

Section 1: Identification of the Substance, Mixture and of the Company/ Undertaking**1.1 Product identifiers**

Product name: Green Wall

Synonyms: cellulose microfibrils, microfibrillated cellulose, cellulose microfibers

Product form: water-based microfibers

Brand: Tangho

CAS no: 9004-34-6 (Cellulose, manufactured microfibril form)

REACH no: At present, REACH does not require registration of cellulose micromaterials. Cellulose pulp is exempt from Registration according to the provisions of Article 2(7)(a) and Annex IV of REACH.

EC no: 232-674-9 (Cellulose)

HS code: 4703.2900

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

Relevant identified uses: Manufacture of substances, laboratory chemicals, inclusion in paper and paperboard products, coatings

Uses advised against: None

1.3 Details of the Supplier of the Safety data sheet

Company: Tangho Green Canada Inc.

Address: 550 Parkside Drive - #B5, Waterloo, ON, Canada

Phone number: +1 (226) 339-8552

Website: www.tangho.green

E-mail: hi@tangho.green

1.4 Emergency phone number: +1 (226) 339-8552

1.5 Date of Preparation of SDS: March 1, 2023

Section 2: Hazard(s) Identification**2.1 Classification of the substance or mixture**

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS) and to Regulation (EC) No. 1272/2008 [CLP]

-if dried: STOT SE 3 (H335: May cause respiratory irritation)

-if dried: Combustible dust, Category 1 (GHS classification according to Hazardous Products Regulations (HPR) (SOR/2015-17)).

2.2 Label elements

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

Hazard pictogram: slurry is not classified as hazardous unless chemically treated; however, the dried form requires labeling under GHS07 (Exclamation Mark) due to potential respiratory and eye irritation.

Signal word: Warning

Hazard statement(s): H335: May cause respiratory irritation or form combustible dust concentrations in ai (if dried).

Precautionary statements

Precautionary statements – **prevention**

P210: If dry, keep away from all ignition sources including heat, sparks, open flames. Prevent dust accumulations to minimize explosion hazard.

P261: Avoid breathing dust/fume/gas/mist/vapors/spray.

P262: Do not get in eyes, on skin, or on clothing

P271: Use only outdoors or in a well-ventilated area.

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

Precautionary statements – **response**

P304+P340+P319: IF INHALED, remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical help if you feel unwell.

Precautionary statements – **Storage**

P403: Store in a wall-ventilated place. P233: Keep containers tightly closed. P405: store locked up.

Precautionary statements – **disposal**

P501: Dispose of contents/container in accordance with local/regional/national/international regulation.

Supplemental Hazard information (EU): not applicable

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form flammable dust concentrations in the air if in powder form.

Section 3: Composition/Information on Ingredients

3.1 Substances OR 3.2 Mixtures

Chemical name: Green wall

CAS no: 9004-34-6 (Cellulose, manufactured microfibril form)

Composition:

Material	CAS Number	EINECS Number	Weight %	Agency	Exposure Limits	Comments
Natural Fiber	9004-34-6	265-998-8	2	OSHA OSHA ACGIH	15 mg/m ³ 5 mg/m ³ 10 mg/m ³	PEL Total dust PEL Respirable dust TLV Total dust
Water	N/A	N/A	98		N/A	N/A

Section 4: First-aid Measures

4.1 Description of first aid measures

Inhalation: Remove victims to fresh air and keep at rest in a comfortable position for breathing. In case of breathing difficulties administer oxygen.

Skin contact: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention.

Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. In all cases of doubt, or when symptoms persist, seek medical advice.

Ingestion: rinse mouth with water (only if the person is conscious). Never give anything by mouth to an unconscious person. Seek medical attention if ill effect or irritation develops.

4.2 Most important symptoms and effects, both acute and delayed

- **Acute effects:** Potential symptoms: Hoarseness, irritation, cough and phlegm. Exercise-induced dyspnea.
- **Delayed effects:** No data available.

4.3 Indication of any immediate medical attention and special treatment needed

Note to physicians: This product may contain microscale particles. Currently, there is no further guidance specific to micromaterial exposure.

