



SAFETY DATA SHEET

Trade name: Graphene Suspension

Revised 2023

1. Identification of the substance/mixture and of the company/undertaking


1.1 Product identifier:

Product Name Graphene suspension
Product Code S-WB60

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

Relevant identified uses of the Additive for enhancing physical properties.
product

1.3 Details of the supplier of the safety data sheet

Manufacturer/ Supplier Enerage Inc. 
Address No.5, Ligong 3rd Rd., Wujie Township, Yilan County 26841, Taiwan, R.O.C.
Phone number 886-3-990-2100
Fax 886-3-990-2500

1.4 Emergency phone number 886-3-990-2100

2. Hazards identification

GHS classification and label elements of the product

2.1 Classification of the substance or mixture

Physical and Chemical hazards Not classified.
Health hazards Not classified.
Environment hazards Not classified.

2.2 Label elements



Signal word Warning

Precautionary statements

Prevention P102 Keep out of reach of children
P201 Obtain special instructions before use
P202 Do not handle until all safety precautions have been read and understood
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P270 Do no eat, drink or smoke when using this product
P280 Wear protective gloves/protective clothing/eye protection/face protection

Response

P301 IF SWALLOWED P330 Rinse mouth.
P331 Do NOT induce vomiting.
P313 Get medical advice/attention



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P303 IF ON SKIN (or hair) P351 Rinse cautiously with water for several minutes.
 P352 Wash with plenty of soap and water.
 P353 Rinse skin with water/shower.

P304 IF INHALED P314 Call a POISON CENTER/doctor if you feel unwell.
 P340 Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 IF IN EYES P338 Remove contact lenses, if present and easy to do. Continue rinsing.
 P351 Rinse cautiously with water for several minutes.

P337 If eye irritation persists P313 Get medical advice/attention.

P370 In case of fire P374 Fight fire with normal precautions from a reasonable distance.
 P378 Use water, carbon dioxide, dry chemical powder or alcohol resistant foam to extinguish.

Storage P402 Store in a dry place.
 P404 Store in a closed container.
 P405 Store locked up.

Disposal P501 Dispose of contents/ container to an approved waste disposal plant.

3. Composition/information on ingredients

<u>Chemical name</u>	<u>CAS No.</u>	<u>EC No.</u>	<u>Index No.</u>	<u>Content (wt%)</u>
Water	7732-18-5	231-791-2		85~95
Graphene	1034343-98-0	801-282-5		5~15
Carboxymethyl cellulose	9000-11-7	618-326-2		0.1~3

4. First-aid measures

4.1 Descriptions of first-aid measures

General measures In the case of prolonged irritation or other adverse effects, contact a doctor.

IF ON SKIN (or hair) Wash with soap and water.
 If skin irritation occurs, get medical advice/ attention.
 Contaminated clothing should be removed and washed thoroughly before re-use.

IF INHALED Remove from exposure to fresh air and call a poison center/ doctor to get medical advice/ attention.
 If breathing is difficult, administer oxygen.
 If breathing has stopped, begin artificial respiration immediately, and seek medical attention.

IF IN EYES Flush eyes with water for at least 15 minutes.
 If easy to do, remove contact lens.



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IF SWALLOWED	Get medical attention Rinse mouth with water and consult a physician. Never give anything to an unconscious person.
4.2 Most important symptoms/ effects, acute and delayed	
Symptoms	May cause irritation to skin, eyes and respiratory tract.
Hazards	No information about adverse effects due to exposure
4.3 Indication of immediate medical attention and special treatment needed.	
Treatment	Symptoms may be delayed. Treat symptomatically.
5. Fire-fighting measures	
5.1 Extinguishing media	
Suitable extinguishing media	Water, carbon dioxide, dry chemical powder or alcohol resistant foam.
Unsuitable extinguishing media	No data available
5.2 Specific hazards arising from the substance or mixture	In the event of combustion or thermal decomposition, this material may release carbon monoxide (CO) or carbon dioxide (CO ₂). Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations.
5.3 Advice for firefighters	
Special protective equipment and precautions for fire-fighters	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Specific fire-fighting measures	Cool containers exposed to flames with water until well after the fire is out. In case of fire and/or explosion do not breathe fumes. Keep away from any heat source or electronic circuits.
6. Accidental release measures	
6.1 Personnel precautions, protective equipment and emergency procedures	Evacuate personnel to safe areas. Remove all sources of ignition if safe to do. Should wear suitable protective equipment to prevent inhalation or skin contact. Should beware of the risk of slippage due to the material's low coefficient of friction. Keep upwind.
6.2 Environmental precautions	Prevent further leakage or spillage if safe to do so. Do not contaminate water sources or sewer. Avoid discharge into drains, water courses or onto the ground
6.3 Methods and materials for containment and cleaning up	Collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations. Do not discharge into storm or sanitary sewers or groundwater.



