

NC7000™

Multiwall carbon nanotubes

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

1.1 Product identifier

Trade Name: NC7000™

Substance name: Multi-walled carbon nanotubes (MWCNTs)
Short tangled MWCNTs obtained by catalytic chemical vapour deposition-
Synthetic graphite in tubular shape

EG-Nr./ List Nr: - / 936-414-1

CAS-Nr.: -

REACH Registration Nr: 01-2119879048-26-0001

Belgium Nanoregister Nr: BE-000924 (as substance)

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

Relevant Identified Uses: Additive for Industrial and Professional use.

1.3. Details of the Supplier of the safety data sheet

Manufacturer: Nanocyl S.A.
Rue de l'Essor, 4 - B-5060 Sambreville - Belgium

Telephone number: + 32 71 750 380 (office hours) - Fax: + 32 71 750 390

E-mail: info@nanocyl.com

2. Hazards identification

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) No 1272/2008 (CLP)

This substance does not meet the criteria for classification according to Regulation (EC) 1272/2008 [CLP].

2.1.2 Additional information: See Section 2.3

2.2 Label elements:

- * Pictograms: not applicable
- * Signal words: not applicable
- * Hazard statements: not applicable
- * Precautionary statements (assigned based on expert judgement):

P233	Keep container tightly closed.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

2.3 Other hazards

Other hazards which do not result in classification: Dust may form explosive mixture with air.

3. Composition/information on ingredients

3.1 Substances

Main constituent	CAS nr / EC nr / List nr	% (wt.)	Classification CLP
<i>Short tangled Multi-walled carbon nanotubes (MWCNTs)</i>	- / - / 936-414-1	~ 90%	-

4. First aid measures

4.1 Description of first aid measures

After skin contact:	Remove contaminated clothing immediately. Wash contacted skin areas with plenty of cold to lukewarm water and soap. If irritation develops, consult a physician.
Eye contact:	Hold the eyes open and rinse with water for a sufficiently long period of time (at least 10 minutes). Obtain medical attention if pain, blurred vision, swelling, burning or redness persist.
After inhalation:	If high concentration of dust is inhaled, move the person into fresh air, keep warm and allow to rest. If breathing is difficult, oxygen may be administered and medical attention should be obtained.

Ingestion: Do not induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Obtain medical attention.

4.2 Most important symptoms and effects, both acute and delayed: See Section 2.

4.3 Indication of any immediate medical attention and special treatment needed: See Section 4.1.

5. Fire-fighting measures

5.1 Extinguishing media

Suitable: Water fog, Foam, Carbon Dioxide, Dry Chemical.

Unsuitable: High volume water jet.

5.2 Special hazards arising from the substance or mixture

Specific hazards: /

Combustion products: May form toxic fumes, carbon monoxide, carbon dioxide, metal oxides.

5.3 Advice for firefighters Wear self-contained breathing apparatus. Wear suitable protective clothing.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Equip cleanup crew with proper protection (see Section 8). Ensure adequate ventilation/exhaust extraction. Prevent formation of explosive dust-air mixture.

6.2 Environmental precautions: Collect for disposal. Avoid discharge to natural waters, sewers and biological waste water treatment plants.

6.3 Methods and material for containment and cleaning up

6.3.1 For containment: Use sealable dedicated containers.

6.3.2 For cleaning up: Collect the spill material using a vacuum with Hepa filter or damp sweep. Avoid formation of dust.

6.3.3 Other information: Clear spills immediately

6.4 Reference to other sections: See Sections 8 and 13.

7. Handling and storage

7.1 Precautions for safe handling

Protective measures:

Handling: Ensure there is no direct skin contact with product. Avoid direct eye contact with product, also via contamination on hands. Avoid inhalation of the product.

Contact with skin and eyes and inhalation of dust must be avoided under all circumstances. In case of contact, ensure prompt removal from eyes, skin and clothing. See also Section 4.

Storage: Keep only in the original closed container in a dedicated place. Keep containers in a cool, dry place with adequate ventilation.

Measures to prevent fire: Avoid dust formation. Keep away from open flames and high temperature.

Measures to prevent aerosol and dust generation: Good ventilation of the workplace is required.

Measures to protect the environment: See Sections 8 and 13.

Advice on general occupational hygiene: Handle in accordance with good industrial hygiene and safety procedures. Wash potentially exposed areas with mild soap and water before eating, drinking, smoking, applying cosmetics, using toilet facilities or leaving work. Change contaminated clothing immediately.

7.2 Conditions for safe storage, including any incompatibilities

Storage class Germany (Lagerungsklasse - LGK): 11 Combustible solids

7.3 Specific end use(s)

Recommendations: use the product as supplied in powder form in industrial or professional settings only.

8. Exposure controls / Personal protection

8.1 Control parameters

No official Occupational Exposure Limit has been established yet. Obtain special instructions before use.

