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

| Trade name | VGCF®, VGCF®-H (Vapor Grown Carbon Fiber) |
| Importer / Distributor Name | SHOWA DENKO AMERICA, INC |
| Address | 420 Lexington Avenue, Suite 2335A, New York, NY 10170, U.S.A. |
| Tel. | +1 212 370 0033 (Monday - Friday 9:00-17:00) |
| E-mail | sales@showadenko.us |
| Emergency phone numbers | U.S.A.: +1 212 370 0033 (Monday – Friday, 9:00–17:00) |
| | Japan: +81-44-344-0613 (VC Section, Production Department, Kawasaki Plant, Chemicals Sector) |
| Manufacturer | SHOWA DENKO K.K. Advanced Battery Materials Department |
| | 13-9, Shiba Daimon 1-chome, Minato-Ku, Tokyo, 105-8518, Japan |
| Phone | +81-3-5470-3943 ; Fax +81-3-5470-3777 |
| Transportation Emergency phone numbers | CHEMTREC, USA （Customer number: CCN20146） |

**SECTION 2: Hazards identification**

### 2.1. Classification of the substance or mixture

<table>
<thead>
<tr>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physico-chemical hazards</td>
</tr>
<tr>
<td>Health Hazards</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Environmental Hazards</td>
</tr>
</tbody>
</table>

Full text of H statements: see section 16

### 2.2. Label elements

<table>
<thead>
<tr>
<th>GHS-US labeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard pictograms (GHS-US)</td>
</tr>
<tr>
<td>Signal word (GHS-US)</td>
</tr>
<tr>
<td>Hazard statements (GHS-US)</td>
</tr>
</tbody>
</table>

### 2.3. Other hazards

Frequent inhalation of dust over a long period of time increases the risk of developing lung diseases. The substance may ignite when exposed to heat, sparks, or flames.

### 2.4. Unknown acute toxicity (GHS US)

Not applicable
SECTION 3: Composition/Information on ingredients

<table>
<thead>
<tr>
<th>Substance</th>
<th>Product identifier</th>
<th>Weight%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiwalled carbon nanotube</td>
<td>(CAS No) None</td>
<td>&gt; 99</td>
<td>Acute Tox. 4, H332, STOT RE. 2, H373</td>
</tr>
</tbody>
</table>

The Chemical Abstract Service is not issuing CAS numbers for carbon nanotube allotropes until US EPA clarifies its nomenclature framework for such substances under the Toxic Substances Control Act. This substance is identified as PMN No. P-08-733 for purposes of US EPA’s new chemical review program.

PMN No. P08-0733

Including nanomaterials based on in-house standards

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation: Remove the victim to fresh air. Have the victim gargle with water and thoroughly rinse the inside of the mouth.

First-aid measures after skin contact: Wash off with water and soap. If contamination cannot be rinsed off readily, apply cleansing cream and wipe off with a soft cloth. Seek medical attention, if necessary.

First-aid measures after eye contact: Immediately flush eyes with running water for at least 15 minutes. Avoid rubbing the eyes. Seek medical attention if symptoms appear.

First-aid measures after ingestion: Rinse mouth. Induce vomiting if victim is conscious. Never give anything by mouth to an unconscious person. Seek medical attention, if necessary.

Protection for first-aid provider: Wear protective equipment to prevent skin contact, inhalation, or any other form of exposure to the material.

4.2. Most important symptoms and effects, both acute and delayed

Dust may cause eye, skin and respiratory tract irritation.

4.3. Indication of any immediate medical attention and special treatment needed

No special treatment required. Treatment should be based on the judgement of the doctor in response to symptoms of the patient. First aid administrators should wear protective equipment such as protective gloves, protective glasses and respiratory protection if inhalation and skin contact to the product is expected.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Water, carbon dioxide, nitrogen gas, or foam

Unsuitable extinguishing media: No data

5.2. Special hazards arising from the substance or mixture

Generation of carbon monoxide and carbon dioxide. The material burns slowly and generates no smoke.

5.3. Advice for firefighters

To extinguish fires, remove the material around the ignited portion, leaving a generous margin, and smother the flames with carbon dioxide, foam, or other extinguishing material. Cool the material from a safe distance by spraying with water mist. Wear protective equipment to prevent skin contact, inhalation, or any other form of exposure to the material.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment: Wear protective equipment to prevent skin contact, inhalation, or any other form of exposure to the material.

