SAFETY DATA SHEET

Product: HiPco SWNT Powder

(1) PRODUCT AND COMPANY IDENTIFICATION

Product Description: HiPco Single-walled nanotube powder.

Manufacturer: NanoIntegris Technologies, Inc.,
c/o Raymor Industries Inc.
3765 La Vérendrye
Boisbriand, Quebec, J7H 1R8
CANADA
Phone No.: +1 450.434.6266

Emergency Telephone: 1-888-CANUTEC (226-8832) (North American use) and/or
1-613-996-6666 (International use)

(2) HAZARDS IDENTIFICATION (EC)

Emergency Overview:	May be harmful if swallowed. Avoid eye contact.
Symptoms of Overexposure:	None expected.
Skin Contact:	May cause dermatitis.
Eye Contact:	May cause irritation, redness, and pain. Corneal injury may occur.
Ingestion:	May cause gastrointestinal irritation, nausea, and vomiting.
Chronic Effects:	None expected.
Medical Conditions Aggravated by Exposure:	Preexisting skin conditions may be aggravated by exposure to powder.
Suspected Carcinogen:	No.

(3) COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	CAS NUMBER	WEIGHT PERCENT
carbon nanotubes	308068-56-6	65-99%
Fe catalyst	7439-89-6	1-35%

(4) FIRST AID MEASURES

Eye contact: Flush thoroughly with water. Remove contact lenses if present after the first 5 minutes and continue flushing for several more minutes. Get medical attention of irritation persists.

Skin contact: Wash with soap and water. If irritation develops and persists, get medical attention.

Inhalation (Breathing): If irritation is experienced, move to fresh air. Get medical attention if irritation or other symptoms develop and persist.

Ingestion (Swallowed): Do NOT induce vomiting. Call local physician or poison control center.

(5) FIRE-FIGHTING MEASURES

Extinguishing Media:	Use water fog, dry chemical, carbon dioxide or foam. Water jet or flooding amounts of water are allowable.
Special Fire Fighting Procedures:	It is recommended but not necessary for firefighters to wear positive pressure selfcontained breathing apparatus, full protective clothing, and NIOSH-approved selfcontained breathing apparatus (SCBA). Cool fire-exposed containers with water.
Unusual Fire and Explosion Hazards:	Sealed container may rupture when heated.

(6) ACCIDENTAL RELEASE MEASURES

Wear appropriate protective clothing (see Section 8). Contain and collect liquid with an inert absorbent and place in a container for disposal. Clean spill area thoroughly with soap and water. Report spills to authorities as required.

(7) HANDLING AND STORAGE

Handling:	Minimize prolonged or repeated contact with skin. Wear proper protective equipment. If ventilation is not efficient, wear proper respiratory equipment. Detailed information on handling carbon nanotubes may be found at the ASTM Standard E 2535-07, “Standard Guide for Handling Unbound Engineer Nanoscale Particles in Occupational Settings,” ASTM International, www.astm.org
Storage:	Store in cool, dry, well-ventilated area away from all sources of ignition. “Empty” containers may retain product residue and can be hazardous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Waste Disposal Method:	Follow applicable Federal, state, and local regulations. A qualified environmental professional should determine waste characterization, disposal, and treatment methods.

(8) EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical	Occupational Exposure Limits
Carbon nanotubes	15mg/m3 TWA (total dust) 5 mg/m3 TWA (respirable fraction)

The Following Controls are Recommended for Normal Consumer Use of this Product

Engineering Controls:	Use in a well-ventilated area. Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Section 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.
Personal Protection:	Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Eye Protection	In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.
Skin Protection:	Avoid prolonged skin contact. Chemical resistant gloves recommended for operations where skin contact is likely.
Respiratory Protection:	None needed for normal use with adequate ventilation.

For Bulk Processing or Workplace Use the Following Recommended Controls:

Engineering Controls:	Use adequate general and local exhaust ventilation to maintain exposure levels below that of occupational exposure limits.

For Bulk Processing or Workplace Use the Following Recommended Controls:

Engineering Controls:	Use adequate general and local exhaust ventilation to maintain exposure levels below that of occupational exposure limits.
Personal Protection:	
Eye Protection:	Safety goggles recommended where eye contact is possible.
Skin Protection:	Wear chemical resistant gloves.
Protective Clothing equipment:	Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye and face- protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with, contact lenses.
Respiratory Protection:	None required if ventilation is adequate. If the occupational exposure limits are exceeded, wear a NIOSH approved respirator. Respirator selection and use should be based on contaminant type, form, and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice. Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear an MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. Warning: air-purifying respirators do not protect workers in oxygen-deficient atmospheres. If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.
Work/ Hygiene Practices:	Wash with soap and water after handling.

