | |
| Prevention | P201 Obtain instructions before use.<br>P202 Do not handle until all safety precautions have been read and understood.<br>P235 + P410 Keep the temperature low and avoid direct sunlight.<br>P264 Wash thoroughly after handling.<br>P270 Do not eat, drink or smoke when using this product.<br>P271 Only handle outdoors or in a well-ventilated area.<br>P273 Do not discharge into the environment. |
| Corresponding | P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor / physician if you feel unwell.<br>P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. If possible, remove contact lenses. Continue to wash.<br>P312 If you feel unwell, seek medical advice / attention.. |
| Storage | P403 + P233 Keep container tightly closed in a well-ventilated place. |
| Disposal | P501 Dispose of contents container according to relevant regulations. |

Carbon black

| | |
|---|---|
| Health | 0 |
| Fire | 1 |
| Reactivity | No data |

Polydimethylsiloxane

| | |
|---|---|
| Health | 1 |
| Fire | 1 |
| Reactivity | 0 |

Tetrapropyl silicate

| | |
|---|---|
| Health | 1 |
| Fire | 1 |
| Reactivity | 1 |

Dibutyltin Dilaurate

| | |
|---|---|
| Health | 2 |
| Fire | 1 |
| Reactivity | 0 |

3-Aminopropyl triethoxysilane

| | |
|---|---|
| Health | 3 |
| Fire | 1 |
| Reactivity | 1 |

## 3. COMPOSITION / INFORMATION ON INTEGREDIENTS

| Name | Comon Name | CAS No | Contents(%) |
|---|---|---|---|
| Carbon black | | 1333-86-4 | 10 ~ 20 |
| Polydimethylsiloxane | DIMETHYLPOLYSILOXANE/WATER EMULSIONS | 63148-62-9 | 30 ~ 40 |
| Tetrapropyl silicate | SILICIC ACID (H4SiO4), TETRAPROPYL ESTER | 682-01-9 | 20 ~ 30 |
| Dibutyltin Dilaurate | DIBUTYLBIS((1-OXODODECYL)OXY)STANNANE | 77-58-7 | 0.1 ~ 1 |
| 3-Aminopropyl triethoxysilane | 1-PROPANAMINE, 3-(TRIETHOXYSILYL) | 919-30-2 | 10 ~ 20 |

## 4. FIRST AID MEASURES

4.1 Eye contact

If it gets on your eyes, wash it carefully with water for a few minutes. If possible, remove contact lenses. Continue to wash.

Get emergency medical attention.

4.2 In case of skin contact

If skin (or hair) gets on the skin, remove all contaminated clothing. Wash skin with water / shower.

If skin irritation or rash occurs, seek medical advice / advice.

Wash contaminated clothing before reuse.

In the case of hot materials, immerse or wash affected areas in a large amount of cold water to remove heat

Remove contaminated clothing and shoes and isolate contaminated areas.

Prevent spread of contamination on mild skin contact

4.3 Inhalation

Immediately call a POISON CENTER or doctor / physician.

If excessive dust or fumes are present, remove with clean air and seek medical attention if coughing or other symptoms occur.

4.4 Ingestion

If swallowed, wash your mouth. Do not try to vomit.

If you feel unwell, seek medical advice immediately.

If substance is ingested or inhaled, do not use artificial respiration with mouth-to-mouth method and use appropriate respiratory medical equipment

4.5 Other precautions

Contact your health care professional and take special emergency measures such as follow-up surveillance.

Have the medical personnel know about the material and take protective measures.

## 5. FIRE FIGHTING MEASURES

### 5.1. Extinguishing media

Extinguishing media

Use alcohol foam, carbon dioxide or water spray for digestion related to this material.

Use dry sand or earth for digestion.

