

MATERIAL SAFETY DATA SHEET - n° 004

PRODUCT NAME: HS10

ELABORATION DATE - 10/04/2023

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1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Product

- . **Common Name:** Graphene; Graphite nanoplatelets; Exfoliated graphite.
- . **Chemical Name:** Graphene;
- . **Internal Identification Code:** HS30
- . **Relevant identified uses of the substance:** Research and development of new products

1.2. Company

- . **Company Name:** Hexo Graphene
- . **Corporate Taxpayer No. (CNPJ):** 48.510.871/0002-62
- . **E-mail:** contact@hexographene.com.br
- . **Address:** Rua Alto do Tanque, No. 2556 - Letra C. Vila Íris - Santa Luzia/MG/Brazil - Zip Code: 33040-210

2. HAZARD IDENTIFICATION

2.1. Substance Classification (ABNT 14725): Non-hazardous chemical according to classification regulations.

2.2. Label Elements (ABNT 14725-2): Chemical product classified as non-hazardous, according to regulations.

2.3. Other hazards which do not result in classification: Acute or continuous exposure to suspension of dust in the air may cause irritation to mucous membranes, eyes and the respiratory system.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

3.1. Substance:

- . **Chemical or Common Name:** Graphene.
- . **Synonyms:** Graphite Nanoplatelets (GnP); Exfoliated Graphite.
- . **CAS Registration Number:** 7782-42-5.
- . **Impurities that contribute to the hazard:** Not available.
- . **GHS Class (Globally Harmonized System):** Not classified.
- . **Chemical Formula:** C
- . **Molecular Weight:** 12,01 g/mol

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4. FIRST AID MEASURES

4.1. First Aid

. Graphene is not classified as toxic or hazardous. Graphene suspension is non-volatile, non-outgassing and stable under normal temperature and pressure conditions for storage and transportation.

Inhalation: Remove the person to a ventilated place. If necessary, call a doctor.

After skin contact: Wash affected skin with flowing water and soap, enough to remove the substance. Consult a doctor in case of skin irritation.

After eye contact: Rinse opened eye for 15 minutes under running water. Remove contact lenses if worn. If symptoms persist, consult a doctor. Avoid rubbing your eyes.

Ingestion: Do not induce vomiting, due to the possibility of reaching the lungs. Rinse the victim's mouth with plenty of water. If you feel unwell, consult a TOXICOLOGICAL INFORMATION CENTER. Take plenty of water. Call a doctor if necessary.

4.2. Description of main symptoms and effects:

. Respiratory tract irritation.

4.3. Notes to physician:

. Symptomatic treatment. There is no specific antidote. Treatment must be directed according to the symptoms and clinical conditions of the patient.

5. FIRE FIGHTING MEASURES

5.1. Suitable extinguishing media:

. Use fire extinguishers with focus on classes A, B and C. Use water spray when there is no fire involving electricity, in this case use fire extinguisher with focus on class C.

5.3. Specific hazards arising from the chemical product combustion:

Release of toxic and asphyxiating gases (CO₂ and CO).

5.4. Protective measures for people involved in firefighting:

Wear self-contained positive pressure respiratory protective equipment and full protective clothing, if necessary. Containers and tanks involved in the fire must be cooled with water mist.

Specific hazards related to firefighting methods:

Data not available.

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6. SPILL OR LEAK CONTROL MEASURES

6.1. Personal precautions, protective equipment and emergency procedures:

Keep your distance and avoid contact with skin, eyes and MAINLY inhalation. If necessary, use personal protective equipment as described in section 8 of this MSDS

6.2. Environmental Precautions:

No special actions are required to protect the environment. However, prevent the spilled product from reaching water courses or sewers. Avoid later spreading of graphite (dust resulting from the drying of this mixture). Contact the relevant local authorities.

6.3. Cleaning methods:

If the material is dry and has dust: collect the product with a shovel or other instrument that does not disperse the product. For larger dust spills: use a vacuum with a HEPA filter (High Efficiency Particulate Retention Filter). Place material in appropriate containers and remove to a safe place. For final disposal, proceed according to Section 13 of this MSDS (Final destination considerations). Liquid must be retained and aspirated.

7. HANDLING, STORAGE AND TRANSPORT

7.1. Handling

Appropriate technical measures for safe handling:
Adequate environment ventilation. Avoid dust formation.

Hygiene Measures:

Wash hands and face thoroughly after handling and before eating, drinking, smoking or going to the toilet; remove contaminated clothing and protective equipment before entering eating areas.

7.2. Safe storage conditions

Keep the package hermetically closed and store between 15 °C and 30 °C (59 °F and 86 °F).

7.3. Transport Information

Declaration (rail and road) ADR, RID: Non-dangerous goods

Declaration (air transport) IATA-DGR: Non-dangerous goods

Declaration (maritime transport) IMDG code: Non-dangerous goods

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8. EXPOSURE CONTROL AND PERSONAL PROTECTION

8.1. Specific control parameter:

Not available. Keep the exposure limit as low as possible.

8.2. Engineering control measures:

Use general ventilation system or local exhaust.
Adopt good safety practices in laboratories.

8.3. Personal protection measures:

Eye/face protection: safety glasses

Skin protection: Nitrile protective gloves. Discard after use.

Respiratory protection: where the risk assessment shows that an air-purifying respirator is appropriate, use a dust mask with a P3 type filter.