(9) PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point:	2,861 °C (5,182 °F) at 1,013 hPa (760 mmHg)
Vapor Pressure:	Not applicable.
Solubility in Water	Low to no solubility.
Appearance:	Black powder.
Odor:	Odorless.
Specific Gravity	No data is currently available.
Melting Point	Melting point/range: 1,538 °C (2,800 °F) at 1,023 hPa (767 mmHg)
Evaporation rate	Not applicable.

Flash Point:	No data is currently available.

(10) STABILITY AND REACTIVITY

Stability:	Stable
Hazardous Polimerization:	Will not occur.
Conditions to Avoid:	Avoid excessive heat, sparks, flames, and other sources of ignition. Extremely cold temperatures. Do not puncture or incinerate storage container.
Incompatibilities:	Strong oxidizing or reducing agents, strong acids or bases, mineral acids.
Hazardous Decomposition Products:	Hazardous decomposition products formed under fire conditions. - Carbon oxides. No data is currently available.

(11) TOXICOLOGICAL INFORMATION

Acute toxicity :	Oral LD50 LD50 Oral - rat - 7,500 mg/kg Inhalation LC50 no data available Dermal LD50 no data available Other information
Skin Corrosion/ irritation	No skin irritation
Serious eye damage/ eye irritation	Eyes - rabbit - No eye irritation - OECD Test Guideline 405
Respiratory or skin sensitisation	Did not cause sensitisation on laboratory animals.
Germ cell mutagenicity	Genotoxicity in vitro - S. typhimurium - Not mutagenic in Ames Test.
Carcinogenicity	IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. ACGIH: No component of this product present at levels greater
Reproductive toxicity	Animal testing did not show any effects on fertility.
Teratogenicity	Did not show teratogenic effects in animal experiments.
Specific target organ toxicity – single exposure (Globally Harmonized System):	The substance or mixture is not classified as specific target organ toxicant, single exposure.
Specific target organ toxicity-repeated exposure (Globally Harmonized System):	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.
Specific target organ toxicity - repeated exposure (Globally Harmonized System)	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.
Aspiration hazard	No data available
Potential health effects	Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Ingestion May be harmful if swallowed. Skin May be harmful if absorbed through skin. May cause skin irritation. Eyes May cause eye irritation.
Synergistic effects	No data available
Additional Information	RTECS: Not available

(12) ECOLOGICAL INFORMATION (Fe Catalyst)

Toxicity:	Toxicity to fish static test - Morone saxatilis - 13.6 mg/l - 96 h
BOD5 and COD:	No data is currently available.
Products of Biodegradation:	No data is currently available.
Toxicity of the Products of Biodegradation:	No data is currently available.
Special Remarks on the Products of Biodegradation:	No data is currently available.

(13) DISPOSAL CONSIDERATIONS

If this product becomes a waste, it would not be expected to meet the criteria of hazardous waste. However, it is the responsibility of the generator to determine at the time of disposal the proper classification and method of disposal. Dispose in accordance with federal, state, and local regulations.

(14) TRANSPORT INFORMATION

Proper Shipping name:	Not applicable.
Hazard Class(es)	This material is not defined under US DOT regulations as a hazardous substance.
Identification Number:	Not applicable.
Packing Group:	Not applicable
Hazardous substances:	None known.
Marine Pollutants:	None known.
IMDG Classification:	Not available.
TDG Classification:	Not available.
ICAO/IATA Classification:	This material is not defined under the US DOT regulations, “Dangerous Chemicals Management Ordinance”, or Dangerous Goods Regulations (DGR), and is suitable for all normal transport by air, ground, rail, or water ways.
RID/ADR Classification:	This material is not classified as Dangerous Goods in the hazard communication tool (GHS) or transport conditions (TDG) by the United Nations Economic Commission for Europe (UNECE) and is suitable for all modes of transport.

(15) REGULATORY INFORMATION

U.S. Federal Regulations:

CERCLA 103 Reportable Quantity:	This product is not subject to CERCLA reporting requirements. Report large volume spills as required under federal, state, and local regulations.
SARA TITLE III:	Not available.
EPA Toxic Substances Control Act (TSCA) Status:	Not applicable.
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65):	This product does not contain chemicals regulated under California Proposition 65.
VOC Regulations:	This product complies with the consumer product VOC limits of CARB, the US EPA, and states adopting the OTC VOC rules.

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Canadian Environmental Protection Act:	All of the ingredients are listed on the Canadian Domestic Substances List or are exempt from notification.
Canadian WHMIS Classification:	This product is not subject to the criteria of the Controlled Products Regulation (CPR).

(16) OTHER INFORMATION

This Product is experimental in nature, may have hazardous properties, and is provided "as is." The information contained in this Material Safety Data Sheet is considered accurate as of the version date. However, no warranty is expressed or implied regarding the accuracy of the data. Since the use of this Product is not within the control of NanoIntegris, it is the user's obligation to determine the suitability of the Product for its intended application. The user also assumes all risk and liability for safe use of the Product.

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Disclaimer:

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user.

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. The information contained herein was not obtained from toxicology assays using our single-wall carbon nanotubes but gathered from literature.