Emergency procedures: Eliminate all sources of ignition. Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Only authorised personnel should enter the leak area, utilising appropriate personal protective equipment. Prevent further leakage or spillage if safe to do so.
6.1.2. **For emergency responders**

Wear full protective clothing and self-contained breathing apparatus. Keep unauthorized personnel from spill area.

6.2. **Environmental precautions**

Try to minimize generated dust to the maximum extent possible.

6.3. **Methods and material for containment and cleaning up**

If the material spills onto the floor or other surfaces, do not attempt to sweep up. Instead, collect the spilled material into an empty container by means that disperse as little dust into the air as possible, such as a HEPA-filtered vacuum cleaner.

6.4. **Reference to other sections**

For details of personal protective equipment, see Section 8. For details on waste disposal, see Section 13.

**SECTION 7: Handling and storage**

7.1. **Precautions for safe handling**

- **Technical measures**: Since the material is electrically conductive, special protective measures must be taken to safeguard electrical equipment. The VGCF® substance must not be released to the waters of the United States, predictably or purposefully. Wastewater containing VGCF® VGCF®-H used for experiments, cleaning machines, or washing hands etc. must be collected and is recommended to be disposed of by incineration. See the section “13. DISPOSAL CONSIDERATIONS”.

- **Local and general ventilation**: In facilities where the material is transported, stored, used, or handled, use local ventilation systems to remove dust at the generation source. Install a total ventilation system to minimize airborne dust concentrations in indoor workspaces. Depending on the conditions of handling, use dust collectors with predetermined suction rates. Before discharging exhaust/ventilated air containing VGCF® VGCF®-H, collect VGCF® VGCF®-H using HEPA filters or filters with equivalent or better performance.

- **Precautions**: Do not get in eyes, on skin, or on clothing. Wear gloves that are impervious to the material, and full body clothing that is impervious to the material. Use an air shower to remove VGCF® VGCF®-H adhering to work clothing. Use local ventilation systems or enclosures to prevent the dispersal of removed VGCF® VGCF®-H into surrounding areas. Wash off VGCF® VGCF®-H adhering to the human body with a warm water shower. Wastewater containing VGCF® VGCF®-H, must be collected and is recommended to be disposed of by incineration. The VGCF® substance must not be released to the waters of the United States, predictably or purposefully. See the section “13. DISPOSAL CONSIDERATIONS”.

7.2. **Conditions for safe storage, including any incompatibilities**

- **Appropriate storage conditions**: In locations where large quantities of the material are stored, avoid using flames or equipment generating sparks or arcs, which may serve as ignition source. Avoid exposure to water. Seal airtight after opening the container and take care to prevent moisture absorption. Avoid exposure to direct sunlight.

- **Safe container material**: Use sealed containers, for example, plastic bags, vinyl bags, or similar containers.

7.3. **Specific end use(s)**

- Lithium ion battery.
- Resin composites.

**SECTION 8: Exposure controls/personal protection**

8.1. **Control parameter**

As explained in Section 15 of this SDS, the substance is subject to a Significant New Use Rule (SNUR) under the Toxic Substance Control Act. This section includes the worker protection measures included in the SNUR. The SNUR was intended to address full-scale commercial use of this substance, rather than the use of the substance for research and development (R&D) purposes. While the measures specified below for commercial-scale operations provide useful guidance for R&D activities, it may be appropriate to adjust them in consideration of the nature of the R&D activity and the scale of operations in the R&D setting, consistent with the provisions of 40 CFR 720.36.

- **Engineering measures to reduce exposure**: Handle the material only in locations where a total ventilation system is installed. Take appropriate measures such as local ventilation systems to avoid generating dust. Before discharging exhaust/ventilated air containing the substance, collect the substance using...
VGCF®, VGCF®-H
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Administrative control levels: HEPA filters or filters with equivalent or better performance.

