

SAFETY DATA SHEET

acc. to Regulation (EC) No. 1907/2006

1. Identification of the substance or mixture and of the company

This Safety Data Sheet is for informational purposes only, and represents a preliminary assessment for a new pre-commercial substance that has not been tested in safety evaluations. The information provided is based on the best available published and unpublished data for similar substances, as listed below.

Product identifier

Product name:	Re:ancel® PD-CNF powder (RE42-D100G5)
Product Description:	cellulose nanofibrils 90%, Poly(diallyldimethylammonium chloride)10%
Other common names or synonyms:	Not available
REACH no.:	Not available
UFI Code:	Not available

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

Relevant identified uses:	Other (Feed materials, Intermediates)
Uses advised against:	For industrial and professional users
Reason why uses advised against:	Not available

Details of the Supplier of the Safety Data Sheet

Company:	ANPOLY Inc.
Address:	137, Yunghapgisul-ro, Heunghae-eup, Buk-gu, Pohang-si, Gyeongsangbuk-do, 37563, Republic of Korea
Phone number:	+82-54-262-0222
Email:	info@anpolyinc.com
Homepage:	www.anpolyinc.com

Emergency phone number

Republic of Korea	+82-54-262-0222
International	Call your national poison center, or a doctor/physician

2. Hazard identification

Classification of the substance or mixture

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

Physical-chemical Hazards:	Combustible Dust
Health Hazard:	Specific target organ toxicity (Single exposure) - Category 3 (Respiratory tract irritation)
Environmental Hazard:	Not classified

Additional information: For full text of Hazard- and EU Hazard-statements: see SECTION 16

Label elements

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

Hazard pictogram:	
Signal word:	Warning
Hazard statements:	H335: May cause respiratory irritation. May form combustible dust concentrations in air.
Precautionary statements:	Prevention - P261: Avoid breathing dust/fume/gas/mist/vapours/spray. P271: Use only outdoors or in a well-ventilated area. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Response - P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P312: Call a POISON CENTER/doctor if you feel unwell. Storage - P403+P233: Store in a well-ventilated place. Keep container tightly closed. Disposal - P501: Dispose of contents/container in accordance with local/regional/national/international regulations.
Supplemental Hazard information (EU):	Not applicable
NFPA rating:	Health: 0 Fire: 0 Reactivity: 0

◦ **Other Hazards:**Not available

According to Annex XIII, the substance does not meet PBT or vPvB criteria.

According to Regulation(EU) 2017/2100 and 2018/605, the substance does not affect to endocrine system.

The substance is not listed in Article 59

No other hazards have been identified

3. Composition/information on ingredients

◦ **Substances**

Chemical name:	Cellulose
Other name:	cellulose nanofibrils, microfibrillated cellulose, nanofibrils, microfibrils, nanofibrillated cellulose, cellulose nanofibers
CAS-No.:	Cellulose (9004-34-6) (manufactured nanofibrillar form)
EC No:	Cellulose (232-674-9)
Composition:	89-91% Cellulose
Chemical name:	Poly(diallyldimethylammonium chloride)
Other name:	PDADMAC
CAS-No.:	26062-79-3
EC No:	230-993-8
Composition:	9-11 %

4. Description of first aid measures

◦ **First aid measures**

General Information :	Call 911 or emergency medical service.
Following inhalation:	- Move victim to fresh air if it can be done safely. - Give artificial respiration if victim is not breathing. - Administer oxygen if breathing is difficult.
Following skin contact:	- In case of contact with substance, immediately flush skin with running water for at least 20 minutes. - Remove and isolate contaminated clothing and shoes. - Wash contaminated clothing before reuse.
Following eye contact:	- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. - Call 911 or emergency medical service.
Following ingestion:	- Never give anything by mouth to an unconscious person.

	- Seek medical attention.
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ⓘ **Most important symptoms and effects, both acute and delayed**

Over-exposure signs/symptoms:	Not available
Potential acute health effects:	Not available

ⓘ **Indication of any immediate medical attention and special treatment needed**

Note for the doctor:	Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves
Special treatment:	No specific treatment

5. Firefighting measures

Extinguishing media:	- Suitable extinguishing media : DRY sand, Dry chemical, Alcohol-resistant foam, Water spray, Regular foam , CO2 - Unsuitable extinguishing media : Not available
Special hazards arising from the substance or mixture:	- Containers may explode when heated. - May cause toxic effects if inhaled. - Vapors may cause dizziness or asphyxiation without warning. - May burn but does not ignite readily. - Fire may produce irritating and/or toxic gases. - Hazardous combustion products : Not available
Advice for fire fighters:	- Wear self-contained breathing apparatus for firefighting if necessary. - If it can be done safely, move undamaged containers away from the area around the fire. - Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out. - Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	For non-emergency personnel : All equipment used when handling the product must be ground. Keep unauthorized personnel away. 1) Protective equipment : Wear proper protective equipment and avoid contact with skin or inhalation of dust. 2) Emergency procedures : Evacuate personnel to safe areas. Ensure adequate ventilation. Use personal protective equipment.
Environmental precautions:	Prevent entry into waterways, sewers, basements or confined areas.
Methods and materials for containment and cleaning up:	For containment - With clean shovel place material into clean, dry container and cover loosely; move containers from spill area. - Small Spill: Absorb with earth, sand or other non-combustible material. For cleaning up - Remove residue with high-efficient cleaner - Flush area with large amounts of water. Other information : Wet down with water and dike for later disposal.
Reference to other sections:	- See Section 1 for emergency contact information. - See also sections 8 and 13 of the Safety Data Sheet.