### 5.2 Specific hazards arising from chemicals

Specific hazards arising from chemicals

Unstable at room temperature
During burning, pyrolysis or combustion may produce irritating and highly toxic gases.
Container may explode on heating
Leaks are a fire / explosion hazard.
Can be re-ignited after digestion
May ignite on contact with moisture
Flammable / combustible material
Some materials flash quickly and can be picked up quickly
Some can ride, but not easily ignite
Some may explode explosively upon fire or heating
Non-flammable, the substance itself is not burned but decomposes on heating and may cause corrosive / toxic fumes

### 5.3 Protective equipment and precautions for fire-fighting

Protective equipment and precautions for fire-fighting

Some can be transported at high temperatures
Leachate may cause contamination.
Contact may cause skin and eye burns
Be careful because it can be carried in a hot state.
In the event of a large fire in a tank fire, use unmanned fire fighting equipment and allow it to retreat if it is not possible
If there is a high sound level in the pressure relief device or a discoloration of the tank in the event of a tank fire, immediately withdraw it
Get out of the flame tank when the tank fires.
Rescuers should wear appropriate protective equipment.
Extinguish the area and maintain safety distance.
Be aware that it may be melted and transported.
Drill ditches for the disposal of digestive waters and keep them from dispersing.
Move container from fire area if it is not hazardous.
In case of tank fire, extinguish at maximum distance or use unmanned fire fighting equipment
Do not let water get inside the container.
Cool containers with large amounts of water even after the fire has evolved.

## 6. ACCIDENTAL RELEASE MEASURES

### 6.1. Personal Precautions, protective equipment and emergency procedures

(Dust, fume, gas, mist, steam, spray).
Wipe off any spills immediately and follow all protective precautions.
Isolate the contaminated area.
If you do not need to enter or do not have protective equipment, do not go in.
Remove all ignition sources.
Stop the leak if it is not dangerous.
Do not touch a damaged container or spill without adequate protection.
Wear full-face protection when flameproofing
Cover with plastic sheet to prevent diffusion
Prevent dust formation
Note the substances and conditions to avoid

### 6.2 Measures necessary to protect the environment

Do not discharge into the environment.

Prevent entry into waterways, sewers, basements and confined spaces.

### 6.3 How to purge or remove

Pile up the embankment and collect the water for digestion.
Absorb spillage with inert materials (eg dry sand or earth) and place in a chemical waste container.
Absorb liquid and rinse contaminated area with detergent and water.
Cover with dry sand / earth or other non-combustible material and cover with plastic sheet to prevent spreading and contact with rain
In case of large spills, make liquid dripping from dripping water.
Use a clean explosion-proof tool to collect the spilled material and place it in a loose plastic container
Clean spills with clean shovel in a clean, dry container, loosely closed, then transfer container from leaking area
Cover with plastic sheet to prevent spreading and keep dry when powder is leaked
Absorb with sand or other non-combustible material in small leakages and place in container.

## 7. HANDLING AND STORAGE

| | |
|---|---|
| 7.1. Precautions for safe handling | Do not handle until all safety precautions have been read and understood.<br>(Dust, fume, gas, mist, steam, spray).<br>Wash thoroughly after handling.<br>Do not eat, drink or smoke when using this product.<br>Follow all MSDS / label precautions as product residues may remain after emptying containers.<br>Handle / store carefully.<br>Avoid prolonged or repeated skin contact.<br>Note the substances and conditions to avoid<br>Be aware of the high temperature. |
| 7.2 Safe storage | Keep it at low temperature and avoid direct sunlight.<br>Keep container tightly closed in a well-ventilated place.<br>Keep away from other materials.<br>The empty drum should be completely drained and properly blocked and immediately returned to the drum regulator or properly positioned. |

## 8. Exposure protection and personal protection

8.1. Exposure standards for chemicals, biological exposure standards, etc.

| | |
|---|---|
| Domestic regulation | |
| Carbon black | TWA - 3.5mg/m3 |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | TWA - 0.1mg/m3 Tin(Organic compound) |
| 3-Aminopropyl triethoxysilane | No data |
| ACGIH regulation | |
| Carbon black | TWA 3 mg/㎥ |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | TWA 0.1 mg/㎥ |
| Dibutyltin Dilaurate | STEL 0.2 mg/㎥ |
| 3-Aminopropyl triethoxysilane | No data |
| Biological exposure standard | |
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |
| 8.2 Appropriate engineering controls | Use local exhaust ventilation or other engineering controls to keep air levels below exposure limits. |
| 8.3 Personal protective equipment | |
| Respiratory protection | Wear a respirator that has been approved by the Korean Occupational Safety and Health Administration in accordance with the physicochemical properties of the substance being exposed. |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| 9.1 Appearance | |
| Physical Form | Paste |
| Color | Black |
| 9.2 Odor | Week smell |
| 9.3 Odor threshold | No data |
| 9.4 pH | No data |
| 9.5 Melting point / freezing point | No data |
| 9.6 Boiling point | No data |
| 9.7 Flash point | No data |
| 9.8 Evaporation Rate | No data |
| 9.9 Flammability (solid, gas) | No data |
| 9.10 Upper/lower flammability or explosive limits | No data |
| 9.11 Vapor Pressure | No data |
| 9.12 Solubility | No data |
| 9.13 Vapor Density | No data |
| 9.14 Specific gravity | 1.00 ~ 1.05 |

