

Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	I van 10	Wijziging	07-01-2022

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

I.1. Product identifier

Brand name: C-Newable EG21–RB Bio-carbon powder

(C = Carbon; E = Energy; G = Gigajoule/ton; 21 = energy value; RB =recycled Biomass)

Description: Powder made from thermally treated woody biomass.

Appearance: Brown / black coloured powder. Particle size: min. 99 % < 2 mm.; min. 60 % < 0,250 mm.; min. 30 % < 0,125 mm.

I.2. Relevant identified uses of the substance or mixture and uses advised against

Energy source, for example in coal fired power plants.

I.3. Details of the supplier of the safety data sheet

Company : TorrCoal Production Centre bvba
Registered under VAT no. : BE 0877.949.770
Address : Energielaan 4
B-3650 Dilsen-Stokkem Belgium

I.4. Emergency telephone number

P : +31 (0)46 4775170 / +32 479 661573

E-mail address : info@torrcoal.nl

Website : www.torrcoal.com

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Self-heating substances cat. 1: H251: Self-heating; may catch fire

2.2. Label elements



H251: Self-heating; may catch fire



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	2 van 10	Wijziging	07-01-2022

2.3. Other hazards

Potential health effects (acute)

- **Swallowing:** Should be avoided. Swallowing small amounts is considered to be harmless.
- **Eyes:** Dust can potentially cause irritation or discomfort. Irritant properties of torrefied material at eye not further investigated.
- **Skin:** If Bio-carbon is in contact with moist skin, irritation may possible occur. It is recommended to wear protective clothing over the skin. Irritant properties of torrefied material at skin not further investigated.
- **Inhalation:** The product forms dust on handling. This dust, in combination may possible cause some discomfort in the respiratory tract on excessive exposure. On handling, where inhalation of dust is inevitable, it is advised to wear a full facial mask with P3 dust filter protection. Irritant properties of torrefied material by inhalation not further investigated.

Possible health effects (chronic)

- Torrefied wood material is not dangerous under normal circumstances; however it can potentially cause discomfort to the eyes, nose, and throat (irritation of the mucous membranes). Irritant properties of torrefied mucous membranes material at skin not further investigated.
- Long-term and repeated exposure to high concentrations of dust may possible lead to respiratory problems. Precautions should be taken to prevent inhalation of the dust. Irritant properties of torrefied material by inhalation not further investigated.
- Information regarding cancer / reproductive toxicity: not identified and not IARC, NTP or OSHA classified.

The product is not on the list of persistent, bio accumulative and toxic (PBT) or very persistent and very bio accumulative (vPvB) substances.

Fire / explosion risk:

- Concentrated airborne dust may present an explosion hazard;
- The product may be subject to spontaneous heating.

Low oxygen risk:

- Ventilate before entry;
- Always measure carbon monoxide and oxygen in enclosed storage areas.



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	3 van 10	Wijziging	07-01-2022

SECTION 3: Composition/information on ingredients

3.1. Substances

The product consists of biomass, thermally treated at maximum 350°C in a low oxygen environment.

Chemical name	CAS-nr	Perc. present
Fixed carbon C	7440-44-085	35 % - 60 %
Volatile Organic ingredients*	n/a	35 % - 60 %
Inert material	n/a	< 5 %

* The organic volatile ingredients are compounds formed by partial decomposition of biomass (cellulose; hemi cellulose; lignin) due to thermal treatment in a low oxygen environment.

* Inert material mainly consists of Ca, Mg, K and Si compounds.

SECTION 4: First aid measures

4.1. Description of first aid measures

Eyes : In case of irritation, immediately flush eyes with plenty of clean/drinking water for at least 15 minutes.

Skin : In case of irritation, flush skin with water. Wash clothing before reuse.

Ingestion : Wash mouth with clean/drinking water.

Inhalation : Remove from further exposure. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should administer oxygen. Get medical aid.

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

Eye contact : Tearing, burning.

Skin contact : Irritation, redness, scaling, itching.

Ingestion : Possible nausea and/or vomiting.

Dust inhalation: Irritation to the lungs and mucus membrane.

There are no known chronic effects of exposure to the product to date. Heat treated wood is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

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

There are no other measures needed than mentioned in section 4.1.