Section 5: Firefighting Measures

5.1 Extinguishing media

Suitable extinguishing media: Small Fire: Dry chemical, CO₂, water spray and alcohol-resistant foam.

Large Fire: Water spray, fog. Move containers from fire area if you can do it without risk.

Unsuitable extinguishing media: For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Explosion hazard: Not known

Fire hazard: May form combustible dust concentrations in air if dried.

5.3 Advice for firefighters

Firefighting instructions: Cool down the containers exposed to heat with a water spray. Move undamaged containers from immediate hazard area if it can be done safely. Fight fire with normal precautions from a reasonable distance. Evacuate area.

Protective equipment for firefighters: Extra personal protection: complete protective clothing including self-contained breathing apparatus.

Section 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergencies procedures

Personal precautions: do not touch or walk through spilled material. Use personal protection recommended in Section 8. Keep away from heat, sparks and flame. Keep the container closed (and grounded). Prevent dust accumulation (to minimize explosion hazard).

Protective equipment: If powder, wear full set of protective clothing and contain breathing apparatus for spills, avoid inhalation, and wash skin following contact. See section 8 for more details on protective equipment.

Emergency procedures: Keep unauthorized personnel away. Keep out of low areas. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). For dry powders,

remove ignition sources and provide sufficient ventilation. Avoid dispersal of powder in air (i.e. clearing with compressed air), use good current practices.

6.2 Environmental precautions

keep away from drains, surface, and ground water. No acute environmental hazard.

6.3 Methods and materials for containment and cleaning up

For containment: Stop leak if safe to do so. Do not flush to sewer or allow to enter waterways.

Methods for cleaning up: For dry powders, ensure the product is not present at concentration level above cellulose TLV (section 8.1). Use HEPA-filtered vacuum or wet wiping methods and avoid re- dispersion of micromaterial powder into the air. For gel spills, use absorbent materials/liquid traps. Immediately dispose of cleaning materials and do not dry and re-use contaminated materials.

6.4 Reference to other sections

For further information refer to section 13. For disposal of residues refer to section 13 : Disposal considerations.

Section 7: Handling and Storage

7.1 Precautions for safe handling

Precautions for safe handling: Minimize dust generation and accumulation. Airborne dust is potentially explosive. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions. Handling and processing operations should be conducted in accordance with “best practices”. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. To avoid fire or explosion, ground and bond container and receiving equipment (and ground personnel) before transferring material. Do not swallow. See Section 8 for information on Personal Protective Equipment.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Always wash hands and face immediately after handling this product, and once again before leaving the workplace. Do not eat, drink or smoke when using this product. Wash contaminated clothing prior to re-use.

7.2 Conditions for safe storage, including any compatibilities

Store in closed, tightly sealed containers in cool (4°C), dry, well-ventilated area, away from sources of ignition, electrostatic sparks, extreme heat, or mechanical friction. Prevent gels from drying to powder. Protect from freezing. Do not store food or beverages in areas where materials are handled. Do not smoke in work areas where micromaterials are stored.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

