

1.- Identification of the substance/preparation and of the company

- **Identification of the product:** Graphene solution (DRP-GPHSOL)
- **Chemical family:** Carbon (Synthetic Graphite)
- **Use of the substance/preparation:** For Research Use Only
- **Manufacturer/supplier identification:** DropSens, S.L.
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2.- Hazards identification

Caution! To the best of our knowledge the toxicological properties of this solution has not been thoroughly investigated. The present substance has been classified according to hazards identification of its components.

Classification of the mixture:

According to Regulation CLP (EC) No1272/2008

- Flammable liquids (Category 3)
- Acute toxicity (Category 4)
- Eye irritation (Category 2)
- Skin irritation (Category 2)
- Respiratory sensitization (Category 1)
- Reproductive toxicity (Category 1B)

Label elements:



- Signal word: Danger

Hazard statements

- H226 Flammable liquid and vapour
- H312 Harmful in contact with skin
- H319 Causes serious eye irritation
- H332 Harmful if inhaled
- H360 May cause harm to the unborn child

Precautionary statements

- P201 Obtain special instructions before use
- P263 Avoid contact during pregnancy
- P280 Wear protective gloves/protective clothing/ eye protection/ face protection
- P305 + P338 + P351 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Physical hazards:

Graphene solution is electrically conductive. Care should be taken.

3.- Composition/Information on ingredients

- **Graphene** Synonyms: natural graphite flakes, graphene sheets, exfoliated graphite, graphite powder.
CAS: 7782-42-5
- **N,N-Dimethylformamide** Synonyms: DMF, Formic acid dimethylamide
CAS: 68-12-2
Molecular weight: 73.09 g/mol
EC index no.: -616-001-00-X
EC number: 200-679-5
Formula: C₃H₇NO
- **Deionized water** Molecular weight: 18.0 g/mol
Formula: H₂O

4.- First aid measures

- **After inhalation:** Fresh air. If it is necessary, give artificial respiration with oxygen. Summon physician if necessary.
- **After skin contact:** Wash skin with soap and copious amounts of water.
- **After ingestion:** Make victim drink plenty of water, induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.
- **After eye contact:** Rinse out with plenty of water with the eyelid held wide open for at least 15 minutes. Summon eye specialist.
- **In case of persisting adverse effects:** Consult a physician.
- **General:** Show this safety data sheet to the doctor in attendance.

5.- Fire-fighting measures

- **Suitable extinguishing media:** Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
- **Special hazards arising from the substance:** Nitrous oxides, carbon dioxide and carbon monoxide. May form toxic fumes.
- **Special protective equipment for fire fighting:** Wear self contained breathing apparatus for fire fighting if necessary.

6.- Accidental release measures

- **Person-related precautionary measures:** Avoid dust formation.
- **Environmental precautions:** Do not discharge into the drains/surface waters/groundwaters.
- **Procedures for cleaning/absorption:** Sweep up and shovel. Keep in suitable, closed containers for disposal.

7.- Handling and storage

- **Handling:** No further requirements.
- **Storage:** Keep in original container, tightly closed. Store at +15°C to +25°C.
- **Further information on storage conditions:** Keep away from sources of heat and ignition. Do not store together with oxidizing agents.

8.- Exposure controls/personal protection

Exposure controls

- Respiratory protection Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
- Hand protection For prolonged or repeated contact use protective gloves.
- Eye protection Use safety glasses with side-shields conforming to EN166

- Skin and body protection Choose body protection according to the amount and concentration of the dangerous substance at the work place.
- Hygiene measures Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9.- Physical and chemical properties

- **General information:**
 - Form: liquid
 - Colour: black
 - Odour: weakly amine-like
- **Important health, safety and environmental information:**
 - pH value: 6 at 25°C
 - Boiling temperature: no data available
 - Flash point: no data available
 - Explosion limits (caused by DMF presence) 2.2% (low) to 16% (high)
 - Vapour pressure: not determined
 - Density: not determined
 - Solubility in water (20°C): soluble

10.- Stability and reactivity

- **Substances to be avoided:** strong oxidizing agents and halogenated hydrocarbons.
- **Conditions to avoid:** strong heating.
- **Hazardous decomposition products:** Hazardous decomposition products formed under fire conditions- Carbon oxides.
- **Further information:** Stable under recommended storage conditions.

11.- Toxicological information

Toxicological information related to Graphite and N,N-Dimethylformamide:

| | Graphite | N,N-Dimethylformamide |
|------------------------------------|-------------------|-----------------------|
| LD ₅₀ (oral, rat) | >2000mg/kg | 2800mg/kg |
| LC ₅₀ (inhalation, rat) | - | 9-15 mg/L (4h) |
| LD ₅₀ (dermal rabbit) | Non irritant (4h) | 1500mg/kg |
| Eye irritation test (rabbit) | Slight irritant | Irritation |

12.- Ecological information:

To the best of our knowledge the ecological effects have not been thoroughly researched.

Ecological information related to Graphite

Graphite is a naturally occurring substance that is found throughout the world. To our knowledge, there is no reliable data regarding its bio-accumulation or mobility in environmental media, there is not data to suggest that it should be considered as an environmental hazard.

Ecological information related to N,N-Dimethylformamide

Eco-toxic effects:

Fish toxicity:

- L. macrochirus CL₅₀ : 6300 mg/l / 96h.
- Onchorhynchus mykiss CL₅₀ : 9800 mg/l / 96h.
- P. promelas CL₅₀: 10600 mg/l / 96h.

Daphnia toxicity: Daphnia magna EC₅₀: 15700 mg/l / 48h.

Algal toxicity:

- Desmodesmus subspicatus IC₅₀ > 500 mg/l / 96h.

- Sc. Quadricauda IC₅ : 10 mg/l

Bacterial toxicity:

- Photobacterium phosphoreum CE₅₀: 20000 mg/l / 5min (Microtox test).

Mobility: log P (o/w): -0.85 (experimentally).

Bioaccumulative potential: Non bioaccumulative.

Persistence and degradability:

- Biological degradability > 90% / 28d.

- Biological degradability: good.

13.- Disposal considerations

- **Product**: Observe all federal, state, and local environmental regulations.
- **Packaging**: Dispose in compliance with federal regulations. If not officially specified differently, non-contaminated packaging may be treated like household waste or recycled

14.- Transport information

- **Road transport ADR/RID**:
 - UN-Nº: 2265
 - Class 3 Packaging group III
 - Proper shipping name: Preparation containing N,N-Dimethylformamide
- **Sea transport IMDG**:
 - UN-Nº: 2265
 - Class 3 Packaging group III
 - Marine pollutant: NO
 - Proper shipping name: Preparation containing N,N-Dimethylformamide
- **Air transport IATA**:
 - UN-Nº: 2265
 - Class 3 Packaging group III
 - Proper shipping name: Preparation containing N,N-Dimethylformamide

15.- Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) 1907/2006 and/or 67/548/EEC and/or 1999/45/EC.

R-phrases

- R61 May cause harm to the unborn child.
- R20/21 Also harmful by inhalation and in contact with skin.
- R36/37 Irritating to eyes and respiratory system

S-phrases

- S26 In case of contact with eyes rinse immediately with plenty of water and seek medical advice.
- S36 Wear suitable protecting clothing
- S45 In case of accident or if you feel unwell, seek medical advice immediately (show this MSDS if possible)

16. Other information

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The contents and format of this MSDS are in accordance with EEC Commission Directive 1907/2006.

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