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	4 van 10	Wijziging	07-01-2022

SECTION 5: Fire fighting measures

5.1. Extinguishing media

Suitable : water spray, foam, carbon dioxide and dry chemical

Unsuitable : none

5.2. Special hazards arising from the substance or mixture

- Risk of dust explosion.
- The product may be subject to spontaneous heating.
- Burning might produce irritating and/or harmful fumes and smoke. Possible decomposition products are: carbon monoxide, carbon dioxide, and unburned hydrocarbons.
- When pneumatically transported, static discharge may occur.

5.3. Advice for fire fighters

- Respiratory, skin and eye protection are required for fire fighting personnel, except for small outdoor fires.
- Full protective equipment (Bunker Gear) and self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires.
- Use water to wet down dust to prevent generation of dust clouds.
- In case of concentrated airborne product, keep at distance.
- Remove burned or wet product to an open area after fire is extinguished.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- Respiratory, skin and eye protection are required for personnel.
- Remove all sources of ignition.
- Use water to wet down dust to prevent generation of dust clouds.
- In case of concentrated airborne product, keep at distance.
- Always measure carbon monoxide and oxygen in enclosed areas.

6.2. Environmental precautions

Pick up and arrange disposal without creating dust.

6.3. Methods and material for containment and cleaning up

Any method and material used should avoid creating dust and ignition.

6.4. Reference to other sections

Not applicable



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	5 van 10	Wijziging	07-01-2022

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Respiratory, skin and eye protection are required for personnel.
- Handle in accordance with good industrial hygiene and safety practice.
- Remove all sources of ignition.
- Always measure carbon monoxide and oxygen in enclosed areas.
- Avoid dust formation.
- Ensure adequate ventilation.
- Wash thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

- Storage facilities should be dry and provided with CO detection and temperature monitoring due to the self-heating properties of Bio-carbon powder and possible CO emission. Associated with the risk of dust explosion the storage facility must be equipped with an explosion safety valve.
- Keep Bio-carbon powder away from heat, sparks, flame or other sources of ignition and from strong oxidizing agents.
- Before entry of the storage facility CO content has to be measured and ventilation of the room has to be done in a proper way.

7.3. Specific end use(s)

See section 7.1 and 7.2. No other recommendations.

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Because the product is new and still under development there are no national exposure limit values to date. Because of the fact that the main exposure problems might be expected from the exposure to the product dust, until reliable values for the product become available known values for general nuisance dust are given instead.

- Threshold limit value, time weighted average (TLV-TWA): 10 mg/m³ (general nuisance dust)
- Permissible Exposure Limit: 10 mg/m³ (as dust)
- European Union professional exposure limit: 3 mg/m³ (as dust).

8.2. Exposure controls

- No exposure assessment has been performed to date, because the product is new and still under development.
- If handling generates dust, use explosion proof ventilation equipment to assure airborne levels are below established exposure limits.
- Facilities storing or using the product should be equipped with an eyewash facility. Good personal hygiene practices should always be followed.

Eye protection : Wear safety glasses or vented safety goggles.

Skin protection : Where contact is likely, wear protective clothes.

Respiratory protection : Wear dust mask (P3 filter) during handling.

- The exposure to dust should be minimised by applying the measures as described in sections 5 (Fire fighting measures) and section 6 (Accidental release measures). Spilled product should be contained and disposed of as non-hazardous waste according to local waste treatment regulations.



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	6 van 10	Wijziging	07-01-2022

SECTION 9: Physical and chemical properties

Because the product is new and still under development there are not many data available to date. The mentioned data in this section determined by DEKRA EXAM GmbH for Bio-carbon powder, according to the test standards between brackets, are single test results. Care has to be taken because of the relative validity of these data, being single measurements on one product only.