Exposure guidelines:


8.2. Exposure controls

Personal protective equipment measures in US TSCA SNUR, at 40 CFR 721.10266, which are only required when a worker is reasonably likely to be exposed to a dust or mist containing the substance:

Personal protective equipment

- **Respiratory protection**: A NIOSH-certified air-purifying, tight-fitting, full-face respirator equipped with N100 cartridges. P-100 or R-100 filter cartridges.
- **Hand protection**: Gloves that are impervious to VGCF® and VGCF®-H (for example, gloves meeting ASTM F1671-07).
- **Eye protection**: A NIOSH-certified air-purifying, tight-fitting, full-face respirator equipped with N100 cartridges. P-100 or R-100 filter cartridges.
- **Skin and body protection**: Full body clothing that is impervious to VGCF® and VGCF®-H (for example, full body clothing meeting ASTM 1671-07).

In determining whether protective clothing is "impervious", testing of the clothing should be conducted based on ASTM F739 (Standard Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases) and ASTM F1194-89 (Guide for Documenting the Results of Chemical Permeation Testing on Protective Clothing Materials.) Showa Denko K. K. have been advised by EPA that clothing meeting ASTM F1671-07 (Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration of Blood-Borne Pathogens Using Phi-X174 Bacteriophage Penetration as a Test System) should satisfy this requirement because the Phi-X174 Bacteriophage test substance is of comparable size to a nanoscale particle.

In case that only small quantities are used for R&D purposes:

Personal protective equipment

- **Respiratory protection**: Dust masks with particulate capture efficiency of 99.9% or greater (for example, Category RL3 dust masks available from Koken, Ltd.)
- **Hand protection**: Plastic or rubber gloves.
- **Eye protection**: Dust-proof glasses (for example, goggles).
- **Skin and body protection**: Dust-proof clothing (for example, CLEANGUARD overalls).

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Powder, fibrous</td>
</tr>
<tr>
<td>Color</td>
<td>Black</td>
</tr>
<tr>
<td>Odor</td>
<td>Odourless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data</td>
</tr>
<tr>
<td>pH</td>
<td>7 in 3% aqueous slurry</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data</td>
</tr>
<tr>
<td>Freezing point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No data</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>500 - 600 °C (in air)</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>500 - 600 °C (in air)</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No data</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>No data</td>
</tr>
<tr>
<td>Relative density</td>
<td>2.1 g/cm³</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: Insoluble in water</td>
</tr>
<tr>
<td></td>
<td>Other solvents: Insoluble in other solvents</td>
</tr>
<tr>
<td>Octanol/water partition coefficient</td>
<td>No data</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data</td>
</tr>
</tbody>
</table>

9.2. Other information

Bulk density:

- 0.04 g/cm³ (VGCF®)
- 0.08 g/cm³ (VGCF®-H)
SECTION 10: Stability and reactivity

10.1. Reactivity
The product is considered stable and non-reactive under normal conditions of use.

10.2. Stability
Stable under normal handling conditions.

10.3. Possibility of hazardous reactions
No possibility of polymerization.

10.4. Conditions to avoid
High atmospheric temperatures of 500-600 °C
Proximity of flames and electrical or other sparks.

10.5. Incompatible substances
No data

10.6. Hazardous decomposition products
Incomplete combustion may produce carbon monoxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity: Oral, rat, LD50: >2,000 mg/kg bw \(^{13}, 14\) Inhalation, dust, rat LC50: >1.87 mg/L/4hr \(^{2}\)

Skin corrosion/irritation: Skin irritation test with rabbits (0.5 g of VGCF® for 4 hours in semi-occlusive application, in compliance with OECD TG404), no skin irritation (primary skin irritation index: PII=0) \(^{15}\)

Serious eye damage/irritation: No data

Respiratory or skin sensitization: Skin sensitization test with guinea pigs (Maximization method, in compliance with OECD TG406), no skin sensitization \(^{16}\)

Germ cell mutagenicity: In vitro chromosomal aberration test with CHL/IU cells of Chinese hamsters (suspensions: prepared with a mortar; doses: 5 mg/mL at maximum; 8 doses set at a common ratio of \(^{3}\), positive (structural aberrations: negative; numerical aberrations: positive) in short-term treatment method with or without metabolizing systems (S9 mix).

