



## Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the Minister of Industry Decree No. 23/M-IND/PER/4/2013 and GHS Classification 4th Edition.

|                        |            |                         |               |
|------------------------|------------|-------------------------|---------------|
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### SECTION 1: Identification

#### 1.1. Product identifier

Graphene

#### 1.2. Recommended use and restrictions on use

##### Recommended use

Coating painted surface

#### 1.3. Supplier's details

**ADDRESS:** PT 3M Indonesia , Perkantoran Hijau Arkadia, Menara F, Lt. 8. Jl. TB. Simatupang Kav. 88, Jakarta Selatan, 12520, Indonesia  
**Telephone:** +6221-29974000  
**Website:** [https://www.3m.co.id/3M/en\\_ID/company-id/](https://www.3m.co.id/3M/en_ID/company-id/)

#### 1.4. Emergency telephone number

(021)29974000

### SECTION 2: Hazard identification

#### 2.1. Classification of the substance or mixture

Flammable Liquid: Category 2.

Acute Aquatic Toxicity: Category 3.

#### 2.2. Label elements

##### Signal word

Danger

##### Symbols

Flame |

##### Pictograms

**HAZARD STATEMENTS:**

H225 Highly flammable liquid and vapor.

H402 Harmful to aquatic life.

**PRECAUTIONARY STATEMENTS****Prevention:**

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280B Wear protective gloves, eye protection, and face protection.

**Response:**

P370 + P378 In case of fire: Use a fire fighting agent suitable for flammable liquids such as dry chemical or carbon dioxide to extinguish.

**2.3. Other hazards**

Repeated exposure may cause skin dryness or cracking.

## SECTION 3: Composition/information on ingredients

This material is a mixture.

| Ingredient               | C.A.S. No.   | % by Wt |
|--------------------------|--------------|---------|
| Amorphous silica         | 7631-86-9    | 75 - 85 |
| N-Butyl Acetate          | 123-86-4     | 5 - 15  |
| Graphene (nanoplatelets) | 1034343-98-0 | 5 - 10  |

## SECTION 4: First aid measures

**4.1. Description of first aid measures****Inhalation:**

Remove person to fresh air. If you feel unwell, get medical attention.

**Skin Contact:**

Immediately wash with soap and water. Remove contaminated clothing and wash before reuse. If signs/symptoms develop, get medical attention.

**Eye Contact:**

If exposed, flush eyes with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms develop, get medical attention.

**If Swallowed:**

Rinse mouth. If you feel unwell, get medical attention.

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

No critical symptoms or effects. See Section 11.1, information on toxicological effects.

**4.3. Indication of any immediate medical attention and special treatment required**

Not applicable.

## SECTION 5: Fire-fighting measures

### 5.1. Suitable extinguishing media

In case of fire: Use a fire fighting agent suitable for flammable liquids such as dry chemical or carbon dioxide to extinguish.

### 5.2. Special hazards arising from the substance or mixture

Closed containers exposed to heat from fire may build pressure and explode.

### Hazardous Decomposition or By-Products

#### Substance

Carbon monoxide

Carbon dioxide

Irritant Vapors or Gases

Oxides of Nitrogen

#### Condition

During Combustion

During Combustion

During Combustion

During Combustion

### 5.3. Special protective actions for fire-fighters

Water may not effectively extinguish fire; however, it should be used to keep fire-exposed containers and surfaces cool and prevent explosive rupture. Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

## SECTION 6: Accidental release measures

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

Evacuate area. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use only non-sparking tools. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Warning! A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. Use personal protective equipment based on the results of an exposure assessment. Refer to Section 8 for PPE recommendations. If anticipated exposure resulting from an accidental release exceeds the protective capabilities of the PPE listed in Section 8, or are unknown, select PPE that offers an appropriate level of protection. Consider the physical and chemical hazards of the material when doing so. Examples of PPE ensembles for emergency response could include wearing bunker gear for a release of flammable material; wearing chemical protective clothing if the spilled material is a corrosive, a sensitizer, a significant dermal irritant, or can be absorbed through the skin; or donning a positive pressure supplied-air respirator for chemicals with inhalation hazards. For information regarding physical and health hazards, refer to sections 2 and 11 of the SDS.

