

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

- **Identification of the product:** Carbon nanofibers solution
- **Chemical family:** Synthetic Graphite
- **Product name:** DRP-CNFSOL
- **Use of the substance/preparation:** Research use only
- **Manufacturer/supplier identification:** DropSens, S.L.  
Ed. CEEI, locales 4 y 5  
Parque Tecnológico de Asturias  
Llanera - 33428 (Asturias) SPAIN  
Tel.- +34 985 27 76 85 Fax.- +34 985 27 76 85  
E-mail.- [info@dropsens.com](mailto:info@dropsens.com)  
Internet Web Site: [www.dropsens.com](http://www.dropsens.com)
- **Emergency phone:** DropSens, S.L. +34 985 27 76 85

## 2 Hazards identification

### 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)



- 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:

Carbon nanofibers solutions are electrically conductive. Care should be taken.

### 3.- Composition/Information on ingredients

- |  |   |
|--|---|
| – Carbon nanofibers                      | <b>Synonyms:</b> Carbon nanofibers<br><b>CAS:</b> -   |
| – N,N-Dimethylformamide                  | <b>Synonyms:</b> DMF, Formic acid dimethylamide<br><b>CAS:</b> 68-12-2<br><b>Molecular weight:</b> 73.09 g/mol<br><b>EC index no.:</b> -616-001-00-X<br><b>EC number:</b> 200-679-5<br><b>Formula:</b> C <sub>3</sub> H <sub>7</sub> NO |
| – Deionized water                        | <b>Molecular weight:</b> 18g/mol<br><b>Formula:</b> H <sub>2</sub> O  |
| – Polycyclic aromatic hydrocarbons       | Trace   |
| – Iron, sulphur, nickel and other metals | Trace   |

### 4.- First aid measures

- **After inhalation:** Move the person into 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. Consult a physician.
- **After ingestion:** Make victim drink plenty of water. 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:** Use personal protective equipment. Ensure adequate ventilation.
- **Environmental precautions:** Do not discharge into the drains/surface waters/groundwaters.
- **Procedures for cleaning/absorption:** Keep in suitable, closed containers for disposal.

### 7.- Handling and storage

- **Handling:** Avoid eye and skin contact. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.
- **Storage:** Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

### 8.- Exposure controls/personal protection

#### Exposure limit values:

- Carbon nanofibers The fibers diameter is in the range of 0.005-0.2 microns. It is a dusty product, but consists of entangled fibers with lengths up to 80 microns. Published data about carbon nanofibers show that they are similar to carbon black with respect to PAHs levels (Pederson, Powell, Santrock, Tibbetts and Alig, "Analysis of Polycyclic Aromatic hydrocarbons on Vapour Grown Carbon Fiber". NATO Workshop on Mechanisms in Fibre Carcinogenesis, October 26, 1990). Carbon nanofibers used by DropSens, S.L. for this preparation contain small

trace of Polycyclic Aromatic Hydrocarbons (PAHs) on the fibre surface much like commercial carbon black. Since there are no specific regulations forms health hazard of the small diameter carbon nanofibers, DropSens, S.L. is following the regulations for carbon black.

Carbon black does not appear in the carcinogenic list shown by the National Toxicology Program (NTP) and the Occupational Safety and Health Administration (OSHA). On the other hand, National Institute of Occupational Safety and Health (NIOSH) recommended in October 1995, that only carbon blacks with PAH level greater than 0.1% require the measurement of PAHs content in air. Because of some PAHs are considered as suspect carcinogenic agents, NIOSH recommended a 0.1 mg/m<sup>3</sup> limit as the maximum value of PAHs exposure in air.

Carbon nanofibers commercialized by DropSens, S.L. in solution form, contains less than 0.1% weight of PAHs, so this fiber can be included in the same group than the carbon black.

Because of the potential health concerns associated with carbon black, workers should follow work practices which limit the amount of carbon black exposure. Engineering controls, such as local exhaust ventilation, is very important in limiting exposure to carbon black. An effective means to limit worker exposure to carbon black is to utilize a closed system in the compounding area.

OSHA requires that worker exposure be limit to 3.5 mg/m<sup>3</sup> of air.