| | |
|---|---|
| 9.15 N-octanol/water partition coefficient | No data |
| 9.16 Autoignition temperature | No data |
| 9.17 Decomposition Temperature | No data |
| 9.18 Viscosity | Paste |
| 9.19 Molecular weight | No data |

## 10. STABILITY AND REACTIVITY

10.1 Possibility of chemical stability and adverse reaction

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | Stable at normal temperature and pressure |
| Polydimethylsiloxane | Container may explode on heating |
| Polydimethylsiloxane | Some are burned but not easily ignited |
| Polydimethylsiloxane | May cause irritation and poisonous gas in case of fire |
| Polydimethylsiloxane | Inhalation of the substance may be harmful |
| Polydimethylsiloxane | Some fluids may cause dizziness, suffocation-inducing vapors |
| Tetrapropyl silicate | Container may explode on heating |
| Tetrapropyl silicate | Highly flammable: easily ignited by heat, spark, flame |
| Tetrapropyl silicate | Leaks are a fire / explosion hazard. |
| Tetrapropyl silicate | Vapors may explode indoors, outdoors, and in drains |
| Tetrapropyl silicate | Vapors may form explosive mixtures with air. |
| Tetrapropyl silicate | Vapors may cause dizziness or suffocation without awareness |
| Tetrapropyl silicate | May cause irritating, corrosive and toxic gases in case of fire |
| Tetrapropyl silicate | Inhalation and contact may irritate or burn the skin and eyes. |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | Container may explode on heating |
| 3-Aminopropyl triethoxysilane | Vapors may form explosive mixtures with air in the presence of heating: indoor, outdoor, and sewer explosion hazards |
| 3-Aminopropyl triethoxysilane | Some are burned but not easily ignited |
| 3-Aminopropyl triethoxysilane | Some may generate flammable hydrogen gas on contact with metal |
| 3-Aminopropyl triethoxysilane | Toxic: inhalation, ingestion, skin contact may result in serious injury and death. |
| 3-Aminopropyl triethoxysilane | Contact with molten material may cause severe skin and eye burns. |
| 3-Aminopropyl triethoxysilane | May cause irritating, corrosive and toxic gases in case of fire |

10.2 Conditions to avoid

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | Heat source, spark, flame, etc. |
| Tetrapropyl silicate | Heat source, spark, flame, etc. |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | Heat source, spark, flame, etc. |

10.3 Substances to avoid

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | Combustible material |
| Polydimethylsiloxane | Irritant, toxic gas |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | Metal |

10.4 Hazardous materials generated during decomposition

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | During burning, pyrolysis or combustion can produce irritating and highly toxic gases. |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | During burning, pyrolysis or combustion can produce irritating and highly toxic gases. |

## 11. TOXICOLOGICAL INFORMATION

11.1. Information about possible routes of exposure

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | Can absorb body by inhalation |
| Polydimethylsiloxane | Can be absorbed by inhalation and extinguisher |
| Polydimethylsiloxane | Through skin, digestive system, can absorb body by inhalation of aerosol |
| Polydimethylsiloxane | Absorption of body by inhalation of steam |

| | |
|---|---|
| Polydimethylsiloxane | Can be absorbed by inhalation, skin and digestive system |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |

11.2 Health hazard information

Acute toxicity

Oral

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | LD50 > 17000 ㎎/㎏ Rat |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | LD50 175 ㎎/㎏ Rat |
| 3-Aminopropyl triethoxysilane | LD50 1570 ~ 3650 ㎎/㎏ Rat |