### 6.2. Environmental precautions

Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

### 6.3. Methods and material for containment and cleaning up

Contain spill. Cover spill area with a fire extinguishing foam that is resistant to polar solvents. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible using non-sparking tools. Place in a metal container approved for transportation by appropriate authorities. Clean up residue with water. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Avoid eye contact. Avoid breathing of dust created by cutting, sanding, grinding or machining. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use only non-sparking tools. Take precautionary measures against

static discharge. Avoid breathing dust/fume/gas/mist/vapors/spray. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.) Wear low static or properly grounded shoes. To minimize the risk of ignition, determine applicable electrical classifications for the process using this product and select specific local exhaust ventilation equipment to avoid flammable vapor accumulation. Ground/bond container and receiving equipment if there is potential for static electricity accumulation during transfer.

## 7.2. Conditions for safe storage including any incompatibilities

Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store away from heat. Store away from acids. Store away from oxidizing agents.

# SECTION 8: Exposure controls/personal protection

## 8.1. Control parameters

### Occupational exposure limits

If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

| Ingredient                                                                                                                                                      | C.A.S. No. | Agency         | Limit type                                                                             | Additional Comments |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|----------------------------------------------------------------------------------------|---------------------|
| Butyl acetates, all isomers                                                                                                                                     | 123-86-4   | ACGIH          | TWA:50 ppm;STEL:150 ppm                                                                |                     |
| N-Butyl Acetate                                                                                                                                                 | 123-86-4   | Indonesia OELs | TWA(8 hours):50 ppm;STEL(15 minutes):150 ppm                                           |                     |
| Particles (insoluble or poorly soluble) not otherwise specified, inhalable particles                                                                            | 7631-86-9  | ACGIH          | TWA(inhalable particulates):10 mg/m3                                                   |                     |
| Particles (insoluble or poorly soluble) not otherwise specified, respirable particles                                                                           | 7631-86-9  | ACGIH          | TWA(respirable particles):3 mg/m3                                                      |                     |
| PARTIKEL-PARTIKEL TIDAK TERKLASIFIKASI, PARTIKEL INHALABEL (PARTIKEL YANG INHALABEL (TOTAL), TIDAK MENGANDUNG ASBES DAN KANDUNGAN SILIKA LEBIH KECIL DARI < 1%) | 7631-86-9  | Indonesia OELs | TWA(Total inhalable dust)(8 hours):10 mg/m3;TWA(respirable particles)(8 hours):3 mg/m3 |                     |

ACGIH : American Conference of Governmental Industrial Hygienists

AIHA : American Industrial Hygiene Association

CMRG : Chemical Manufacturer's Recommended Guidelines

Indonesia OELs : Indonesia. Minister of Manpower and Transmigration Decree No. 13/MEN/X/2011 concerning Threshold Values, Chemical and Physical Factors in the Workplace.

TWA: Time-Weighted-Average

STEL: Short Term Exposure Limit

CEIL: Ceiling

## 8.2. Exposure controls

### 8.2.1. Engineering controls

Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment. Use explosion-proof ventilation equipment.

### 8.2.2. Personal protective equipment (PPE)

#### Eye/face protection

None required.

**Skin/hand protection**

Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity.

For prolonged or repeated contact, gloves made from the following material(s) are recommended (breakthrough times are >4 hours): Polymer laminate, Polyvinyl Alcohol (PVA)

Any glove recommended for prolonged/repeated contact is also suitable for short-term/splash contact.