The D20 value was 0.265 mg/mL. \(^{13}\)

Reverse mutagenicity test with Salmonella TA98, TA100, TA1535, TA1537, and Escherichia coli WP2uvrA, negative with or without metabolic activation systems (S9 mix). \(^{5}, 17\)

Carcinogenicity: Assessment by IARC: MWCNT(not applicable for MWNT-7) : Group 3 (Not classifiable as to its carcinogenicity to humans)

A carcinogenicity test was performed by intratracheal injection with hamsters.

The hamsters were administered six doses every other week (0.2 mg for VGCF® and 0.4 mg for benzpyrene per hamster per administration, respectively). The number of hamsters developing malignancies was compared at two years after the initial administration. The results are as follows: No development of malignancies was observed in the control group, VGCF® group, or VGCF® + benzpyrene group. The development of malignancies was observed only in the chrysotile + benzpyrene group (occurrence ratio: 0.55 localized malignancies/hamster) It was considered that the carcinogenic potential of VGCF® to lung is lower compared to chrysotile under the conditions of this study (SDK study report).

Hyperplasia, fibrosis of alveolar wall and such non-neoplastic lesions were observed in lung of the animals of the treated group and no significant difference was noted between the control group in a carcinogenicity study by intratracheal injection of VGCF®-H to the hamsters (six doses every other week at 0.12, 1.2 mg/animal/6 doses; incidence of malignancy after 2 years was assessed.). Intrapertioneal mesothelioma was noted in an animal of high dose group, but metastasis to lung was not observed and no statistically significant difference was not noted between the control group. Based on above results, carcinogenicity was not noted by intratracheal injection (SDK study report).

In the carcinogenicity study (two administration (1, 10mg/rat for every other week for a year) at interperitoneal administration of 3 kinds of MWCNT (NT50a, NT145, NTtngl) in the rat, mesothelial tumor was not observed in tangled MWCNT (NTtngl). Mesothelial tumor was observed in thin and rigid MWCNT (NT50a) and thick MWCNT (NT145), NT50a induced mesothelial tumor with high frequency and an early stage compared to NT145. (Nagai et al. PNAS, 2011, 108, E1330-38)

Reproductive toxicity: No data
**Specific target organ toxicity (single exposure)**: In the histopathological examination at 1 month after the single intraperitoneal administration of 3 kinds of MWCNT (NT50a, NT145 and NTtngl) in the rat, thin and rigid MWCNT (NT50a) and thick MWCNT (NT145) induced stronger inflammation compared to tangled MWCNT (NTtngl) (Nagai et al. PNAS, 2011, 108, E1330-38).

**Specific target organ toxicity (repeated exposure)**: Four groups of rats were exposed nose only, 6 hours per day, 5 days a week to aerosol concentrations of 0, 0.54, 2.5 or 25 mg/m³ VGCF®-H over a 90 day period for a total of 65 exposures. The exposures resulted in statistically significant increases in lung weights of male and female rats exposed to 25 mg/m³ and of female rats exposed to 2.5 mg/m³. The increases in lung weights did not recover after a 90 day recovery period. Inflammation was noted in all ten of the 25 mg/m³ exposed rats of each sex and was graded slight and in 7/15 rats of each sex in the 2.5 mg/m³ exposure group where it was graded minimal.

Evaluation of bronchoalveolar lavage fluid (BALF) demonstrated that exposure to 25 mg/m³ produced a test material-induced increase in BAL-recovered neutrophils (PMNs), lactate dehydrogenase (LDH), alkaline phosphatase (ALKP) and micrototal prote in (MTP).

Following the 90-day recovery period, animals from the 25 mg/m³ still demonstrated significantly increased levels of PMNs, LDH, ALKP and MTP, indicating that the inflammatory response had not been resolved 3 months after the cessation of the 25 mg/m³ exposure.

Cell proliferation studies (using BrdU labeling) demonstrated a test material-induced increase in cell proliferation of the terminal bronchioles, lung parenchyma and subpleural/mesothelial areas of both male and female rats exposed to 25 mg/m³ VGCF®-H, when compared to the air control group. Under the conditions of this study, the no-observed-adverse-effect level (NOAEL) for VGCF®-H is considered to be 0.54 mg/m³ (4.9 fibers/cc) for male and female rats.