Percutaneous

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | LD50 > 2000 ㎎/㎏ Rabbit |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | LD50 > 2000 ㎎/㎏ Rat (OECD Guideline 402) |
| 3-Aminopropyl triethoxysilane | LD50 4290 ㎎/㎏ Rabbit |

Inhalation

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | Mist LC50 0.059 ~ 22 ㎎/㎏ Rat |
| 3-Aminopropyl triethoxysilane | Steam LC50> 7.35 ㎎/㎏ 4 hr Rat |

Skin corrosive or irritant

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | Causes skin irritation |
| Dibutyltin Dilaurate | Skin corrosion / irritation Test result No irritant (GLP) |
| 3-Aminopropyl triethoxysilane | Rabbit showed severe irritation when diluted solution was tested but necrosis and / or necrosis occurred when the undiluted solution was applied as it was |

Severe eye damage or irritation

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | Eye Standard dose test Rabbit amount: 100 mg / 1H; Reaction: Mild (light stimulus) |
| Tetrapropyl silicate | Causes eye irritation |
| Dibutyltin Dilaurate | Severe eye damage / irritation Test result No irritation (GLP) |
| 3-Aminopropyl triethoxysilane | Severe irritation and necrosis appear until rabbit observation period of 13 days |

Respiratory sensitization

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |

Skin sensitization

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | Skin sensitization test results for guinea pigs (female / male) indicate sensitivity (OECD Guideline 406 (Skin Sensitization), GLP) |
| 3-Aminopropyl triethoxysilane | Seven of the 30 guinea pigs are hypersensitive. |

Carcinogenicity

Industrial Safety and Health Act

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |

Notice of Ministry of Employment and Labor

| | |
|---|---|
| Carbon black | 2 |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |

IARC

| | |
|---|---|
| Carbon black | 2B |

| | |
|---|---|
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |
| OSHA | |
| Carbon black | Applicable |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |
| ACGIH | |
| Carbon black | A3 |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | A4 (Tin and organic compounds, as Sn) |
| 3-Aminopropyl triethoxysilane | No data |
| NTP | |
| Carbon black | OSHA |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |
| EU CLP | |
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |
| Germ cell mutagenicity | |
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | In Vitro Mammalian Chromosome Aberration Test (OECD Guideline 474 (Mammalian Erythrocyte Micronucleus Test), GLP, ECHA), in vitro Mammalian Chromosome Aberration Test (OECD Guideline 473) , ECHA), in vitro mutagenicity test positive in vitro Ames test result negative. In vivo tests (Bacilus subtilis / Rec-assay, Spot test), positive |
| 3-Aminopropyl triethoxysilane | In vitro Mammaliam cell gene mutation, Chromated exchange assay negative<br>in vivo Mouse micronucleus assay nagative |
| Reproductive toxicity | |
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | Developmental toxicity test of rats (female / male) resulted in severe malformations (OECD Guideline 414 (Prenatal Developmental Toxicity Study), GLP) |
| 3-Aminopropyl triethoxysilane | No effects on spermatogenesis or reproductive organs at 600 mg / kg administered by gavage for 90 days |
| Specific target organ toxicity (single exposure) | |
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | Stimulates airway inhalation |
| Dibutyltin Dilaurate | LD50> 2000 mg / kg bw (OECD Guideline 402, GLP) was observed in rats (female / male) as a result of acute toxicity test, crocheting posture |
| 3-Aminopropyl triethoxysilane | No data |
| Specific target organ toxicity (repeated exposure) | |
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | The results of reproductive / developmental toxicity studies in rats (female / male) showed severe lymphatic depletion in females and autologous fetuses in uterus at autopsy. NOAEL 0.3-0.4 mg / kg bw / day (OECD Guideline 421, GLP ) |
| 3-Aminopropyl triethoxysilane | Scaly alteration at inhalation exposure, at least granulomatous laryngitis |
| Inhalation hazard | |
| Carbon black | No data |

| | |
|---|---|
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | Viscosity 72 mPas (dynamic) 20 °C (ECHA) molecular structure C32H64O4Sn |
| 3-Aminopropyl triethoxysilane | No data |