**Respiratory protection**

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:

Half facepiece or full facepiece air-purifying respirator suitable for organic vapors

For questions about suitability for a specific application, consult with your respirator manufacturer.

## SECTION 9: Physical and chemical properties

**9.1. Information on basic physical and chemical properties**

|                                                          |                                |
|----------------------------------------------------------|--------------------------------|
| <b>Physical state</b>                                    | Liquid                         |
| <b>Color</b>                                             | Transparent Colorless          |
| <b>Odor</b>                                              | Minty                          |
| <b>Odor threshold</b>                                    | No Data Available              |
| <b>pH</b>                                                | No Data Available              |
| <b>Melting point/Freezing point</b>                      | -95 °C                         |
| <b>Boiling point/Initial boiling point/Boiling range</b> | 56 °C                          |
| <b>Flash Point</b>                                       | -20 °C [Test Method: Open Cup] |
| <b>Evaporation rate</b>                                  | No Data Available              |
| <b>Flammability</b>                                      | Flammable Liquid: Category 2.  |
| <b>Flammable Limits(LEL)</b>                             | No Data Available              |
| <b>Flammable Limits(UEL)</b>                             | No Data Available              |
| <b>Vapor Pressure</b>                                    | No Data Available              |
| <b>Relative Vapor Density</b>                            | No Data Available              |
| <b>Density</b>                                           | No Data Available              |
| <b>Relative Density</b>                                  | 0.79                           |
| <b>Water solubility</b>                                  | Soluble                        |
| <b>Solubility- non-water</b>                             | No Data Available              |
| <b>Partition coefficient: n-octanol/ water</b>           | No Data Available              |
| <b>Autoignition temperature</b>                          | No Data Available              |
| <b>Decomposition temperature</b>                         | No Data Available              |
| <b>Kinematic Viscosity</b>                               | No Data Available              |
| <b>Volatile Organic Compounds</b>                        | No Data Available              |
| <b>Percent volatile</b>                                  | No Data Available              |
| <b>VOC Less H2O &amp; Exempt Solvents</b>                | No Data Available              |

|                                 |                |
|---------------------------------|----------------|
| <b>Particle Characteristics</b> | Not Applicable |
|---------------------------------|----------------|

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

### 10.2. Chemical stability

Stable.

### 10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

### 10.4. Conditions to avoid

Heat  
Sparks and/or flames  
Static discharge (Solids can generate static electricity charges when transferred and in mixing operations sufficient to be an ignition source.)

### 10.5. Incompatible materials

Strong acids  
Alkali and alkaline earth metals  
Strong oxidizing agents  
Reducing agents

### 10.6. Hazardous decomposition products

| <u>Substance</u> | <u>Condition</u> |
|------------------|------------------|
| None known.      |                  |

Refer to section 5.2 for hazardous decomposition products during combustion.

## SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

### 11.1. Information on Toxicological effects

#### Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

#### Inhalation:

Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause additional health effects (see below).

#### Skin Contact:

Prolonged or repeated exposure may cause: Dermal Defatting: Signs/symptoms may include localized redness, itching, drying and cracking of skin.

#### Eye Contact:

Contact with the eyes during product use is not expected to result in significant irritation.