## Exposure controls

- Respiratory protection Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
- Hand protection The selected protective gloves have to satisfy the specification of EU Directive 89/686/EEC and the standard EN 374 derived from it. Handle with gloves.
- Eye protection 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: amine like
- **Important health, safety and environmental information:**
  - pH value: 6 at 25°C
  - Melting temperature: Not data available.
  - Ignition temperature: Not determined
  - Bulk Density: Not data available
  - Solubility in water (20°C): insoluble
  - Solubility in other solvent: No determined.
  - Relative vapour density: Not determined.
  - Refractive index: Not determined.

## 10.- Stability and reactivity

- **Conditions to be avoid:** Heating should be avoid.
- **Substances to be avoided:** Strong oxidizing agents and/or reducing agents.
- **Hazardous decomposition products:** Hazardous decomposition products formed under fire conditions.
- **Further information:** Stable under recommended storage conditions.

## 11.- Toxicological information

- **Acute toxicity:**
  - **LD<sub>50</sub>(oral, rat):** 2800 mg/kg
  - **LC<sub>50</sub> (inhalation, rat):** 9-15 mg/l /4h
  - **LD<sub>50</sub> (skin, rabbit):** 1500 mg/kg
- **Genotoxicity** in vitro-mouse lymphocyte, mutation in mammalian cells and may cause congenital malformation in the fetus.
- **Carcinogenic:** This product contains a component that is no classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP or EPA classification.
- **Further toxicological information**
  - **Skin corrosion/irritation:** may be harmful if absorbed through skin. Causes skin irritation.
  - **Inhalation:** may be harmful if inhaled. May cause respiratory tract irritation.
  - **Ingestion:** harmful if swallowed.
  - **Serious eye damage/eye irritation:** causes eye irritation.

## 12.- Ecological information:

To the best of our knowledge the ecological effects have not been thoroughly researched.  
Avoid contact with water, wastewaters or soil.

### Ecotoxic effects:

#### Fish toxicity

- L. macrochirus CL<sub>50</sub> : 6300 mg/l / 96h.
- Onchorhynchus mykiss CL<sub>50</sub> : 9800 mg/l / 96h.
- P. promelas CL<sub>50</sub>: 10600 mg/l / 96h.

Daphnia toxicity: Daphnia magna EC<sub>50</sub>: 15700 mg/l / 48h.

#### Algae toxicity:

- Desmodesmus subspicatus IC<sub>50</sub> > 500 mg/l / 96h.
- Sc. Quadricauda IC<sub>5</sub> : 10 mg/l

#### Bacterial toxicity:

- Photobacterium phosphoreum CE<sub>50</sub>: 20000 mg/l / 5min (Microtox test).
  - **Mobility:** log P (o/w): -0.85 (experimental).

**Bioaccumulative potential:** no bioaccumulative.

**Persistence and degradability:** Biological degradability > 90% / 28d. Good.

## 13.- Disposal considerations

- **Product:** Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.
- **Packaging:** Dispose of as unused product.

## 14.- Transport information

- **Road transport:** UN-No: 2265  
ADR class: 3F1 III  
Correct technical name: Preparation containing N,N-Dimetilformamida
- **Sea transport:** UN-No: 2265  
IMDG class: 3 III  
Correct technical name: Preparation containing N,N-Dimetilformamida
- **Air transport:** UN-No: 2265  
IATA/ICAO class: 3 III  
Correct technical name: Preparation containing N,N-Dimetilformamida

## 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:

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

## MATERIAL SAFETY DATA SHEET

*Carbon nanofibers solution*  
*De acuerdo con la directiva CE N° 1907/2006*  
*Fecha de edición 10/03/2011*  
*Versión 2.0*

– **S-phrases:**

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S36 Wear suitable protective clothing

S45 In case of accident or if you feel unwell, seeks medical advice immediately (show the label if possible)

### 16. Other information

Date of creation: 10/03/2011

Author: Carla Navarro

Revised by: Pablo Fanjul Bolado (Director I+D, DropSens, S.L.)

The contents and format of this MSDS are in accordance with EEC Commission Directive 2001/58/EC, 67/548/EC resp. 99/45/EC

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