

Section 1.- Identification of the substance/mixture and of the company

- **Identification of the product:** Graphene oxide solution
- **Chemical family:** Graphite
- **Product name:** DRP-GPHOXSOL
- **Use of the substance/preparation:** Research use only
- **Manufacturer/supplier identification:** Metrohm DropSens, S.L. Vivero de Ciencias de la Salud, Calle Colegio Santo Domingo de Guzmán, s/n, 33010 Oviedo, Asturias, Spain
Tel.- +34 985 27 76 85
E-mail: info.dropsens@metrohm.com
Internet Web Site: www.metrohm-dropsens.com
- **Emergency phone:** Metrohm DropSens, S.L. +34 985 27 76 85

Section 2.- Hazards identification

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

If dries, may cause eye, skin and respiratory tract irritation.

Classification of the mixture:

According to Regulation CLP (EC) No1272/2008

- Flammable liquid (Category 3)
- Acute toxicity, inhalation (Category 4)
- Acute toxicity, dermal (Category 4)
- Eye irritation (Category 2)
- Reproductive toxicity (Category 1B)

Label elements:**Hazard statements**

- H226 – Flammable liquid and vapour
- H312 + H332 – Harmful in contact with skin or if inhaled.
- H319 – Causes serious eye irritation.
- H360D – May damage fertility or the unborn child.

Precautionary statements

- P201 – Obtain special instructions before use.
- 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.
- P308 + P313 – If exposed or concerned. Get medical advice/ attention.

Supplemental Hazard Statements: None

Section 3.- Composition/Information on ingredients

- **Graphene oxide** **Synonyms:** Oxidic graphene, graphite oxide, oxidized graphite
CAS: Graphite 7782-42-5
Concentration: 2 mg/mL

- **N,N-Dimethylformamide** **Synonyms:** DMF
CAS: 68-12-2
Molecular weight: 73.09 g/mol
Classification: Flam. Liq. 3: Acute toxicity 4, Eye irritation 2, Repr. 1B

Section 4.- First aid measures

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

The most important symptoms and effects are described in the section 2 (label elements).

Section 5.- Fire-fighting measures

- **Suitable extinguishing media:** use water spray, alcohol resistant foam, dry chemical or carbon dioxide.
- **Special hazards arising from the substance:** carbon oxides, nitrogen oxides.
- **Special protective equipment for fire fighting:** Wear self contained breathing apparatus for fire fighting if necessary.
- **Further information:** Use water spray to cool unopened containers.

Section 6.- Accidental release measures

- **Person-related precautionary measures:** Use personal protective equipment. Avoid breathing vapours. Ensure adequate ventilation.
- **Environmental precautions:** Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.
- **Methods and materials for containment and cleaning up:** Contain spillage and then with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations.
- **Procedures for cleaning/absorption:** Keep in suitable, closed containers for disposal.

Section 7.- Handling and storage

- **Handling:** Avoid eye and skin contact. Avoid inhalation of vapour or mist. Keep away from sources of ignition – No smoking. Take measures to prevent the build-up of electrostatic charge.
- **Storage:** Store in cool place. Keep container tightly closed in a dry and well-ventilated place protected from direct sunlight. Opened containers must be kept upright to prevent leakage.

Section 8.- Exposure controls/personal protection

Exposure controls

General industrial hygiene practice

- Hand protection Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique to avoid skin contact with this product.

- Eye protection Safety glasses with side-shields conforming to NIOSH (US) or EN166 (EU)
- Skin and body protection Choose body protection according to the amount and concentration of the dangerous substance at the work place. Handle with gloves. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and standard EN 374 derived from it.
- Hygiene measures Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Section 9.- Physical and chemical properties

- **General information:**
 - Form: liquid
 - Colour: brown
 - Odour: 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

Section 10.- Stability and reactivity

- **Reactivity:** No data available
- **Chemical Stability:** No data available.
- **Possibility of hazardous reactions:** No data available.
- **Incompatible materials:** Strong oxidizing agents.
- **Conditions to avoid:** Heat, flames and sparks. Direct sunlight should be avoid.
- **Hazardous decomposition products:** Other decomposition products – no data available.
- **Further information:** Stable under recommended storage conditions.

Section 11.- Toxicological information

Toxicological information related to graphite and N,N-Dimethylformamide

	Graphite	N,N-Dimethylformamide
LD ₅₀ (oral, rat)	>2000 mg/kg	2800 mg/kg
LC ₅₀ (inhalation, rat)	2000 mg/m ³ (4h)	9-15 mg/L (4h)
LD ₅₀ (dermal rabbit)	Non irritant (4h)	1500 mg/kg
Skin corrosion/ irritation	Not irritant	Mild skin irritation (24h)
Serious eye damage/ eye irritation	Not irritant	Moderate eye irritation
Respiratory or skin sensitisation	Not cause sensitisation	No data available
Germ cell mutagenicity	Negative	Mutation in mammalian somatic cells
Reproductive toxicity	No data available	May cause congenital malformation in the fetus
Additional information	RTECS: MD9659600	RTECS: LQ2100000

* RTECS: registry of toxic effects of chemical substances

Section 12.- Ecological information:

To the best of our knowledge the ecological effects of this solution 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

Fish toxicity:

- LC50- Oncorhynchus mykiss (rainbow trout) – 9.000 – 13.000 mg/L – 96h
- LC50- Lepomis macrochirus (Bluegill) – 6.700 – 7.500 mg/L – 96h
- LC50- Pimephales promelas (fathead minnow) – 10.400 – 10.800 mg/L – 96h
- EC50- Daphnia magna (water flea) – 9.600 – 13.100 mg/L – 48h
- LC50- Desmodesmus subspicatus (green algae) - > 500 mg/L – 96h

Persistence and degradability: Biodegradability, result > 90% - Readily biodegradable

Section 13.- Disposal considerations

- **Product:** Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose this material.
- **Contaminated packaging:** Dispose of as unused product.

Section 14.- Transport information

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

Section 15.- Regulatory information

This safety datasheet has been revised to comply with the requirements establish in (EC) 453/2010.

Section 16.- Other information

Date of creation: 26/10/2016

Author: Carla Navarro

Revised by: Pablo Fanjul Bolado (R&D manager, Metrohm DropSens, S.L.)

The contents and format of this MSDS are in accordance with EC 453/2010.

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