Derived No Effect Level (DNEL) for MWCNT – Inhalation - long term exposure of workers: 0.05 mg/m³

8.2 Exposure controls

8.2.1. Appropriate engineering controls

Organisational measures to prevent exposure: See Section 7.

Technical measures to prevent release: Specific advice can be provided by Nanocyl S.A..

Technical measures to prevent exposure: Good ventilation of the workplace is required. Facilities storing or utilizing this material should be equipped with an eyewash facility.

8.2.2. Individual protection measures, such as personal protective equipment

Hand protection: Protecting gloves: Suitable materials for safety gloves/ EN 374-3 include nitrile rubber (NBR; > 0.35 mm). Unsuitable material: do not wear neoprene gloves, as neoprene absorbs nanoparticles.

Skin and body protection: Wear gloves and other clothing as required to avoid contact.

Respiratory protection: Wear suitable respiratory equipment with high efficiency dust cartridge (P3 filter) when directly exposed or handling the powder.

Eye protection: Chemical goggles or safety glasses.

8.2.3. Environmental exposure controls

Do not allow to enter ground soil, sewage, drains.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	solid; black powder
Odour/Odour threshold:	odorless
pH:	Not applicable.*
Solubility in water:	insoluble
Melting point/freezing point:	> 400°C
Initial boiling point and boiling range:	> 400°C
Flash point:	Not applicable.*
Decomposition temperature:	> 450°C (VDI 2263, Part 1)
Smouldering temperature:	No data available.
Auto-ignition temperature:	> 390°C at 1013 hPa
Evaporation rate	Not applicable.*
Viscosity:	Not applicable.*
Vapour pressure:	Not applicable.*

Vapour density:	Not applicable.*
Relative density	~2 at 20°C (pycnometry)
Oxidising properties	Not fulfilling GHS/CLP criteria.
Flammability (solid, gas):	Not fulfilling GHS/CLP criteria.
Explosive properties	Not fulfilling GHS/CLP criteria.

Formation of explosive dust/air mixtures

Upper explosion limit	No data available.
Lower explosion limit	180 g/m ³ (EN 14034-3)
Minimum ignition energy	> 10J (VDI 2263)
Minimum ignition temperature of a dust layer (°C)	
KSt-value (bar x m/s):	42-64
Dust explosion category:	St1 class

* Testing may be waived as the product is a solid.

9.2 Other information

Bulk density: ~ 60 g/L

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. Stability and reactivity

10.1 Reactivity: No hazardous reaction when handled and stored according to provisions.

10.2 Chemical stability: Stable under normal handling and storage conditions.

10.3 Possibility of hazardous reactions: Hazardous polymerization will not occur.

10.4 Conditions to avoid: Avoid exposure to moisture. Avoid dust formation.

10.5 Incompatible materials: Strong oxidizing and reducing agents.

10.6 Hazardous decomposition products:

No hazardous decomposition products known at room temperature (see also Section 5.2).

11. Toxicological information

Acute toxicity:

Test material	Route of exposure	LD50
MWCNT	Oral	> 5000 mg/kg
MWCNT	Dermal	> 2000 mg/kg

Skin corrosion/irritation - Serious eye damage/irritation:

Test material	Organ	Result
MWCNT	skin	Not irritant
MWCNT	eye	Not irritant

Respiratory or skin sensitization: No data available.

Germ cell mutagenicity:

Test material	Method	Result
MWCNT	<i>In vitro</i>	Negative

Carcinogenicity:

Test material	Exposure	Species	Result
MWCNT	2-years, intraperitoneal	rat	No carcinogenic response

Reproductive toxicity / Teratogenicity: No data available.

Summary of evaluation of the CMR properties: Practical experiences do not give any evidence for CMR activity of categories 1 or 2.

STOT-single exposure:

Test material	Method	Result
MWCNT	Estimation: Possible hazard	May be harmful if inhaled.

STOT-repeated exposure:

Test material	Exposure	Species, Target organ	Result
MWCNT	28 days, oral	rat	NOAEL: 0.5 mg/kg
MWCNT	5 days, inhalation	rat, lung (pulmonary inflammation)	LOAEC: 2 mg/m ³
MWCNT	90 days, inhalation	rat, lung (multifocal granulomatous inflammation)	LOAEC: 0.1 mg/m ³

Aspiration hazard: No data available

12. Ecological information

Acute toxicity

Test material	Study type	Result
MWCNT	Fish, 14 days	LC50: > 100 mg/l
MWCNT	Daphnia, 48 hours	EC50: > 100 mg/l
MWCNT	Algae, 72 hours	EC50: 134 mg/l

Chronic toxicity

Test material	Study type	Result
MWCNT	Fish, semi static	EC10: 100 mg/l
MWCNT	Daphnia, semi static	NOEC: > 25 mg/l

12.2 Persistence and degradability: Not readily biodegradable according to OECD criteria.

12.3 Bioaccumulative potential

Partition coefficient n-octanol /water (log Kow): Not applicable.

