

# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 1 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

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

### 1.1 Product identifier: Graphene Powder

**Substances: Carbon**

**Formula: C**

**Molecular Weight: NA**

**Substance name: Graphene**

**CAS No.: 1034343-98-0**

**Index No: None**

**EC No: None**

**Other means of identification: Exfoliated Graphene**

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

#### Relevant identified uses

For R&D use only. Not for pharmaceutical, household or other uses.

### 1.3 Details of the supplier of the safety data sheet:

#### Supplier:

2D Materials Pte. Ltd.

Blk 16C #04-41, JTC

Space@Tuas, Tuas Avenue 1,

Singapore – 639535

E-mail: info@2dmsolutions.com

www.2dmsolutions.com Information

contact +65 97738261

### 1.4 EMERGENCY TELEPHONE NUMBER: + 65 97738261

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## SECTION 2: Hazards identification

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

**EMERGENCY OVERVIEW:** Irritating to skin, eyes and respiratory tract

**PRIMARY ROUTS OF EXPOSURE:** Ingestion, Inhalation, eyes

**EYE CONTACT:** Causes Slight to mild irritation of the eyes

**SKIN CONTACT:** Causes slight to mild irritation of the skin (nanomaterial)

**INHALATION:** Material is a fine powder. Irritating to the nose, mucous membranes and respiratory tract

**INGESTION:** No information available on the physiological effects of ingestion. May be harmful if swallowed

**ACUTE HEALTH EFFECTS:** Irritating to skin, eyes and respiratory tract

**CHRONIC HEALTH EFFECTS:** No information on long-term chronic effects. Limited evidences of a carcinogenic effect.

**NTP:** No

**IARC:** No

**OSHA:** No

# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 2 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

## 2.2 Label elements

### Product identifier:

**Substances:** Graphene

**Authorization No:** None

### Hazard pictograms



GHS08

GHS07

### Signal word:

Danger Inhalable material

### Hazard statements:

H312	Harmful in contact with skin.
H317	May cause an allergic skin reaction.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H372	Causes damage to organs through prolonged or repeated exposure

### Precautionary statements:

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P308+P311	IF exposed or concerned: Call a POISON CENTER/doctor.
P301+P330	IF SWALLOWED: Rinse mouth.
P303+P361+P353	IF ON SKIN (or hair): Rinse skin with water/shower.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

**Supplemental Hazard information:** None

## 2.3 Other hazards

None

## SECTION 3. Composition/information on ingredients

### 3.1 Substances

**Substance name:** Graphene

**INDEX No:** None

**EC No:** None

**REACH No:** None

**CAS No:** 1034343-98-0

**Purity:** 99%

**Synonyms:** Graphene, Nano Graphene

**Stabilisers:** None

**Hazard impurities:** None

# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 3 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

---

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

**Inhalation:** Remove the victim to fresh air. Closely monitor the victim for signs of respiratory problem, such as difficulty in breathing, coughing wheezing, or pain. In such cases seek immediate medical assistance.

**Skin contact:** Wash off with soap and plenty of water. Seek medical assistance if irritation persists.

**Eye contact:** Flush eyes with water as a precaution. Seek medical assistance if irritation persists.

**Ingestion:** Never give anything by mouth to an unconscious person. Rinse mouth with water.

**Self-protection of the first aider:** Gloves, NR95 face mask

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

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

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## SECTION 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

### 5.3 Advice for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

**Additional information:** No data available

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## SECTION 6: Accidental release measures

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

Avoid dust formation. Avoid breathing vapours, mist or gas.

### 6.2 Environmental precautions:

No special environmental precautions required.

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

Sweep up and shovel. Keep in suitable, closed containers for disposal.

### 6.4 Reference to other sections: For Disposal see section 13

# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 4 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

---

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Provide appropriate exhaust ventilation at places where dust is formed.

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## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### 8.1.1 Occupational exposure limits:

Substance name	CAS-No.	Occupational exposure limit value		Monitoring and observation processes	Peak limitation
		Long term	Short term		
Graphene	1034343-98-0	No data	No Data	None Data	None Data

### 8.2 Exposure controls

#### 8.2.1 Appropriate engineering controls:

General industrial hygiene practice.

#### 8.2.2 Personal protective equipment:

##### Personal protective equipment

##### Eye/face protection

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.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 5 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

## 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

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

## Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 6 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