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7. Handling and storage

7.1 Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)
 Do not breathe dust/fume/gas/mist/vapors/spray.
 Avoid breathing dust/fume/gas/mist/vapors/spray.
 (Protective measures against fire and explosion)
 Ground/bond container and receiving equipment.
 Take precautionary measures against static discharge.

Safety Measures/Incompatibility

Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.
 Use only outdoors or in a well-ventilated area.
 Wear protective gloves and face protection.
 Use personal protective equipment as required.
 Remove contaminated clothing and wash the skin thoroughly with soap and water after work.

7.2 Conditions for safe storage, including any incompatibilities

Recommendation for storage

Store in a well-ventilated place and keep cool.
 Keep container tightly closed
 Store locked up.
 Graphene is electrically conductive. Avoid accumulations of graphene in places where these accumulations could cause shorting of electrical switches, circuits or components since any dust can form a potentially explosive mixture in air.

8. Exposure controls/personal protection

8.1 Engineering controls

Provide adequate workplace ventilation. If vapor/dusts are generated through handling, local exhaust ventilation should be employed.
 Eye wash facilities and emergency shower must be available when handling this product.
 Respiratory protection may be needed for non-routine or emergency situations.

8.2 Exposure controls

<u>Components</u>	<u>Type</u>	<u>Exposure limit(s)</u>	<u>Source</u>
Graphene		No data available	

8.3 Personal protective Equipment

General

Good general ventilation (typically 10 air changes per hour) should be used.
 Ventilation rates should be matched to conditions.
 If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.



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	<p>If exposure limits have not been established, maintain airborne levels to an acceptable level.</p> <p>An eye wash and safety shower must be available in the immediate work area.</p>
Respiratory protection	<p>To minimize risk of over exposure to dust, vapor or fumes, it is recommended that a local exhaust system is placed above the equipment, and that the working area is properly ventilated.</p> <p>If ventilation is inadequate, use certified respirator that will protect against dust/mist.</p>
Eye/face protection	<p>Wear suitable safety eyeglasses or chemical protective goggles or other face protection.</p>
Skin and body protection	<p>Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.</p>
Hand protection	<p>Handle with gloves. Gloves must be inspected prior to use.</p> <p>Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product.</p> <p>Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.</p>
Hygiene	<p>Do not eat, drink or smoke when using the product.</p> <p>Wash hands after handling.</p> <p>Observe good industrial hygiene practices.</p>

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance	Liquid
Color	Gray to black
Odor	No odor
Odor threshold	No data available
pH	No data available
Melting point	Graphene: >3600°C
Initial boiling point	Water: 100°C
Flash point	No data available
Auto-ignition temperature	Graphene: dispersed dust cloud: >600°C
Flammability (solid, gas)	No data available
Flammable limit	No data available
Evaporation rate	No data available
Vapor density	1.0
Vapor pressure	No data available
Decomposition temperature	No data available



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Density	0.9~1.0 g/cm ³ @20°C
Solubility in water	Graphene: Insoluble
Solubility (other)	No data available
Partition coefficient (n-Octanol/water)	No data available

10. Stability and Reactivity

10.1 Reactivity	Stable under recommended storage conditions.
10.2 Chemical stability	No decomposition under standard ambient condition (room temperature).
10.3 Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
10.4 Conditions to avoid	Electronic circuits.
10.5 Incompatible materials	Strong oxidizing agents, Alkali metals, Strong acids.
10.6 Hazardous decomposition products	Mainly carbon oxides occur under high temperature/fire conditions.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Specific substance(s)	Graphene
Acute toxicity	OECD Test Guideline 403, LD50 Inhalation, Rat male and female, 4h: 2.000 mg/m ³ OECD Test Guideline 423, LD50 Oral, Rat female, >2.000 mg/kg
Skin toxicity	OECD Test Guideline 404, Skin, Rabbit, No skin irritation
Serious eye damage/eye irritation	OECD Test Guideline 405, Eyes, Rabbit, No eye irritation
Respiratory or skin sensitization	OECD Test Guideline 429, Mouse, Did not cause sensitization on laboratory animals
Germ cell mutagenicity	No data available. Ames test, S. typhimurium, Result: negative
Carcinogenicity	No data available. IARC: No ingredient 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.

