

SAFETY DATA SHEET

Perpetual Carbon pellet–volume ≤ 3m³ PCX205–230

Version: 2.3

Date: 20 June 2023



According to EC-Regulations 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name	Perpetual Carbon / Carbonised wood pellets (in volume ≤ 3m ³) 20.5–23 MJ/kg.
Product code	PCN205S, PCN210S, PCN230S, PCC230T, PCR230T, PCP210T, PCP230T, PCB210T, PCB230T
Unique Formula Identifier (UFI)	None assigned.

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

Identified use(s)	Perpetual Carbon is a renewable carbon-based product which can be used as a combustible, a reduction or (coking) coal replacement or as an additive to (building) materials to sequester the carbon for carbon sequestration. It is made from forestry and agricultural residues which are thermally treated in an oxygen deficient environment.
Uses advised against	Not for human or animal consumption.

1.3 Details of the supplier of the safety data sheet

Company identification	Perpetual Next Kraanspoor 36 1033 SE Amsterdam The Netherlands
Telephone number	+31 20 308 5910 (Netherlands)
E-mail (competent person)	argo.tonuri@baltania.ee (Estonia, Vägari site). dilsen-stokkem@perpetualnext.com (Belgium, Dilsen-Stokkem site)

1.4 Emergency telephone number

Emergency telephone number	+372 508 0144 (Estonia, Vägari site). Vägari site office hours: 8 am – 5 pm. +32 479 66 15 73 (Belgium, Dilsen-Stokkem site). Dilsen-Stokkem site office hours: 8 am – 5 pm.
Languages spoken	English and Estonian (Estonia, Baltania site). Dutch and English (Amsterdam site, Dilsen-Stokkem site).

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SECTION 2: HAZARDS IDENTIFICATION

2.1	Classification of the substance or mixture	
2.1.1	Regulation (EC) No. 1272/2008 (CLP)	Eye Irrit. 2, H319. STOT SE 3, H335.
2.2	Label elements	According to regulation (EC) No. 1272/2008 (CLP).
	Product name	Perpetual Carbon/biochar.
	Contains	Carbon.
	Hazard pictogram(s)	
	Signal word(s)	WARNING
	Hazard statement(s)	H319: causes serious eye irritation. H335: may cause respiratory irritation.
	Precautionary statement(s)	P261: avoid breathing dust. P280: wear protective gloves/protective clothing/eye protection/face protection. P304+P340: IF INHALED: remove person to fresh air and keep comfortable for breathing. P312: call a POISON CENTRE/doctor if you feel unwell. P305+P351+P338: IF IN EYES: rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337+P313: if eye irritation persists: get medical advice/attention.
	Supplemental information	Not applicable.
2.3	Other hazards	Flammable product used as a fuel. Flames and smoke may not always be generated as a sign of combustion. May form combustible or explosive dust concentrations in air. Handling of this material may generate a dust which can cause mechanical irritation of the eyes, skin nose and throat. Self-heating may occur if product is transported in bulk (volume > 3m ³) or stored in non-airtight packagings and exposed to air flow.

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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances Not applicable.

3.2 Mixtures

EC classification regulation (EC) No. 1272/2008 (CLP).

Chemical identity of the substance	%W/W	CAS No.	EC No.	REACH registration No.	Hazard classification
Carbon	>65	7440-44-0	231-153-3 (240-383-3)	Not yet assigned in the supply chain	Eye irrit. 2, H319 STOT SE 3, H335

For full text of H phrases see section 16.



SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Self-protection of the first aider	Obtain special instructions before use. No action should be taken involving personal risk. Use personal protective equipment as required. Wear appropriate personal protective equipment, avoid direct contact. Ensure adequate ventilation. Avoid breathing dust. Avoid contact with skin and eyes.
Inhalation	IF INHALED: if breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention immediately.
Skin contact	IF ON SKIN: gently wash with plenty of soap and water. If skin irritation or rash occurs, remove contaminated clothing/PPE. If irritation develops and persists, seek medical attention.
Eye contact	IF IN EYES: rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation develops and persists, seek medical attention.
Ingestion	IF SWALLOWED: rinse mouth. Give plenty of water to drink. Do NOT induce vomiting. Seek medical treatment.
4.2 Most important symptoms and effects, both acute and delayed	Causes serious eye irritation. May cause respiratory irritation.
4.3 Indication of any immediate medical attention and special treatment needed	Treat symptomatically.