## Graphene

### Ingestion:

Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

### Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

### Acute Toxicity

| Name                     | Route                          | Species                | Value                                          |
|--------------------------|--------------------------------|------------------------|------------------------------------------------|
| Overall product          | Inhalation-Vapor(4 hr)         |                        | No data available; calculated ATE >50 mg/l     |
| Overall product          | Ingestion                      |                        | No data available; calculated ATE >5,000 mg/kg |
| Amorphous silica         | Dermal                         | Rabbit                 | LD50 > 5,000 mg/kg                             |
| Amorphous silica         | Inhalation-Dust/Mist (4 hours) | Rat                    | LC50 > 0.691 mg/l                              |
| Amorphous silica         | Ingestion                      | Rat                    | LD50 > 5,110 mg/kg                             |
| N-Butyl Acetate          | Dermal                         | Rabbit                 | LD50 > 14,112 mg/kg                            |
| N-Butyl Acetate          | Inhalation-Dust/Mist (4 hours) | Rat                    | LC50 1.8 mg/l                                  |
| N-Butyl Acetate          | Inhalation-Vapor (4 hours)     | Rat                    | LC50 > 21 mg/l                                 |
| N-Butyl Acetate          | Ingestion                      | Rat                    | LD50 > 10,760 mg/kg                            |
| Graphene (nanoplatelets) | Ingestion                      | Mouse                  | LD50 > 5,000 mg/kg                             |
| Graphene (nanoplatelets) | Inhalation-Dust/Mist (4 hours) | Rat                    | LC50 > 1.99 mg/l                               |
| Graphene (nanoplatelets) | Dermal                         | similar health hazards | LD50 estimated to be > 5,000 mg/kg             |

ATE = acute toxicity estimate

### Skin Corrosion/Irritation

| Name                     | Species | Value                     |
|--------------------------|---------|---------------------------|
| Amorphous silica         | Rabbit  | No significant irritation |
| N-Butyl Acetate          | Rabbit  | No significant irritation |
| Graphene (nanoplatelets) | Rabbit  | No significant irritation |

### Serious Eye Damage/Irritation

| Name                     | Species       | Value                     |
|--------------------------|---------------|---------------------------|
| Amorphous silica         | Rabbit        | No significant irritation |
| N-Butyl Acetate          | Human         | Mild irritant             |
| Graphene (nanoplatelets) | In vitro data | No significant irritation |

### Sensitization:

#### Skin Sensitization

| Name                     | Species                 | Value          |
|--------------------------|-------------------------|----------------|
| Amorphous silica         | Human and animal        | Not classified |
| N-Butyl Acetate          | Multiple animal species | Not classified |
| Graphene (nanoplatelets) | Guinea pig              | Not classified |

**Respiratory Sensitization**

For the component/components, either no data are currently available or the data are not sufficient for classification.

**Germ Cell Mutagenicity**

| Name                     | Route    | Value         |
|--------------------------|----------|---------------|
| Amorphous silica         | In Vitro | Not mutagenic |
| N-Butyl Acetate          | In Vitro | Not mutagenic |
| Graphene (nanoplatelets) | In Vitro | Not mutagenic |
| Graphene (nanoplatelets) | In vivo  | Not mutagenic |

**Carcinogenicity**

| Name             | Route         | Species | Value                                                                        |
|------------------|---------------|---------|------------------------------------------------------------------------------|
| Amorphous silica | Not Specified | Mouse   | Some positive data exist, but the data are not sufficient for classification |

**Reproductive Toxicity****Reproductive and/or Developmental Effects**

| Name                     | Route      | Value                                  | Species | Test Result           | Exposure Duration        |
|--------------------------|------------|----------------------------------------|---------|-----------------------|--------------------------|
| Amorphous silica         | Ingestion  | Not classified for female reproduction | Rat     | NOAEL 509 mg/kg/day   | 1 generation             |
| Amorphous silica         | Ingestion  | Not classified for male reproduction   | Rat     | NOAEL 497 mg/kg/day   | 1 generation             |
| Amorphous silica         | Ingestion  | Not classified for development         | Rat     | NOAEL 1,350 mg/kg/day | during organogenesis     |
| N-Butyl Acetate          | Inhalation | Not classified for female reproduction | Rat     | NOAEL 9.5 mg/l        | 2 generation             |
| N-Butyl Acetate          | Inhalation | Not classified for male reproduction   | Rat     | NOAEL 9.5 mg/l        | 2 generation             |
| N-Butyl Acetate          | Inhalation | Not classified for development         | Rat     | NOAEL 3.6 mg/l        | 2 generation             |
| Graphene (nanoplatelets) | Inhalation | Not classified for female reproduction | Rat     | NOAEL 1.03 mg/l       | premating into lactation |
| Graphene (nanoplatelets) | Inhalation | Not classified for male reproduction   | Rat     | NOAEL 1.03 mg/l       | 4 weeks                  |
| Graphene (nanoplatelets) | Inhalation | Not classified for development         | Rat     | NOAEL 1.03 mg/l       | premating into lactation |