9.1. Information on basic physical and chemical properties

Appearance	: Solid, brown / black coloured
Odour	: Slight smell of charcoal
Odour threshold	: Not determined
pH	: Not applicable, <i>solid in normal use</i>
Melting/freezing point	: Not applicable, <i>solid in normal use</i>
Initial boiling point/range	: Not applicable, <i>solid in normal use</i>
Flash point	: Not applicable, <i>solid in normal use</i>
Evaporation rate	: Not applicable, <i>solid in normal use</i>
Flammability	: Not determined
Lower explosion limit	: 60 g/m ³ (DIN EN 14034-3)
Vapour pressure	: Not applicable, <i>solid in normal use</i>
Vapour density	: Not applicable, <i>solid in normal use</i>
Relative density	: 1000-1200 kg/m ³

Solubility (water) : Nearly Insoluble. Only the slightly present volatile organic constituents are partly soluble in water; Bio-carbon powder exhibits a hydrophobic behavior. After being wetted, biocarbon powder, thanks to micro porous properties, retains about 30% of capillary moisture.

Minimum required ignition energy	: > 10mj.
Partition coefficient	: Not applicable, <i>solid in normal use</i>
Auto-ignition temperature	: 127°C (DIN EN 15188)
Decomposition temperature	: Not applicable, <i>solid in normal use</i>
Viscosity	: Not applicable, <i>solid in normal use</i>

Explosive properties	: Maximum explosion pressure: 8.9 bar (DIN EN 14034-1)
Max. rate of explosion press. Rise	: 135 bar.m/s (DIN EN 14034-2)
Oxidising properties	: Not applicable, <i>solid in normal use</i>

9.2. Other information

Bulk density	: 250 kg/m ³ - 350 kg/m ³
Glowing temperature	: 250°C (DIN EN 50281-2-1)



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	7 van 10	Wijziging	07-01-2022

SECTION 10: Stability and reactivity

10.1. Reactivity

In contact with air, the product absorbs oxygen and emits carbon monoxide.

10.2. Chemical stability

The product is stable under normal ambient conditions of temperature and pressure.

10.3. Possibility of hazardous reactions

Higher temperature accelerates product decomposition. Moisture content could accelerate product decomposition.

10.4. Conditions to avoid

Avoid dust formation, heat, flames, and sparks.

10.5. Incompatible materials

Strong oxidizing agents.

10.6. Hazardous decomposition products

Carbon monoxide, carbon dioxide, small levels of methane, and other hydrocarbons.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: There is no evidence to date that the product is of acute toxicological nature.
Skin corrosion/irritation	: May possible cause skin irritation. Irritant properties of torrefied material at skin not further investigated.
Serious eye damage/irritation	: May possible cause eye irritation. Irritant properties of torrefied material at eye not further investigated.
Respiratory or skin sensitisation	: Can be possible (not further investigated).
Germ cell mutagenicity	: There is no evidence to date that the product is of acute toxicological nature.
Carcinogenicity	: There is no evidence to date that the product is of acute toxicological nature.
Reproductive toxicity	: There is no evidence to date that the product is of acute toxicological nature.
STOT-single exposure	: May possible cause respiratory tract or skin irritation (more investigations needed).
STOT-repeated exposure	: May possible cause respiratory tract or skin irritation (more investigations needed).
Aspiration hazard	: May possible cause respiratory tract irritation (more investigations needed).

Thermally treated wood is not listed by IARC, NTP and OSHA to be carcinogenic or reproductive toxic.

Effects on eyes : Not determined

Effects through inhalation : Not determined



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	8 van 10	Wijziging	07-01-2022

Effects through ingestion : Not determined

Effects on skin : Not determined

Irritation of the eyes, skin and respiratory system can be possible after exposure to dust, created during the handling of the product. There is no information available (no investigations results) on the effects of exposure to product dust or chronic effects of prolonged exposure.

SECTION 12: Ecological information

12.1. Toxicity

There are no experimental ecological data on the toxicity of the product available to date.

12.2. Persistence and degradability

The persistence of the product in the environment is limited due to the biodegradable nature of the product.

12.3. Bio accumulative potential

There are no experimental ecological data on the bio accumulative potential of the product available to date.

12.4. Mobility in soil

Because of the solid nature of the product the mobility will be limited.

12.5. Results of PBT and vPvB assessment

Not applicable.

12.6. Other adverse effects

Not applicable.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Dispose of waste at an appropriate waste disposal facility according to current applicable laws and regulations. Appropriate waste treatment methods are land filling and incineration.