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SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media As appropriate for surrounding fire. Use water, CO₂, dry chemical or foam.

Unsuitable extinguishing media None known.

5.2 Special hazards arising from the substance or mixture

Combustion of this product is unlikely to produce a flame, the product will smoulder and combust at high temperature in certain circumstances without visible smoke or flames. Product may re-ignite after fire is extinguished.

Explosion: may form combustible or explosive dust concentrations in air. Avoid dust generation. Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Combustion products: carbon monoxide, carbon dioxide.

5.3 Advice for firefighters

Beware of flameless combustion, beware of carbon monoxide. Fight fire with normal precautions from a reasonable distance. Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers. Use of water to prevent generation of dust clouds.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Caution: spillages may be slippery. Ensure operatives are trained to minimise exposures. No action should be taken involving personal risk. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Wear appropriate personal protective equipment, avoid direct contact. Avoid breathing dust. Ensure adequate ventilation. Remove contaminated clothing and wash all affected areas with plenty of water. Avoid dust generation. Maintain air gap between stacks or pallets. Dust deposits should not be allowed to accumulate on surfaces, as these may form a flammable or explosive mixture if they are released into the atmosphere in sufficient concentration.

6.2 Environmental precautions

Avoid release to the environment. Do not allow to enter drains, sewers or water courses.

6.3 Methods and material for containment and cleaning up

Provided it is safe to do so, isolate the source of the leak. Sweep spilled substances into containers if appropriate moisten first to prevent dusting. Use non-sparking equipment when picking up flammable spill. Collect mechanically and dispose of according to section 13. Use non-sparking tools. Ventilate the area and wash spill site after material pick-up is complete.

6.4 Reference to other sections

See section: 8, 13.

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SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling Flammable product. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Provide adequate ventilation when using the material and follow the principles of good occupational hygiene to control personal exposures. Do not eat, drink or smoke when using this product. Remove contaminated clothing and wash clothing before reuse. Maintain air gap between stacks or pallets when applicable.

7.2 Conditions for safe storage, including any incompatibilities Keep only in original packaging. Self-heating may occur if product is stored in non-airtight packaging. Do not expose product to air flow. Ensure adequate ventilation in storage room. Keep container closed if applicable. Keep away from moisture. Oxygen depletion and carbon monoxide emission can occur when material is stored in a confined space. Ensure oxygen and carbon monoxide monitors are worn and activated when entering storage room. Access routes for fire-fighting must be free.

Storage temperature Store in a cool/low-temperature, dry place away from heat and ignition sources.

Incompatible materials Keep away from oils, acids and strong oxidising agents.

7.3 Specific end use(s) See section: 1.2.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational exposure limits The UK HSE (EH40) recommends the following limits for dusts: 10 mg/m³ (8hr TWA) total inhalable dust, 4 mg/m³ (8hr TWA) total respirable dust.

Substance	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m ³)	STEL (ppm)	STEL (mg/m ³)	Note
Vinyl acetate	108-05-4	5	17.6	10	35.2	IOELV, WEL
2,6-Di-tert-butyl-p-cresol	128-37-0	-	10	-	-	WEL

Source: WEL (Workplace Exposure Limit - UK HSE EH40), OELV (Health and Safety Authority, Code of Practice, 2020 - Ireland), IOELV (Indicative Occupational Exposure Limit Value - EU).

8.1.2 Biological limit value Not established.

8.1.3 PNECs and DNELs Not established.

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8.2 Exposure controls

8.2.1 Appropriate engineering controls

Provide adequate ventilation, including appropriate local extraction if dusts, fumes or vapours are likely to be evolved. Avoid breathing dust. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Maintain air gap between stacks or pallets. Keep cool.

8.2.2 Individual protection measures, such as personal protective equipment

Keep good industrial hygiene. Wear appropriate personal protective equipment, avoid direct contact. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke at the work place. Avoid breathing dust.

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Eye/face protection



Wear eye protection with side protection (EN166). Eyewash bottles should be available.

Skin protection



Hand protection: recommend wearing of impervious gloves (EN374). Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer. Protective index 6, corresponding >480 minutes of permeation time according to EN 374.
Suitable material: nitrile rubber.

Body protection: wear dust-resistant protective clothing.

Respiratory protection



Not normally required. Wear suitable respiratory protective equipment if processing involves working in areas where significant concentrations of dusts or vapours are likely to be evolved. In case of inadequate ventilation wear respiratory protection.

Thermal hazards

Not applicable.