**Aspiration hazard**: No data

**Other hazardous information**:

1. Since the material is whisker-shaped, handle carefully to prevent inhalation or contact with skin.

   The US EPA requires evaluation studies of ultrafine particles for environmental effects and potential effects on the human body.


   "All fibres that are respirable and biopersistent must undergo testing for toxicity and carcinogenicity. Exposures to these fibres should be controlled to the same degree as that required for asbestos until data supporting a lesser degree of control become available. The available data suggest that para-aramid fibres fall within this category. Furthermore, other respirable organic fibres should be considered to fall within this category until data indicating a lesser degree of hazard become available."

3. Professor Donaldson at the University of Edinburgh, UK, posted a paper concerning the safety of carbon nanotubes (CNT) in Nature Nanotechnology and pointed out the need for further testing and studies of CNT safety. An overview is provided below.

   "In mice to which samples containing straight CNT 20 μm or longer were injected into the peritoneal cavity, inflammation and the development of granulomas were confirmed in the peritoneal cavity in inspections carried out one week after the injection. This also occurs when mice are exposed to amosite asbestos, the reference substance, by injection into the peritoneal cavity. This inflammation and granulomas are normal foreign body reactions to indigestible or non-degradable material that macrophages cannot eliminate. However, our study did not address whether this inflammation and granulomas would develop into the cancer mesothelioma. In addition, our study did not address whether CNTs would reach the mesothelium in sufficient amounts to cause mesothelioma following inhalation exposure. Furthermore, it remains unknown whether exposure to such long CNTs sufficient to reach the threshold dose in the mesothelium would occur in a workplace or in the environment."

4. Carcinogenicity classification by IARC

   MWNT-7 : Group 2B (Possibly carcinogenic to humans)
: (5) Literature on the different effects to living organisms and cells depending on the form of MWCNT

In a two-year carcinogenicity study to rats by the single intraperitoneal administration of 4 kinds of MWCNT (straight or needle-like, curved or wavy and amosite asbestos), tumor (malignant mesothelioma) was induced in all treated groups. Tumor was observed more frequently and earlier in the groups treated with needle-like MWCNT than curved MWCNT or amosite. (Rittinghausen et al. Part Fibre Toxicol, 2014, 11: 59)

No difference was observed in toxicity or cytokine producibility after administration of MWCNT with different diameter to macrophage in an in vitro cytotoxicity study. It was indicated that mesothelial cells injury strongly related to inflammation induction and carcinogenicity. In addition, MWCNT (NTtngl) which had the smallest diameter and formed aggregate did not enter into cells and had low level of inflammation induction and carcinogenicity. Based on this it was considered that not only small diameter but also high rigidity and linearity were important to enter into mesothelial cells. (Nagai et al. PNAS, 2011, 108, E1330-38)


It was concluded by above committee that NT-7K (former MWNT-7) indicates the carcinogenicity based on the result of 2-years carcinogenicity study in rats by systemic inhalation exposure to NT-7K (former MWNT-7).

Based on this evaluation, NT-7K (former MWNT-7) has been added to the substance list in the Guideline of carcinogenicity on March, 2016, and enterprises who manufacture or handling this substance are required to take measures to lower the exposure level and etc.

SECTION 12: Ecological information

12.1. Toxicity

<table>
<thead>
<tr>
<th>VGCF®, VGCF®-H</th>
<th></th>
</tr>
</thead>
</table>
| Fish (killifish) LC50 (96 hr) | > 100 mg/L (semi-static)  
(220) |
| Fish (carp) LL50 (96 hr) | >100 mg/L (semi-static)  
(220) |
| Crustacea (Daphnia magna) EC50 (48 hr) | >100 mg/L  
(170) |
| Algae (Pseudokirchneriella subcapitata) ErC50 (72 hr) | >100mg/L (incompliance with OECD TG201)  
(112.20) |
| NOEC | >100mg/L  
(122.20) |

12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>VGCF®, VGCF®-H</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and degradability</td>
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</table>

12.3. Bioaccumulative potential

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Bioaccumulative potential</td>
<td>No data</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil

<table>
<thead>
<tr>
<th>VGCF®, VGCF®-H</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology - soil</td>
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</tr>
</tbody>
</table>