**Target Organ(s)****Specific Target Organ Toxicity - single exposure**

| Name            | Route      | Target Organ(s)                   | Value                             | Species                | Test Result         | Exposure Duration |
|-----------------|------------|-----------------------------------|-----------------------------------|------------------------|---------------------|-------------------|
| N-Butyl Acetate | Inhalation | central nervous system depression | May cause drowsiness or dizziness | Human                  | NOAEL Not available | not available     |
| N-Butyl Acetate | Inhalation | respiratory irritation            | May cause respiratory irritation  | Human                  | NOAEL Not available | not available     |
| N-Butyl Acetate | Ingestion  | central nervous system depression | May cause drowsiness or dizziness | Professional judgement | NOAEL Not available |                   |

**Specific Target Organ Toxicity - repeated exposure**

| Name             | Route      | Target Organ(s)    | Value          | Species | Test Result         | Exposure Duration     |
|------------------|------------|--------------------|----------------|---------|---------------------|-----------------------|
| Amorphous silica | Inhalation | respiratory system | Not classified | Human   | NOAEL Not available | occupational exposure |
| Amorphous silica | Inhalation | silicosis          | Not classified | Human   | NOAEL Not available | occupational exposure |



## Graphene

|                          |            |                                 |                |     |                    |          |
|--------------------------|------------|---------------------------------|----------------|-----|--------------------|----------|
| N-Butyl Acetate          | Inhalation | endocrine system                | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | hematopoietic system            | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | liver                           | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | nervous system                  | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | kidney and/or bladder           | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | gastrointestinal tract          | Not classified | Rat | NOAEL 4.8 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | respiratory system              | Not classified | Rat | NOAEL 4.8 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | heart                           | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | bone, teeth, nails, and/or hair | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | immune system                   | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | eyes                            | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| N-Butyl Acetate          | Inhalation | vascular system                 | Not classified | Rat | NOAEL 9.6 mg/l     | 13 weeks |
| Graphene (nanoplatelets) | Inhalation | immune system                   | Not classified | Rat | NOAEL 0.00188 mg/l | 4 weeks  |
| Graphene (nanoplatelets) | Inhalation | nervous system                  | Not classified | Rat | NOAEL 0.00188 mg/l | 4 weeks  |
| Graphene (nanoplatelets) | Inhalation | respiratory system              | Not classified | Rat | NOAEL 0.00188 mg/l | 4 weeks  |
| Graphene (nanoplatelets) | Inhalation | heart                           | Not classified | Rat | NOAEL 0.00188 mg/l | 4 weeks  |
| Graphene (nanoplatelets) | Inhalation | endocrine system                | Not classified | Rat | NOAEL 0.00188 mg/l | 4 weeks  |
| Graphene (nanoplatelets) | Inhalation | hematopoietic system            | Not classified | Rat | NOAEL 0.00188 mg/l | 4 weeks  |
| Graphene (nanoplatelets) | Inhalation | liver                           | Not classified | Rat | NOAEL 0.00188 mg/l | 4 weeks  |
| Graphene (nanoplatelets) | Inhalation | kidney and/or bladder           | Not classified | Rat | NOAEL 0.00188 mg/l | 4 weeks  |

### Aspiration Hazard

For the component/components, either no data are currently available or the data are not sufficient for classification.

**Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.**

## SECTION 12: Ecological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. Additional information leading to material classification in Section 2 is available upon request. In addition, environmental fate and effects data on ingredients may not be reflected in this section because an ingredient is present below the threshold for labeling, an ingredient is not expected to be available for exposure, or the data is considered not relevant to the material as a whole.