Section 8: Exposure Controls/ Personal Protection

8.1 Control parameters		
CNF	Gels do not represent an inhalation hazard; avoid inhalation exposure to if dried/powder forms and dusts. No exposure limits for micro- forms of cellulose. British Standards Institute has developed pragmatic guidance for OEL - for insoluble micromaterials a factor of 0.066*OEL of micro-sized bulk material is proposed.	
Water-based microcellulose		
Ireland	OEL (8 hours ref) (mg/m ³)	4 mg/m ³ (respirable dust)
Ireland	OEL (15 min ref) (mg/m ³)	12 mg/m ³ (calculated respirable dust)
Cellulose (900-34-6)		
Belgium	Limit value (mg/m ³)	10 mg/m ³
Croatia	GVI (granična vrijednost izloženosti) (mg/m ³)	10 mg/m ³ (total dust) 4 mg/m ³ (respirable dust)
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m ³)	20 mg/m ³ (total dust)
Estonia	OEL TWA (mg/m ³)	10 mg/m ³ (respirable dust)
France	Local name	Cellulose
France	VME (mg/m ³)	10 mg/m ³ (paper fiber)
France	Note (FR)	Valeurs recommandées/ admises
Ireland	OEL (8 hours ref) (mg/m ³)	10 mg/m ³ (inhalable dust) 4 mg/m ³ (respirable dust)
Ireland	OEL (15 min ref) (mg/m ³)	20 mg/m ³ 12 mg/m ³ (calculated-respirable dust)
Latvia	OEL TWA (mg/m ³)	2 mg/m ³
Portugal	OEL TWA (mg/m ³)	10 mg/m ³
Romania	OEL TWA (mg/m ³)	10 mg/m ³ (dust, inhalable fraction)
Spain	VLA-ED (mg/m ³)	10 mg/m ³
United Kingdom	Local name	Cellulose
United Kingdom	WEL TWA (mg/m ³)	10 mg/m ³ inhalable dust 4 mg/m ³ respirable
United Kingdom	WEL STEL (mg/m ³)	20 mg/m ³ inhalable dust
Switzerland	MAK (mg/m ³)	3 mg/m ³ (respirable dust)
Australia	TWA (mg/m ³)	10 mg/m ³ (containing no asbestos and <1% crystalline silica-inhalable dust)
Canada (Quebec)	VEMP (mg/m ³)	10 mg/m ³ (containing no Asbestos and <1% Crystalline silica-total dust)
USA - ACGIH	Local name	Cellulose
USA - ACGIH	ACGIH TWA (mg/m ³)	10 mg/m ³
USA - ACGIH	Remark (ACGIH)	NA URT irr
USA - NIOSH	NIOSH REL (TWA) (mg/m ³)	10 mg/m ³ (total dust) 5 mg/m ³ (respirable dust)
USA - OSHA	OSHA PEL (TWA) (mg/m ³)	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)

8.2 Exposure Control

Engineering control: provide adequate ventilation.

Personal protective equipment: At present, due to a lack of micromaterial-specific data regarding PPE, good hygiene practices are recommended. For gel, dermal exposure is possible and gloves, protective clothing, and goggles are recommended. If powder, in the absence of confirmatory measurements, inhalation exposure to dry forms should be avoided using appropriate respirators.

Eye/Face protection: Wear safety glasses. Use equipment for eye protection that meets the standards referenced by CSA Standard CAN/CSA-Z94.3:20 and OSHA regulations in 29 CFR 1910.133 for Personal Protective Equipment.

Hand protection: Preliminary evidence suggests that butyl rubber gloves may be more protective than nitrile gloves. Regular disposal and replacement of gloves is recommended.

Protective clothing: Cover skin to minimize dermal exposure, avoid direct contact with abraded or lacerated skin. Non-woven protective clothing is preferable to woven fabric laboratory coats. Prolonged use or reuse should be avoided.

Respiratory protection: If engineering controls and ventilation are not sufficient to control exposure to below the allowable limits then a half mask particulate respirator (NIOSH type N95 or better filters) must be worn. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.

General Hygiene considerations: Handle according to established industrial hygiene and safety practices. Consult a competent industrial hygienist to determine hazard potential and/or the PPE manufacturers to ensure adequate protection.

Personal Protective Equipment Symbol(s):



Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance: Gel

Physical state: Liquid

Color: Yellowish

Odor: Odorless

Odor threshold: n/a

pH: 4.5-7

Melting point/freezing point: n/a

Boiling point: 100 °C

Flash point: No data available for Green Wall. Cellulose ca. 240°C

Evaporation rate: n/a

Flammability (solid, gas): May form combustible dust concentrations in air.

Upper/lower flammability or explosive limits: No data for Green Wall. Cellulose dust explosion class “St 2 – strong explosion”. Cellulose dust deflagration index Kst = 229.

Vapor pressure: n/a

Vapor density: n/a

Relative density: no data available

Water Solubility: Insoluble; forms a gel.

Partition coefficient: n-octanol/water: No data.