11.2 Additional Information



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Specific substance(s) Graphene
Repeated dose toxicity NOAEL (no observed adverse effect level), Feed, Rat male, 813/mg/kg
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
BOD/ThBOD No data available.

12. Ecological Information

12.1 Ecotoxicity

Specific substance(s)	Graphene
Fish	OECD Test Guideline 203, Semi-static test, LC 50, Danio rerio (zebra fish), 96 h: >100 mg/l
Aquatic invertebrates	OECD Test Guideline 202, Static test, EC 50, Daphnia magna (Water flea), 48 h: >100 mg/l
Algae	OECD Test Guideline 201, Static test, EC50, Pseudokirchneriella subcapitata, 72h: >100 mg/l

12.2 Persistence and degradability

Biodegradation No data available.
BOD/ThBOD No data available.

12.3 Bioaccumulative potential

Bioaccumulation No data available.
Bioconcentration factor (BCF) No data available.
Partition coefficient n-octanol/water No data available.

12.4 Mobility in soil

The product is water soluble and may spread in water systems.

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available.

13. Disposal considerations

13.1 Waste Code

No data available.

13.2 Disposal methods

Dispose of only in accordance with local, state, and federal regulations. Do not contaminate any lakes, streams, ponds, groundwater or soil.
No mixing with other waste.
Leave chemicals in original containers.

13.3 Empty containers

Empty containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR



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OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, triple-rinsed, properly bunged and promptly returned to a drum reconditioner, or properly disposed.

14. Transport Information

DOT (U.S. Department of Transportation)

UN number	No data available.
UN proper shipping name	No data available.
Transport hazard class(es)	
Class	No data available.
Label(s)	No data available.
Packing group	No data available.
Marine pollutant	No
Special precaution for user	No data available.

IATA (International Air Transport Association)

UN number	No data available.
UN proper shipping name	No data available.
Transport hazard class(es)	
Class	No data available.
Label(s)	No data available.
Packing group	No data available.
Marine pollutant	No
Special precaution for user	No data available.

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IMDG (International Maritime Dangerous Goods)

UN number	No data available.
UN proper shipping name	No data available.
Transport hazard class(es)	
Class	No data available.
Label(s)	No data available.
EmS No.	No data available.
Packing group	No data available.
Marine pollutant	No
Special precaution for user	No data available..

14.1 Environmental hazards

MARPOL Annex III - Prevention of pollution by harmful substances

Marine pollutants (yes/no)	no
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14.2 Special precautions for user No data available.

14.3 Transport in bulk according to Annex II of MARPOL73/78 and IBC Code

Remarks No data available.

15. Regulatory Information

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

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out.

International Regulations

Inventory status

Australia	Inventory of Chemical Substances (AICS)	No data available.
Japan	The inventory of existing and new chemical substances (ENCS)	No data available.
EU	European Inventory of Existing Commercial Chemical Substances (EINECS)	No data available.
EU	European List of Notified Chemical Substances (ELINCS)	No data available.
EU	No-longer Polymers (NLP)	No data available.
Canada	Domestic Substances List (DSL) Inventory	No data available.
Philippines	Inventory of Chemicals/ Chemical Substances (PICCS)	No data available.
Korea	Existing Chemicals Inventory (KECI)	No data available.
China	Inventory of Existing Chemical Substances (IECSC)	No data available.
Mexico	National Inventory of Chemical Substances of Mexico (INSQ)	No data available.
New Zealand	Inventory of Chemical Substances	No data available.
Taiwan	National Existing Chemical Inventory (NECI)	No data available.

16. Other Information

Hazard Ratings

	<u>Health</u>	<u>Flammability</u>	<u>Physical Hazard/ Instability</u>
HMIS	1	0	0
NFPA	1	0	0

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Date of the latest revision 2023/03/08

DISCLAIMER:

This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Information contained in this Safety Data Sheet is to the best of our knowledge and believed to be reliable but no representation, guarantee or warranties of any kind are made as to its accuracy, suitability for a particular



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