## 12. ECOLOGICAL INFORMATION

### 12.1. Ecotoxicity

Fish

| | |
|---|---|
| Carbon black | LC50 > 1000 ㎎/ℓ 96 hr etc (Tribolodon hakonensis) |
| Polydimethylsiloxane | LC50 37.79 ㎎/ℓ 96 hr Lepomis macrochirus |
| Tetrapropyl silicate | LC50 196.032 ㎎/ℓ 96 hr |
| Dibutyltin Dilaurate | LC50 262.89 ㎎/ℓ etc (Danio rerio, OECD Guideline 203 (Fish, Acute Toxicity Test)) |
| 3-Aminopropyl triethoxysilane | LC50 ≥ 934 ㎎/ℓ 96 hr Brachydanio rerio |

shellfish

| | |
|---|---|
| Carbon black | EC50 > 5600 ㎎/ℓ 24 hr Daphnia magna (OECD Guideline 202, GLP) |
| Polydimethylsiloxane | LC50 44.5 ㎎/ℓ 48 hr Daphnia magna |
| Tetrapropyl silicate | LC50 210.052 ㎎/ℓ 48 hr |
| Dibutyltin Dilaurate | EC50 1.7 ~ 3.4 ㎎/ℓ 48 hr Daphnia magna (OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)) |
| 3-Aminopropyl triethoxysilane | EC50 331 ㎎/ℓ 48 hr Daphnia magna |

Algae

| | |
|---|---|
| Carbon black | ErC50 > 10000 ㎎/ℓ 72 hr etc (Desmodesmus subspicatus) |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | EC50< 1 ㎎/ℓ 97 hr |
| Dibutyltin Dilaurate | EC50 > 1 ㎎/ℓ 72 hr etc (Desmodesmus subspicatus, OECD Guideline 201 (Alga, Growth Inhibition Test)) |
| 3-Aminopropyl triethoxysilane | EC50 603 ㎎/ℓ 72 hr (Scenedesmus subspicatus) |

### 12.2. Persistence and degradability

Persistence

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | log Kow 2 |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | log Kow 0.31 ((Estimate)) |

degradability

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |

### 12.3. Bioaccumulation

Enrichment

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | BCF 6.926 |
| Dibutyltin Dilaurate | BCF 31 |
| 3-Aminopropyl triethoxysilane | No data |

Biodegradable

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | 78 01 14 day |
| 3-Aminopropyl triethoxysilane | 67 (%) 28 day |

### 12.4. Soil mobility

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | No data |
| 3-Aminopropyl triethoxysilane | No data |

### 12.5. Other harmful effects

| | |
|---|---|
| Carbon black | No data |
| Polydimethylsiloxane | No data |

| | |
|---|---|
| Tetrapropyl silicate | No data |
| Dibutyltin Dilaurate | Aglae(Desmodesmus subspicatus) EC50 72hr >1mg/L ,OECD Guideline 201 (Alga, Growth Inhibition Test)<br>Not classified (Not classified as acute toxicity due to poorly soluble substance (water solubility <1 mg / L) |
| 3-Aminopropyl triethoxysilane | Shellfish NOEC = 94mg/L/48hr (Daphnia magna)<br>Source of material : SIDS |

## 13. DISPOSAL CONSIDERATIONS

| | |
|---|---|
| 13.1 Disposal method | Dispose of contents and container in accordance with local regulations. |
| 13.2 Disposal considerations | Dispose of contents and container in accordance with local regulations. |

## 14. TRANSPORT INFORMATION

| | |
|---|---|
| 14.1 UN Number (UN No.) | UN 2924 |
| 14.2. UN proper shipping name | FLAMMABLE LIQUID, CORROSIVE, N.O.S. (Alkoxysilane) |
| 14.3. Transport hazard class(es) | 3 |
| Secondary risk | 8 |
| 14.4. Packing group | III |
| Lable | 3(8) |
| EmS Code | F-E, S-C |
| 14.5. Environmental hazards | |
| Dibutyltin Dilaurate | applicable(MP) |

14.6 Special safety measures that the user needs or needs to know about transportation or transportation

| | |
|---|---|
| Emergency measures in case of fire | Not applicable |
| Emergency Action | Not applicable |

14.7 Other International Transportation Regulations

IATA-DGR

| | |
|---|---|
| Packaging instructions (cargo transporter) | 365 |
| Packaging instructions (passenger aircraft) | 354 |