7. Handling and storage

Precautions for safe handling:	Protective measures : Pay attention to incompatible materials and conditions. Advice on general occupational hygiene : - When using, do not eat, drink or smoke. - Wash thoroughly after handling.
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Conditions for safe storage, including any compatibilities:	Store in refrigeration, well-ventilated area. Keep closed, tightly sealed containers to prevent evaporation of water and contamination away from sources of ignition, electrostatic sparks, and mechanical friction. Do not store food or beverages in areas where nanomaterials are handled. Do not smoke in work area where nanomaterials are stored.
Specific end use(s):	Recommendations : Avoid prolonged exposure. Wash thoroughly after handling.

8. Exposure controls/personal protection

Control parameters

Occupational exposure limits:	TWA - 10mg/m ³
Biological limit values:	Not applicable
Exposure limits at intended use:	Not applicable

Exposure controls

Appropriate engineering controls:	- Ensure adequate ventilation, especially in confined areas. - Ensure compliance with applicable exposure limits and operate local exhaust ventilation when working.
Personal protection equipment:	Eye and face protection - Tightly fitting safety goggles. - Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Skin protection - Hand protection : Handle with gloves. Gloves must be inspected prior to use. - Other skin protection : Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Respiratory protection - Wear positive pressure self-contained breathing apparatus (SCBA). - Wear suitable respiratory equipment in case of inadequate ventilation. Thermal hazards - Structural firefighters' protective clothing provides thermal protection but only limited chemical protection.
Environmental exposure controls:	- Substance/mixture related measures to prevent exposure : Prevent entry into waterways, sewers, basements or confined areas.

9. Physical and chemical properties

Information on basic physical and chemical properties

Appearance:	Suspension, Optically transparent
Odor:	Odorless
Solids:	2.2 wt%(cellulose, Poly(diallyldimethylammonium chloride))
pH:	(25°C) 6 - 8
Conductivity:	(25°C) <3 mS/cm
Density	(25°C) 0.99 – 1.01 g/cm ³
Melting point/freezing point:	Not applicable
Initial boiling point and boiling range:	Not applicable
Flash point:	No data for CNF suspension. Cellulose ca. 240 °C
Evaporation rate:	Not applicable
Flammability (solid, gas):	No data for CNF suspension. Cellulose may be combustible at high temperature (240 °C)
Upper/lower flammability or explosive limits:	No data for CNF suspension. Cellulose dust explosion class “St 2 – strong explosion”. Cellulose dust deflagration index K _{st} = 229. Note: nanomaterials may

	pose a greater explosion hazard than bulk material.
Vapor pressure/density:	Not applicable
Solubility(ies):	Insoluble in water; forms a gel
Partition coefficient: n-octanol/water:	Not applicable
Auto-ignition temperature:	No data for CNF suspension. Cellulose may self-ignite at high temperatures (ca. 240 °C).
Decomposition temperature:	210 °C

10: Stability and reactivity

Reactivity:	This material is not reactive under normal ambient conditions.
Chemical stability:	Stable under normal temperatures and pressures.
Possibility of hazardous reactions:	- May cause toxic effects if inhaled. - Vapors may cause dizziness or asphyxiation without warning.
Conditions to avoid:	Ignition sources as heat, spark, flame, etc.
Incompatible materials:	Not available
Hazardous decomposition products:	Not available

11. Toxicological information

Information on hazard classes as defined in Regulation(EC) NO 1272/2008

Acute toxicity :	Oral: ALD(Approximate Lethal Dose)> 2,000 mg/kg (Rat) (Ref:Korea Conformity Laboratories) Dermal: ALD(Approximate Lethal Dose)> 2,000 mg/kg (Rat) (Ref:Korea Conformity Laboratories) Inhalation(dust/mist): LC50> 5.8 mg/L (4hr) (Not classified) (Ref:ChemIDplus)
Skin corrosion/irritation:	Not available
Serious eye damage/irritation:	Not available
Respiratory or skin sensitization :	Respiratory sensitization: Not available Skin sensitization: Cellulose nanofibers were evaluated as non-sensitizing substances with a final sensitization rate of 0% in the skin sensitization evaluation. (Guinea pig) (Ref:Korea Conformity Laboratories)
Germ cell mutagenicity:	In vitro: Negative (S.typhimurium, Bacterial reverse mutation assay, Metabolic activation:with) (Ref:Korea Conformity Laboratories) In vivo: Negative (Mouse, Cytotoxicity assay) (Ref:Korea Conformity Laboratories)
Carcinogenicity :	Not carcinogenicity
Reproductive toxicity :	Not available
STOT-single exposure :	As a result of oral administration to rats at 500, 1,000, 2,000 mg/kg, no dead animals were observed, and no unusual changes related to the administration of test materials were observed. (Ref:Korea Conformity Laboratories) As a result of dermal administration to rats, no dead animals were observed, and no unusual changes related to the administration of test materials were observed. (Ref:Korea Conformity Laboratories)
STOT-repeated exposure:	Not available

Aspiration hazard:	Not available
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Information on other hazards

Endocrine disrupting properties:	According to Regulation(EU) 2017/2100 and 2018/605, the substance not affects to endocrine system.
Biological limit values:	No other hazards have been identified

12. Ecological information

The basic elements of CNF are abundant materials that are not likely to be harmful to the environment. However, environmental effects of this material have not been determined. Therefore, avoid releasing material to the environment.