Thermal hazards: Not available

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practices. Wash the skin site with soap and water, if contaminated. Wash hands before meals and at the end of the working day.

9. PHYSICAL-CHEMICAL PROPERTIES

. **Aspect:** Liquid dispersion, opaque, grayish black

. **Odor / odor threshold:** Odorless / Not available

. **pH:** 6 a 8

. **Melting point / freezing:** Not available

. **Boiling point:** Not available

. **Flash point:** Not available

. **Evaporation rate:** Not available

. **Flammability:** Non flammable

. **Lower bound/superior flammability and/or explosion:** Non-flammable and non-explosive

. **Vapor pressure:** Not available

. **Vapor density:** Not available

. **Density:** 1,05 g/cm³

. **Solubility:** Not available

. **Partition coefficient (octane/water):** Not available

. **Autoignition temperature:** Not available

. **Decomposition temperature:** Not available

. **Viscosity:** Not available

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10. STABILITY AND REACTIVITY

10.1. Chemical stability: Stable.

10.2. Physical stability: Resistant to impacts and friction.

10.3. Reactivity: Not available.

10.4. Possibility of dangerous reactions: Not available.

10.5. Conditions to avoid: Very high temperatures.

10.6. Incompatible materials: Stable, except in the presence of chlorosulfonic acid.

10.7. Hazardous decomposition products: Formation of carbon monoxide and carbon dioxide when subjected to high temperatures.

11. TOXICOLOGICAL INFORMATION

11. 1. Inhalation: May cause irritation of the respiratory system (based on available data from similar products).

11. 2. Ingestion: May cause discomfort if ingested (based on available data from similar products).

11. 3. Skin contact: May be harmful in skin contact (based on available data from similar products).

11. 4. Contact with eyes: May cause irritation (based on available data from similar products).

11. 5. Germ cell mutagenicity: not available.

11. 6. Carcinogenicity: not available.

11. 7. Reproductive toxicity: not available.

11. 8. Organ toxicity: not available.

11. 9. Danger by sprinkling: not available.

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity: Although there are no specific data for graphene, there is a small percentage (<3%) of toxic substance to aquatic organism.

12.2. Persistence and degradability: not available.

12.3. Bioaccumulative potential: not available.

12.4. Mobility in soil: not available.

12.5. Other adverse effects: Increased turbidity. Bed siltation.

13. CONSIDERATIONS ABOUT TREATMENT AND DISPOSITION

13.1. Recommended methods for final destination:

. **General:** Incineration at high temperature (pyrolysis above 800oC (1472 °F).

. **Product:** Compliance with municipal, state and federal environmental control regulations.

. **Product remains:** Collect and properly store the spilled product for later reuse or disposal.

. **Used packaging:** Must be disposed of according to environmental control standards.

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14 – TRANSPORT INFORMATION

1. National and international regulations: Graphene and its derivatives are not covered by international regulations on the transport of dangerous goods. It is not classified as hazardous for land transport, according to the Resolution of National Terrestrial Transport Agency - ANTT nr. 5232 of December 14, 2016, as well as air transport according to National Civil Aviation Agency - ANAC Resolution nr. 129 of December 8, 2009 or even waterway.

Land: National Terrestrial Transport Agency – ANTT:

. *Resolution No. 5232 of December 14, 2016: Approves the Complementary Instructions to the Land Regulation of the Transport of Dangerous Products, and gives other measures.*

Waterway: DPC - Directorate of Ports and Coasts: Transport in Brazilian waters:

. *NORMAM - Maritime Authority Standards:*

. *NORMAM 01/DPC: Vessels Employed in Open Sea Navigation.*

. *NORMAM 02/DPC: Vessels Employed in Inland Navigation*

. *IMO - International Maritime Organization:*

. *IMDG Code - International Maritime Dangerous Goods Code*

Air: National Civil Aviation Agency – ANAC:

Resolution No.129 of December 8, 2009.N° 175 - (Brazilian Regulation of Civil Aviation):

. *Transport of Dangerous Goods in Civil Aircraft.*

. *IS N° 175-001 - Supplementary Instruction - International Civil Aviation Organization:*

Doc 9284-NA/905.- International Air Transport Association Air Transport):

. *DGR - Dangerous Goods Regulation.*

15 – REGULATIONS:

1. Specific safety, health and environmental regulations for the chemical:

Chemical not classified as hazardous according to ANTT Resolution No. 5232 of December 14, 2016.

16. OTHER INFORMATION

1. General information regarding this MSDS:

This MSDS was prepared on the basis of ABNT 14.725

Frases H e P (health and protection):

H302: Harmful if swallowed

H312: Harmful in contact with skin

H332: Harmful by inhalation

H335: May cause airway irritation

H402: Harmful to aquatic life

P264: Wash hands thoroughly after handling

P273: Avoid release to the environment

P280: Wear protective gloves / protective clothing / eye protection / facial protection

P391: collect the spilled product.

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NOTE:

The information contained herein was not obtained from toxicological tests using any type of graphene, but from the literature. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. These materials were produced for research purposes only. Please, like any chemical material, a full risk assessment must be done by an accredited and/or qualified safety, hygienist or healthcare, safety and environmental professional. Special attention should be paid when this material is mixed with other chemicals, dried (powdered), stored or reacted with other chemicals. Attention should be paid during intensive drying and/or mixing and/or other procedures that may release particles or droplets into the workplace and the environment. The user may consult the specific legislation and the available bibliography in order to use the material safely.