## 15. REGULATORY INFORMATION

15.1 Regulation by the Industrial Safety and Health Act

| | |
|---|---|
| Carbon black | Exposure standard setting substance |
| Dibutyltin Dilaurate | Exposure standard setting substance |
| Dibutyltin Dilaurate | Working environment Measured material |
| Dibutyltin Dilaurate | Substances subject to special medical examination |
| Dibutyltin Dilaurate | Toxic substances to be controlled |
| 15.2 Regulation by Chemical Substance Control Act | No data |

15.3 Regulation under dangerous goods safety management law

| | |
|---|---|
| Dibutyltin Dilaurate | Category 4 petroleum (water-soluble) 4000L |
| 3-Aminopropyl triethoxysilane | Category 4 petroleum (non-water-soluble liquid) 2000ℓ |
| 15.4 Regulation by waste management law | Designated waste |
| 15.5 Other domestic and foreign regulations | |
| Domestic regulation | |
| Residual Organic Pollutant Control Act | Not available |
| Foreign regulation | |
| OSHA regulations | Not applicable |
| CERCLA regulations | Not applicable |
| US Administration Information(EPCRA 302 regulations) | Not applicable |
| US Administration Information(EPCRA 304 regulations) | Not applicable |
| US Administration Information(EPCRA 313 regulations) | Not applicable |
| US Administration Information(Rotterdam Convention material) | Not applicable |
| US Administration Information(Stockholm Convention substance) | Not applicable |
| US Administration Information(Montreal Protocol substance) | Not applicable |
| EU Classification information(Confirmed classification result) | |
| 3-Aminopropyl triethoxysilane | Xn; R22C; R34 |

EU Classification information(Danger phrases)

| | |
|---|---|
| 3-Aminopropyl triethoxysilane | R22, R34 |

EU Classification information(Safety phrases)

| | |
|---|---|
| 3-Aminopropyl triethoxysilane | S1/2, S26, S36/37/39, S45 |

## 16. OTHER INFORMATION

16.1 Source of material

Carbon black

NITE,EHCA

Polydimethylsiloxane

National Library of Medicine(NLM)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?CHEM)(Oral)
National Library of Medicine(NLM)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?CHEM)(Percutaneous)
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com)(Severe eye damage or irritation )
The ECOTOXicology database (ECOTOX)(http://cfpub.epa.gov/ECOTOX/quick_query.htm)(Fish)
The ECOTOXicology database (ECOTOX)(http://cfpub.epa.gov/ECOTOX/quick_query.htm)(Shellfish)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)

Tetrapropyl silicate

Ecological Structure Activity Relationships(ECOSAR)(Fish)
Ecological Structure Activity Relationships(ECOSAR)(Shellfish)
Ecological Structure Activity Relationships(ECOSAR)(aglae)
National Library of Medicine(NLM)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?CHEM)(Persistence)
Quantitative Structure Activity Relation(QSAR)(Enrichment)
Quantitative Structure Activity Relation(QSAR)(Soil mobility)
Akron University(http://ull.chemistry.uakron.edu/erd/)(Pyrolysis product)

Dibutyltin Dilaurate

OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Inhalation)
National Library of Medicine(NLM)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?CHEM)(Enrichment)
HSDB,ECHA,Chemicalbook

3-Aminopropyl triethoxysilane

OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Oral)
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Percutaneous)
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Inhalation)
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Skin corrosive or irritant )
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Severe eye damage or irritation )
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Skin sensitization)
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Germ cell mutagenicity)
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Reproductive toxicity)
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Specific target organ toxicity (repeated exposure))
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Fish)
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Shellfish)
SIDS(aglae)
OECD Screening Information Data Set(http://cs3-hq.oecd.org/scripts/hpv/)(Biodegradable)
Emergency Response Guidebook(2008)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)

| | |
|---|---|
| 16.2 Date First | 2017-09-26 |
| 16.3 Revision number and date | |
| Revision number | 0 time |
| Revision Date | 0 |

16.4 Etc.

○ The MSDS (Material Safty Data Sheet) is edited or partially corrected by referring to the MSDS provided by KOSHA (Korea Occupational Safty and Health Agency)