12.5. Other adverse effects

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Effect on ozone layer</td>
<td>No additional information</td>
</tr>
<tr>
<td>Effect on the global warming</td>
<td>No known ecological damage caused by this product.</td>
</tr>
</tbody>
</table>

SECTION 13: Disposal considerations

13.1. Waste treatment methods

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual waste</td>
<td>Dispose of residual waste by incineration in a licenced facility.</td>
</tr>
<tr>
<td>Contaminated packaging</td>
<td>Empty contaminated container and packaging should be incinerated in a licenced facility. Follow the relevant acts and regulations in incineration. If incineration is not possible for disposal of contaminated container and packaging, remove the contents and contract to a Industrial Waste Collectors and Transporters and Industrial Waste Disposal Operators who are licensed by the local governor, follow the Waste Management and Public Cleansing Act and other related acts and regulations. Treat the waste properly.</td>
</tr>
</tbody>
</table>
VGCF®, VGCF®-H
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International regulations

<table>
<thead>
<tr>
<th>UN classification</th>
<th>Not applicable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Domestic regulations</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

Specific precautionary transport measures and conditions

Ideally, issue a transport cautionary statement to the shipper if the material is transported by means such as a vehicle. Make sure the containers are free of damage or leaks. Load carefully to protect from impact, overturning, falls, or breakage. Implement specific measures to prevent load shifting.

Emergency Response

Response in compliance with Emergency Response Guide No. 133 is recommended.

SECTION 15: Regulatory information

15.1. US Federal regulations

VGCF®, VGCF®-H

Listed on the United States TSCA (Toxic Substances Control Act) inventory

The substance has been included on the Master Inventory File under the US Toxic Substances Control Act (TSCA) program. It is identified on the Inventory as a Multi-Wall Carbon Nanotube.

The substance is subject to a TSCA Significant New Use Rule, at 40 CFR 721.10266. Under this SNUR, manufacturers, importers or processors are required to submit a Significant New Use Notice to EPA before undertaking manufacture, import or processing of this substance UNLESS it meets requirements of the SNUR on the following matters:

- No manufacture in the U.S. Only import is allowed
- Limits on the use of the substance specified in the SNUR
- Volume limit on import into the US specified in the SNUR
- Worker protection measures (gloves, protective clothing and respirator when a worker is reasonably likely to be exposure to dust or mist containing the substance). These measures are discussed in the PERSONAL PROTECTIVE EQUIPMENT section of this SDS
- No release of the substance to water bodies
- Recordkeeping specified in the SNUR
- Duty to notify EPA if a customer does not maintain applicable worker protection measures as required in the SNUR

These provisions cease to be applicable once the substance is embedded, encapsulated or incorporated into a solid matrix as specified in the SNUR.

15.2. International regulations

EU-Regulations

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Acute Tox. 4 (Inhalation:dust,mist) H332
STOT RE. 2 H373

Full text of hazard classes and H-statements: see section 16

SECTION 16: Other information

Full text of H-phrases:

<table>
<thead>
<tr>
<th>H332</th>
<th>Harmful if inhaled</th>
</tr>
</thead>
<tbody>
<tr>
<td>H373</td>
<td>May cause damage to organs through prolonged or repeated exposure</td>
</tr>
</tbody>
</table>

TSCA

Please refer to SNUR number 40 CFR 721.10266.

TSCA: Registered under SNUR number (Significant New Use Rule) 40 CFR 721.10266

“Notification on Precautionary Measures for Prevention of Exposure etc., to Nanomaterials” (Director General of Labour Standards Bureau, Ministry of Health, Labour and Welfare, Notification No.0331013, March 31, 2009.)


Guidance for prevention of health hazard caused by chemical substances designated by Minister of Health, Labour and Welfare based on Paragraph 3, Article 28 of Industrial Safety and Health Act (Guideline of carcinogenicity)


Notice for “Guideline of the partial amendment of the Guidance for prevention of health hazard caused by chemical substances designated by Minister of Health, Labour and Welfare based on Paragraph 3, Article 28 of Industrial Safety and Health Act”


References

1) SHOWA DENKO K.K., Test Report T05035 (Non-GLP, 2005)
2) SHOWA DENKO K.K., Test Report 0145/0180 (GLP, 2006)
3) SHOWA DENKO K.K., Test Report 0145/0181 (GLP, 2006)
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