---

## SECTION 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

**Physical state: Solid**

**Colour: Black**

**Odour: None**

**Odour threshold: None**

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	<b>Value</b>
<b>pH</b>	No Data Available
<b>Melting point/freezing point</b>	3,652 - 3,697 °C - lit.
<b>Initial boiling point/boiling range</b>	No Data Available
<b>Flash point</b>	No Data Available
<b>Evaporation rate</b>	No Data Available
<b>Flammability (solid, gas)</b>	No Data Available
<b>Upper/lower flammability or explosive limits</b>	No Data Available
<b>Upper explosive limits</b>	No Data Available
<b>Lower explosive limits</b>	No Data Available
<b>Vapour pressure</b>	No Data Available
<b>Vapour density</b>	No Data Available
<b>Relative density</b>	1.900 g/cm <sup>3</sup>
<b>Solubility in water</b>	slightly soluble
<b>Partition coefficient: n-octanol/water</b>	No Data Available
<b>Auto-ignition temperature</b>	No Data Available
<b>Decomposition temperature</b>	No Data Available
<b>Viscosity</b>	No Data Available
<b>Viscosity, dynamic</b>	No Data Available
<b>Viscosity, cinematic</b>	No Data Available
<b>Explosive properties</b>	None
<b>Oxidising properties</b>	None

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# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 7 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

---

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

No Data Available

### 10.2 Chemical stability

No Data Available

### 10.3 Possibility of hazardous reactions

No Data Available

### 10.4 Conditions to avoid:

No Data Available

### 10.5 Incompatible materials:

Strong oxidizing agents

### 10.6 Hazardous decomposition products:

Other decomposition products - No data available

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## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### 11.1.1 Substances

##### **Acute toxicity**

LD50 Oral - Rat - female - > 2,000 mg/kg

LC50 Inhalation - Rat - male and female - 4 h - 2,000 mg/m<sup>3</sup>

##### **Skin corrosion/irritation**

##### **Practical experience / human evidence:**

Skin - Rabbit - No skin irritation - OECD Test Guideline 404

##### **Eye damage/irritation**

##### **Practical experience / human evidence:**

Eyes - Rabbit - No eye irritation - OECD Test Guideline 405

##### **Sensitisation to the respiratory tract/skin**

Mouse - OECD Test Guideline 429 - Did not cause sensitisation on laboratory animals.

##### **Germ cell mutagenicity**

Genotoxicity in vitro - in vitro assay - S. typhimurium - with and without metabolic activation - negative

# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 8 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

## **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.

## **Reproductive toxicity**

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

## **Symptoms related to the physical, chemical and toxicological characteristics:**

In case of ingestion: May be harmful if swallowed.

In case of skin contact: May be harmful if absorbed through skin. May cause skin irritation.

In case of inhalation: May be harmful if inhaled. May cause respiratory tract irritation.

In case of eye contact: May cause eye irritation.

## **Signs and Symptoms of Exposure**

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

Additional Information

Repeated dose toxicity - Rat - male - Feed - No observed adverse effect level - 813 mg/kg

RTECS: MD9659600

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## **SECTION 12: Ecological information**

### **12.1 Toxicity:**

Toxicity to fish	semi-static test LC50 - Danio rerio (zebra fish) - > 100 mg/l – 96h Method: OECD Test Guideline 20
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - > 100 mg/l – 48h Method: OECD Test Guideline 202
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata - > 100 mg/l – 72h Method: OECD Test Guideline 201

### **12.2 Persistence and degradability**

No data available



# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 9 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

## 12.3 Bioaccumulative potential

No data available

## 12.4 Mobility in soil

No data available

## 12.5 Results of PBT and vPvB assessment

No data available

## 12.6 Other adverse effects:

No data available

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## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

#### Product:

Offer surplus and non-recyclable solutions to a licensed disposal company.

#### Packaging disposal:

Dispose of as unused product.

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## SECTION 14: Transport information

	Land transport (ADR/RID)	Inland waterway transport (ADN)	Sea transport (IMDG)	Air transport (ICAO-TI / IATA-DGR)
14.1 UN No.	-	-	-	-
14.2 UN Proper shipping name	Not Dangerous Good	Not Dangerous Good	Not Dangerous Good	Not Dangerous Good
14.3 Transport hazard class(es)	-	-	-	-
Hazard label(s)	GHS07/GHS08	GHS07/GHS08	GHS07/GHS08	GHS07/GHS08
14.4 Packing group	-	-	-	-
14.5 Environmental hazards	NO	NO	NO	NO

### 14.6 Special precautions for user

No data available

# Safety Data Sheet



Trade name: Graphene GP

Product No: 002

Version: 1.1

Page 10 of 10

Print date: 21.04.2020

Revision date: 21.04.2020

---

## SECTION 15: Regulatory information

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

#### Notification Status:

<b>AICS:</b>	On the inventory, or in compliance with the inventory
<b>DSL:</b>	All components of this product are on the Canadian DSL.
<b>ENCS:</b>	Not in compliance with the inventory - Graphite
<b>IECSC:</b>	On the inventory, or in compliance with the inventory
<b>ISHL:</b>	Not in compliance with the inventory - Graphite
<b>KECI:</b>	On the inventory, or in compliance with the inventory
<b>NZIoC:</b>	Not in compliance with the inventory - Graphite
<b>PICCS:</b>	On the inventory, or in compliance with the inventory

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## SECTION 16: Other information

The information herein is believed to be accurate and reliable as of the date compiled. However, 2DM makes no representation, warranty, or guarantee of any kind with respect to the information contained in this document or any use the product based on this information.