### 12.1. Toxicity

#### Acute aquatic hazard:

GHS Acute 3: Harmful to aquatic life.

#### Chronic aquatic hazard:

Not chronically toxic to aquatic life by GHS criteria.

**Graphene**

No product test data available

| Material                 | Cas #        | Organism            | Type               | Exposure | Test Endpoint                  | Test Result                |
|--------------------------|--------------|---------------------|--------------------|----------|--------------------------------|----------------------------|
| Amorphous silica         | 7631-86-9    | Green algae         | Experimental       | 72 hours | ErC50                          | >173.1 mg/l                |
| Amorphous silica         | 7631-86-9    | Rainbow Trout       | Experimental       | 96 hours | LC50                           | >1,000 mg/l                |
| Amorphous silica         | 7631-86-9    | Sediment organism   | Experimental       | 96 hours | EC50                           | 8,500 mg/kg (Dry Weight)   |
| Amorphous silica         | 7631-86-9    | Water flea          | Experimental       | 48 hours | EL50                           | >1,000 mg/l                |
| Amorphous silica         | 7631-86-9    | Green algae         | Experimental       | 72 hours | NOEC                           | 173.1 mg/l                 |
| Amorphous silica         | 7631-86-9    | Water flea          | Experimental       | 21 days  | NOEC                           | 68 mg/l                    |
| Amorphous silica         | 7631-86-9    | Activated sludge    | Experimental       | 3 hours  | EC50                           | >1,000 mg/l                |
| Amorphous silica         | 7631-86-9    | Redworm             | Experimental       | 56 days  | NOEC                           | 100,000 mg/kg (Dry Weight) |
| N-Butyl Acetate          | 123-86-4     | Green algae         | Analogous Compound | 72 hours | ErC50                          | 397 mg/l                   |
| N-Butyl Acetate          | 123-86-4     | Fathead Minnow      | Experimental       | 96 hours | LC50                           | 18 mg/l                    |
| N-Butyl Acetate          | 123-86-4     | Water flea          | Experimental       | 48 hours | EC50                           | 44 mg/l                    |
| N-Butyl Acetate          | 123-86-4     | Green algae         | Analogous Compound | 72 hours | NOEC                           | 196 mg/l                   |
| N-Butyl Acetate          | 123-86-4     | Water flea          | Analogous Compound | 21 days  | NOEC                           | 23.2 mg/l                  |
| N-Butyl Acetate          | 123-86-4     | Ciliated protozoa   | Experimental       | 40 hours | IC50                           | 356 mg/l                   |
| N-Butyl Acetate          | 123-86-4     | Lettuce             | Experimental       | 14 days  | EC50                           | >1,000 mg/kg (Dry Weight)  |
| Graphene (nanoplatelets) | 1034343-98-0 | Chinese rare minnow | Experimental       | 96 hours | No tox obs at lmt of water sol | >100 mg/l                  |
| Graphene (nanoplatelets) | 1034343-98-0 | Green algae         | Experimental       | 96 hours | EC50                           | 62.2 mg/l                  |
| Graphene (nanoplatelets) | 1034343-98-0 | Water flea          | Experimental       | 48 hours | LC50                           | >16 mg/l                   |
| Graphene (nanoplatelets) | 1034343-98-0 | Activated sludge    | Experimental       | 3 hours  | EC50                           | >1,000 mg/l                |
| Graphene (nanoplatelets) | 1034343-98-0 | Redworm             | Experimental       | 14 days  | LC50                           | >1,001 mg/kg (Dry Weight)  |