Auto-ignition temperature: No data available for Green Wall. Cellulose may self-ignite at high temperatures (ca. 240°C).

Decomposition temperature: >350°C

Viscosity: no data available

Oxidizing properties: Not oxidizing.

9.2 Specific properties

Go to Technical Data Sheet.

9.3 Other safety information

No data available.

Section 10: Stability and Reactivity

10.1 Reactivity

Cellulose is stable. Cellulose dust is classified as “St 2 – risk of strong explosion”, due to dust deflagration index $K_{st} = 229$ (OSHA CPL 03-00-008). At present, no data is available for microcale cellulose.

10.2 Chemical stability

The product is chemically stable under normal condition of use (room temperature).

10.3 Possibility of hazardous reaction

None known. Hazardous polymerization will not occur. A high concentration of dust may form an explosive mixture in air.

10.4 Conditions to avoid

Contact with incompatible materials. Sources of ignition. Exposure to heat. High temperatures, extreme pressure, electrostatic sparks, collisions and mechanical friction. Avoid dust formation and deposits.

10.5 Incompatible materials

Strong oxidizers and acids. Fires and explosions may occur from reactions involving pentafluoride, acetic acid, and cellulose. Contact between cellulose and sodium nitrite at elevated temperatures results in vigorous burning from decomposition reaction.

10.6 Hazardous decomposition products

No known hazardous decomposition products.

Section 11: Toxicological Information

11.1 Information on toxicological effects

Likely routes of exposure: If in powder form: inhalation, eyes, and skin; If in gel form: skin.

Target organs: Respiratory system.

11.2 Immediate, delayed, or chronic effects and symptoms

Inhalation: No adverse effects are anticipated from single exposure to mist. Inhalation of large amounts of dust may cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Eye: May cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Skin: Brief contact is essentially non-irritating to skin. (Primary irritation index: 0.0) Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally because of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

11.3 Other measures of toxicity

	CNF (microcellulose)	Cellulose
Immunotoxicity	Based on in vitro tests, no effect on cytokine or chemokine production >300 mg/L CNF (Vartiainen 2011).	Exposure to lower concentrations or subchronic inhalation of cellulose may result in acute inflammatory lung effects, which are resolved after 30 days (Cullen 2000; Nagato 2008).
Neurotoxicity	No data available.	No data available.
Genotoxicity	Highest tolerated dose >240 mg/L in bacterial Ames test; no mutagenicity (Pitkänen 2010). After pharyngeal aspiration of 200 rig/mouse, no effects after 24h nor 28d on marrow polychromatic erythrocytes (as determined by micronucleus assay) (Aimonen 2015). <i>In vitro</i> Beas2B human bronchial epithelial cells: no DNA strand breakage (>950 mg/L) nor chromosomal damage (1250 mg/L) Lindberg (2014)	Highest tolerated dose >2000 mg/L in bacterial Ames test (OECD 471); no mutagenicity (Pitkänen 2010). <i>In vitro</i> Beas2B human bronchial epithelial cells: no DNA strand breakage (>950 mg/L) nor chromosomal damage (1250 mg/L) (Lindberg 2014). <i>In vitro</i> BEAS2B human bronchial epithelial cells (48h) – no micronucleus induction >100 mg/L (Catalán 2014).
Carcinogenicity	No data available.	Rats fed a 30% MCC diet for 72 weeks – no increase in tumorigenicity (unpublished report, WHO 1998).
Reproductive toxicity	No egg-laying effects in nematodes (<i>C.elegans</i>) up to 500 mg/L (Pitkänen 2014).	Rats fed MCC a 30% MCC diet for 72 weeks – no adverse reproductive effects (WHO 1998).
Biodurability/ Biopersistence	CNF (both TEMPO and homogenized) in artificial airway epithelial lining fluid using serum ultrafiltrate) did not degrade (as evidenced by unchanged crystalline structure) over 7 days (Stefaniak 2014).	Cellulose highly biopersistent. Half time of cellulose fiber clearance around 1000 days after 1-time intratracheal instillation of 2 mg (dust overload condition) in rats (Muhle 1997). After 7 days in lung fluid, MCC did not degrade (Seehra and Stefaniak 2013).