SECTION 14: Transport information

14.1. UN number

UN 1361 (CARBON, animal or vegetable origin) Danger number 40

14.2. UN proper shipping name

CARBON, animal or vegetable origin (UN 1361)

14.3. Transport hazard class(es)

ADR 4.2

- Hot storage test at 140 °C in a cubical wire mesh basket of 10x10x10 cm³ (1 l.): auto ignition observed (> 200 °C within 24 hours).
- Hot storage test at 140 °C in a cubical wire mesh basket of 2,5x2,5x2,5 cm³ (15,6 ml.): no auto ignition observed (still 140 °C after 48 hours).



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	9 van 10	Wijziging	07-01-2022

- Hot storage test at 120 °C in a cubical wire mesh basket of 10x10x10 cm³ (1 l.): auto ignition observed (> 200 °C within 24 hours).
- Hot storage test at 100 °C in a cubical wire mesh basket of 10x10x10 cm³ (1 l.): no auto ignition observed (still 100 °C after 48 hours).

This means according to:

- UN Transportation of dangerous goods: Self-heating Substance of Division 4.2 for packing unit > 450 l.
- the CLP regulation: Self heating solid “Category 2” / H252 “Self Heating in large quantities; may catch fire.

However this based on one measurement result and by that still under investigation. Measurements done by other parties (producers of torrefied material) indicated no self heating during hot storage test at 120 °C in a cubical wire mesh basket of 10x10x10 cm³ (1 l.) and this means, that transport class ADR 4.2 is not applicable for this kind of torrefied material.

ADR 4.1

According “recommendations on the transport of dangerous goods (Manual of tests and criteria; 5th edition 2009)” a material belongs to ADR 4.1 class if the burning speed will be < 45 sec. for 100 mm. measuring length.

According measurements, done by OFI Technology & Innovation GmbH (test report 402.093; date 2013-01-23) torrefied spruce woodchips show a burning speed of 120 sec. for 50 mm. measuring length.

This means, that transport class ADR 4.1 is not applicable for this kind of torrefied material.

14.4. Packing group

Following classifications can be assigned to the sample “Torrefied Biomass” according to UN Transportation of dangerous goods* and the CLP regulation**:

- Classification according UN: Self-heating substance of Division 4.2 – **Packing group III.**
- Classification according CLP [2009]: Self heating solid “Category 2” / H 252: Self heating in large quantities; may catch fire.

14.5. Environmental hazards

Road and rail (ADR/RID) : {Still to be determined}

Air (ICAO/IATA) : {Still to be determined}

Vessel (IMO/IMDG/ADNR) : {Still to be determined}

14.6. Special precautions for user

The product is expected to be not flammable under normal conditions of use, but is combustible and will help sustain a fire.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.



Material Safety Data Sheet Bio-carbon powder			Afdeling	T&I
			Versie	0.2
TORR COAL	Document	T&I 26	Origineel	19-04-2021
	Pagina	10 van 10	Wijziging	07-01-2022

SECTION 15: Regulatory information

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

Not applicable.

15.2. Chemical safety assessment

Not applicable.

SECTION 16: Other information

Abbreviations:

ADNR : European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.

ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road.

IARC : International Agency for Research on Cancer.

IATA : International Air Transport Association.

ICAO : Technical Instructions for the Safe Transport of Dangerous Goods by Air.

IMDG : International Maritime Dangerous Goods.

IMO : International Maritime Organization.

NTP : National Toxicology Program.

OSHA : Occupational Safety and Health Administration.

PBT : Persistent, Bio accumulative and Toxic substance.

RID : Regulations concerning the International Carriage of Dangerous Goods by Rail.

SCBA : Self-Contained Breathing Apparatus.

STOT : Specific Target Organ Toxicity.

TLV-TWA: Threshold Limit Value, Time Weighted Average.

vPvB : Very Persistent and Very Bio accumulative substance.

R-phrases, hazard statements, safety phrases:

H251 : Self-heating; may catch fire (investigations ongoing).

S16 : Keep away from sources of ignition – No smoking.

S22 : Do not breathe dust.

S24/25 : Avoid contact with skin or eyes.

S26 : In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S28 : After contact with skin, wash immediately with plenty of soap and water.

S38 : In case of insufficient ventilation, wear suitable respiratory equipment.

Information, recommendations, and suggestions appearing herein concerning this product are to date and taken from sources or based upon data believed to be reliable and reasonable care has been taken in the preparation of this information.