**12.2. Persistence and degradability**

| Material                 | CAS No.      | Test Type                     | Duration | Study Type                    | Test Result       | Protocol                       |
|--------------------------|--------------|-------------------------------|----------|-------------------------------|-------------------|--------------------------------|
| Amorphous silica         | 7631-86-9    | Data not availbl-insufficient | N/A      | N/A                           | N/A               | N/A                            |
| N-Butyl Acetate          | 123-86-4     | Experimental Biodegradation   | 28 days  | Biological Oxygen Demand      | 83 %BOD/ThOD      | OECD 301D - Closed Bottle Test |
| N-Butyl Acetate          | 123-86-4     | Experimental Photolysis       |          | Photolytic half-life (in air) | 6.3 days (t 1/2)  |                                |
| N-Butyl Acetate          | 123-86-4     | Experimental Hydrolysis       |          | Hydrolytic half-life (pH 7)   | 3.1 years (t 1/2) |                                |
| Graphene (nanoplatelets) | 1034343-98-0 | Experimental Biodegradation   | 28 days  | Biological Oxygen Demand      | 0 %BOD/ThOD       | OECD 301D - Closed Bottle Test |

**12.3. Bioaccumulative potential**

| Material                 | CAS No.      | Test Type                                             | Duration | Study Type                     | Test Result | Protocol                     |
|--------------------------|--------------|-------------------------------------------------------|----------|--------------------------------|-------------|------------------------------|
| Amorphous silica         | 7631-86-9    | Data not available or insufficient for classification | N/A      | N/A                            | N/A         | N/A                          |
| N-Butyl Acetate          | 123-86-4     | Experimental Bioconcentration                         |          | Log of Octanol/H2O part. coeff | 2.3         | OECD 117 log Kow HPLC method |
| Graphene (nanoplatelets) | 1034343-98-0 | Data not available or insufficient for classification | N/A      | N/A                            | N/A         | N/A                          |

#### 12.4. Mobility in soil

Please contact manufacturer for more details

#### 12.5 Other adverse effects

No information available

### SECTION 13: Disposal considerations

#### 13.1. Disposal methods

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

Incinerate in a permitted waste incineration facility. As a disposal alternative, utilize an acceptable permitted waste disposal facility. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

### SECTION 14: Transport Information

#### Local Regulations

**Land Transport:** In accordance with Director General of Land Transportation Decree No. SK.725/AJ.302/DRJD/2004 which refer to UN Standard.

**Sea Transport:** In accordance with Minister of Transportation Decree No. KM 2/2010 which refer to IMDG Code Standard.

#### International Regulations

**UN No.:** Not applicable

**UN Proper Shipping Name:** Not applicable

**Transportation Class (IMO):** Not applicable

**Transportation Class (IATA):** Not applicable

**Packing Group:** Not applicable

**Marine Pollutant:** Not applicable

### SECTION 15: Regulatory information

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

##### Global inventory status

Contact 3M for more information.

##### Local Inventory Status

##### Addendum I Government Regulation No. 74/2001:

##### List of Hazardous Substances Approved for Use :

None of the substances are listed as a Hazardous Substance Approved for Use.

##### Addendum II Government Regulation No. 74/2001:

##### Tab.1 List of Prohibited Substances for Use:

None of the substances are listed as a Prohibited Substance for Use.

##### Addendum II Government Regulation No. 74/2001:

##### Tab.2 List of Restricted Substances for Use:

None of the substances are listed as a Restricted Substance for Use.

##### Addendum I Ministry of Health Regulation No. 472/1996:

**List and Classification of Hazardous Substances for Health:**

None of the substances are listed and classified as a Hazardous Substance for Health.

**Addendum I Act of Minister of Industry and Trade No. 254/MPP/KEP/2000****List of Hazardous Substances that are Regulated to Import Trade System:**

None of the substances are listed and classified as a Hazardous Substance that is Regulated to Import Trade System.

|                                      |
|--------------------------------------|
| <b>SECTION 16: Other information</b> |
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|                        |            |                         |               |
|------------------------|------------|-------------------------|---------------|
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