Toxicity

Toxicity:	Short-term (acute) aquatic hazard: Not classified Long-term (chronic) aquatic hazard: Not classified 1) Fish : Not available 2) Invertebrates : EC50 > 100 mg/L (Daphnia magna, 48hr) (Ref:Korea Conformity Laboratories) 3) Aquatic plants : Not available
Persistence and degradability:	1) Persistence : Not available 2) Degradability : Not available
Bioaccumulative potential:	1) Bioaccumulative potential : Not available 2) Biodegradation : Not available
Mobility in soil:	Not available
Results of PBT and vPvB assessment:	This substance does not contain any substances that are assessed to be a PBT or a vPvB.
Endocrine disrupting properties:	According to Regulation(EU) 2017/2100 and 2018/605, the substance not affects to endocrine system.
Other adverse effects:	Ozone layer hazard – Not classified
Additional information:	Not available

13. Disposal considerations

Waste treatment methods

Product / Packaging disposal:	Waste codes / waste designations according to LoW : - Not classified as hazardous waste according to European Union regulations. - Dispose of contents/container to a facility in accordance with local and national regulations.
Waste treatment-relevant information:	- Waste must be disposed of in accordance with directive 2008/98/EC. - Waste must be disposed of in accordance with federal, state and local environmental control regulations
Sewage disposal-relevant information:	Release to the environment or sewage system is prohibited.
Other disposal recommendations:	Not available

14. Transport information

UN number or ID number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class:	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user:	Not applicable

Maritime transport in bulk according to IMO Instruments:	Not available
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Cellulose is not a DOT controlled material (United States). At present, no nano-specific regulations exist.

15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture:	EU Regulation (EC) No. 1907/2006(REACH)/ Authorisations and/or restrictions on use : -Authorisations(Annex XIV): Not applicable -Restrictions on use(Annex XVII): Not applicable Other EU regulations: EU - Seveso III Directive (2012/18/EU) - Qualifying Quantities of Dangerous Substances : Not applicable EU - Persistent Organic Pollutants (850/2004) : Not applicable EU - Paints, Varnishes, Vehicle Refinishing Products (2004/42/CE) – VOCs : Not applicable EU - Industrial Emissions (2010/75/EU) - Integrated Pollution Prevention and Control Directive – List of Polluting Substances : Not applicable EU - Fluorinated Gases (517/2014) - Global Warming Potential : Not applicable EU - Substances Depleting the Ozone layer (1005/2009) : Not applicable EU - Export and Import Restrictions (649/2012) - Chemicals and Articles Subject to Export Ban : Not applicable
Chemical safety assessment:	No chemical safety assessment has been carried out for this substance by the supplier.

16. Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Indication of changes / Date of issue:	- Indication of changes : Rev. 0
Abbreviations and acronyms:	- o ECHA : European Chemicals Agency - o EU CLP : EU Regulation 1272/2008 on the classification, labelling and packaging of chemicals and mixtures) - o GLP : Good Laboratory Practice - o EL50 : 50% Effect Loading dose - o LC50 : Lethal Concentration 50% kill - o LD50: Lethal Dose 50% kill - o TWA : Time weight Average - o EC Number = EINECS and ELINCS Number (see also EINECS and ELINCS) - o EU = European Union - o SVHC = Substances of Very High Concern - o vPvB = Very Persistent and Very Bioaccumulative
Key literature references and sources for data:	- o ACGIH - o CAMEO Chemicals NOAA - o ChemIDplus - o ECHA - o ECOSAR - o Emergency response guide book - o EPI Suite - o HSDB - o HPVIS - o IARC - o ICSC - o INCHEM - o IPCS - o OECD SIDS - o PubChem

	○ Recommendations on the transport of dangerous goods ○ Single exposure oral administration toxicity test of cellulose nanofibers using rats. (GT 20-00169) ○ Single exposure dermal administration toxicity test of cellulose nanofibers using rats. (GT 20-00170) ○ Evaluation of acute toxic effects of cellulose nanofibers on daphnia (Test report no. NT20-00116K) ○ Bacterial reverse mutation assay of cellulose nanofiber (GM20-00763) ○ Cytotoxicity test of cellulose nanofibers using mouse fibroblasts(L-929) (Dissolution method) (GM20-00759) ○ Skin sensitization test of cellulose nanofibers using Hartley guinea pigs (GM20-00765)
Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]: Not applicable	