Bioconcentration factor (BCF): No data available.

12.4 Mobility in soil: No data available.

12.5 Results of PBT and vPvB assessment:

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6 Other adverse effects: The substance has no ozone depleting potential.

Environmental precautions: Do not allow to enter ground soil, sewage, drains.

13. Disposal considerations

13.1 Waste treatment methods

13.1.1 Product / Packaging disposal:

Product: If the material becomes a waste, consider it as special waste. It can be destroyed by incineration in accordance with local, state and federal regulations. For all countries, the disposal methods must be in compliance with national and provincial laws and any municipal or local by-laws. European

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Waste Catalogue (EWC) code: 061399 "wastes not otherwise specified"

Container:

Empty containers can be landfilled after have been emptied as thoroughly as possible, when in compliance with the Environmental Protection Regulation and with local, state and federal regulations.

13.1.2 Waste treatment-relevant information: Avoid losses to the environment

13.1.3 Sewage disposal-relevant information: Do not allow to enter ground soil, sewage, drains.

13.1.4 Other disposal recommendations: No data available

14. Transport information

No dangerous good in sense of these transport regulations:

Land transport (ADR/RID); Inland waterway transport (ADN); Sea transport (IMDG); Air transport (ICAO-TI / IATA-DGR); USA Department of Transport (DOT); Canada Transportation of Dangerous Goods (TDG).

14.1. UN number : None.

14.2. UN proper shipping name: Not applicable.

14.3. Transport hazard class(es) : Not applicable.

14.4. Packing group: Not applicable.

14.5. Environmental hazards: No.

14.6. Special precautions for user: Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code": Not applicable.

15. Regulation information

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

Specific regulatory dossiers were established based on data generated on the above-mentioned product. For all dossiers, no CAS number was provided to the authorities and this product was registered under the chemical name "*short tangled multi-walled carbon nanotubes obtained by catalytic chemical vapour deposition*".

European Union

REACH

The substance “short tangled multi-walled carbon nanotubes obtained by catalytic chemical vapour deposition” (MWCNT) has been registered under REACH (RRN: 01-2119879048-26-0001). The substance as registered had no corresponding CAS number. The European Agency ECHA has however assigned the provisional EC List Number 936-414-1.

Other regulations (EU)

Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances (SEVESO III): Not listed on Annex I.

This substance/mixture does not contain any volatile organic compounds (VOCs) in the sense of Directive 2010/75/EU.

Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer (Ozone Depleting Substances): Not applicable.

Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (PIC), as revised in 2015: Not applicable.

United States of America

Toxic Substance Control Act

The substance in this product is listed on the TSCA Inventory and is considered as Active.

This product contains one or more substance(s) which is/are subject to a TSCA Section 5(e) consent order that imposes certain restrictions on handling, storage, distribution, use and disposal. Nanocyl S.A. has filled a Pre-Manufacture Notice and submitted a Notice of Commencement in 2010. Please contact Nanocyl S.A. for further information over the Consent Order.

SARA 313 EPCRA Toxic Chemical Release Inventory (TRI): No substances listed.

SARA Section 311/312 Hazard Categories: None

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986): None

Canada

Since a component of this product was not listed on the Canadian Domestic Substance List (DSL) or non-Domestic Substances List (NDSL), a schedule 5 of the New Substances Notification Regulations (Chemicals and Polymers) of the Canadian Environmental Protection Act, 1999, has been granted.

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Inventories

All components of this product are compliant with the following chemical inventories: Japanese Existing and New Chemical Substances (ENCS), Korean Existing Chemicals List (ECL), Philippines Inventory of Chemicals and Chemical Substances (PICCS), Swiss Giftliste 1 Inventory of Notified New Substances, Chinese Chemical Inventory of Existing Chemical Substance (IECS) and Taiwan Existing chemical Substance Nomination (ECN).

15.2 Chemical Safety Assessment:

A Chemical Safety Assessment has been carried out for this substance.

16. Other information

Voluntary safety information following the Safety Data Sheet format according to Regulation (EC) No. 1907/2006 (REACH).

Abbreviations and acronyms:

EC	European Commission
EPCRA	Emergency Planning and Community Right-to-Know Act
CLP	Classification Labelling and Packaging
CFR	Code of Federal Regulations
GHS	Globally Harmonized System
HCS	Hazard Communication Standard
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
SARA	Superfund Amendments and Reauthorization Act
SDS	Safety Data Sheet
TRI	Toxic Chemical Release Inventory

Vertical lines in the left hand margin indicate an amendment from the previous version.

Safety Data Sheet revision history:

Previous version: 23 February 2018 (V12)

Current version: 23 July 2018 (V13)

Disclaimer:

Nanocyl S.A. provides the information contained herein in good faith and makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their

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