Section 12: Ecological Information

12.1 Toxicity

Acute data:

Zebrafish embryo	CNF-TEMPO (Forest Products Laboratory)	LOEC = ~ 2000 mg/L	Harper et al. 2015 (in press)
	CNF-homogenization (Forest Products Laboratory)	LOEC = 200 mg/L	Harper et al. 2015
	CNF-homogenization (Maine Pilot Plant)	No mortality up to 2000 mg/L	Harper et al. 2015
Bacteria (<i>V. fischeri</i>)	1250 mg/L CNF (mechanically produced)	9% fluorescence inhibition	Vartiainen et al. 2011
Algae (<i>C. vulgaris</i>)	1-100 mg/L CNF (chemically produced)	Decreased viability after 96h	Pereira et al. 2014

Chronic data: No data for CNF.

12.2 Persistence and biodegradability

No data for nanocellulose. Cellulose fibers readily biodegradable: Using ISO 14855- 1999 and EN 14046-2003, complete degradation by 25 days (Fernandes et al. 2011). Using EN14046 cellulose powder and Whatman cellulose paper were >60% after 28 days, and 82% and 69% after 65 days (Vikman et al. 2014). CNF is readily biodegradable: Non-functionalized NFC >70% degraded by day 28, approx. 90% degraded by day 70 (under “controlled composting conditions”) (SUNPAP 2012). Using EN 14046, >60% degradation of NFCbased products (concentrated NFC granules, paper with 1.5% NFC additive, NFC film) after 65 days – 76%, 95%, and 100%, respectively (Vikman et al. 2014).

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 PBT and vPvB assessment

No data available.

12.6 Other adverse effects

No additional information is available.

Section 13: Disposal Considerations

13.1 Waste treatment methods

All components are derived from natural materials and not expected to require specific handling for disposal. Avoid dust generation upon disposal. Not specifically listed as a hazardous waste under the Resource Conservation and Recovery Act (RCRA). However, if waste exhibits one or more of the following characteristics: ignitability, corrosivity, reactivity, or toxicity as described by 40 CFR 261.21-24, then waste must be classified as hazardous. At present, no micro-specific regulations exist. Waste must be disposed of in accordance with federal, state, and local environmental control regulations.

Section 14: Transport Information

14.2 UN proper shipping name: Not regulated.

14.3 Transport hazard class: Not applicable.

14.4 Packaging group: Not applicable.

14.5 Environmental hazards: Not classified as hazardous to the environment.

14.6 Special precautions for user: Not subject to regulations for transportation by sea, land, air, inland waterways, or rail.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code: Not applicable. Cellulose is not a DOT (U.S. Department of Transportation) and TDG (Canada transportation of Dangerous Goods) controlled material. Currently, there are no specific regulations for micromaterials.

Section 15: Regulatory Information

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

None for CNF. For related substances, OSHA regulations: See Section 8.

15.2 Chemical safety assessment: No chemical safety assessment has been carried out for this substance by the supplier. This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [CLP]

Section 16: Other Information

SDS preparation date: 2023-03-01

SDS last known revision date and changes made: Version 1, 2025-03-01

NFPA rating : **Slurry:** Health: 1; Flammability: 0; Reactivity: 0; Specific Hazard: 0

Abbreviations and Acronyms:

SDS	Safety Data Sheet
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
OECD	Organisation for Economic Co-operation and Development
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
vPvB	Very Persistent and Very Bioaccumulative
PBT	Persistent Bioaccumulative Toxic

Disclaimer:

This information applies only to the material in its supplied form and may not be valid if combined with other substances. Users are responsible for determining its suitability and completeness for their specific applications. The safety data sheet should be shared with all individuals who may use, handle, store, transport, or be exposed to this product. The information and handling recommendations provided are offered in good faith and are believed to be reliable as of the publication date. However, no warranty is given regarding their accuracy or sufficiency, nor does this document grant or extend any license under any patent.