8.2.3 Environmental exposure controls

Avoid release to the environment.

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	Pellets.
Colour	Dark brown to black.
Odour	None/woody/smoky.
Melting point/freezing point	No data available.
Boiling point or initial boiling point and boiling range	No data available.
Flammability (solid, gas)	Explosion: dust from pellets may form combustible or explosive dust concentrations in air.
Upper/lower flammability or explosive limits	Maximum explosion pressure (Pmax) = 9.6 bar. Coefficient of pressure rise (Kst) = 179 bar.m.s-1. Maximum Rate of Pressure Rise (dP/dt)max = 658 – 660 bar.s-1. St Class = 1. Layer ignition temperature = 270°C. LIT value (270°C), minus 75°C safety factor = 195°C. MIT value (440 – 460°C), minus 1/3 safety factor = 293 – 307°C. Capacitive & inductive MIE = in the range of 20 – 25 mJ and 80 – 100 mJ.
Flash point	No data available.
Auto-ignition temperature	Self heating classification not applicable if transported in volume of no more than three cubic meters. Product is being transported and stored in volume of $\leq 3\text{m}^3$. Product may generate self heating combustion if transported in bulk (volume $> 3\text{m}^3$) or stored in non-airtight packagings and exposed to air flow.
Decomposition temperature	No data available.
pH	No data available.
Kinematic viscosity	No data available.
Solubility	No data available.
Partition coefficient: n-octanol/water (log value)	No data available.
Vapour pressure	No data available.

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Density and/or relative density	No data available.
Relative vapour density	No data available.
Particle characteristics	No data available.
9.2 Other information	
Evaporation rate	No data available.
Explosive properties	Dust from pellets may form combustible or explosive dust concentrations in air
Oxidising properties	Not oxidising.
Moisture content	$\leq 10\%$.
Particle size	Pellet diameter: 6 mm, pellet length: up to c. 30 mm.
Loss on drying	No data available.
Form	Round cylindrical pellets.
Colour	Brown to black.
Net CV dry	20 – 23 MJ/kg.
Bulk density	500 – 650 kg/m ³ .
Mechanical durability	90 – 99%.
Minimum Explosive Concentration (MEC)	40 – 50 g/m ³ .

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SECTION 10: STABILITY AND REACTIVITY

10.1	Reactivity	Stable under normal conditions.
10.2	Chemical stability	Stable under normal conditions.
10.3	Possibility of hazardous reactions	Self-heating possible when transported in bulk (volume $>3\text{m}^3$) or stored in non-airtight packagings and exposed to air flow. Hazardous polymerisation will not occur. May form combustible or explosive dust concentrations in air. May generate concentrations of CO in bulk.
10.4	Conditions to avoid	Keep away from ignition sources, excess airflow, heat and moisture. Avoid dust formation.
10.5	Incompatible materials	Keep away from acids and strong oxidising agents.
10.6	Hazardous decomposition products	Combustion products: carbon monoxide, carbon dioxide.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1	Information on hazard classes as defined in Regulation (EC) No 1272/2008	
	Acute toxicity - ingestion	Mixture: based upon the available data, the classification criteria are not met. Calculated acute toxicity estimate (ATE) $>2,000\text{ mg/kg}$.
	Acute toxicity - inhalation	Mixture: based upon the available data, the classification criteria are not met. Calculated acute toxicity estimate (ATE) $> 5\text{ mg/L}$ (dust).
	Acute toxicity - skin contact	Mixture: Based upon the available data, the classification criteria are not met. Calculated acute toxicity estimate (ATE) $>2,000\text{ mg/kg}$.
	Skin corrosion - irritation	Mixture: based upon the available data, the classification criteria are not met.
	Serious eye damage - irritation	Mixture: eye irrit. 2, H319: causes serious eye irritation.
	Carbon	Eye irrit. 2, H319: causes serious eye irritation. EU classification and labelling inventory.
	Respiratory or skin sensitisation	Mixture: based upon the available data, the classification criteria are not met.
	Germ cell mutagenicity	Mixture: based upon the available data, the classification criteria are not met.
	Carcinogenicity	Mixture: based upon the available data, the classification criteria are not met.
	Reproductive toxicity	Mixture: based upon the available data, the classification criteria are not met.

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STOT - single exposure	Mixture: STOT SE 3, H335: may cause respiratory irritation.
Carbon	STOT SE 3, H335: may cause respiratory irritation. EU classification and labelling inventory.
STOT - repeated exposure	Mixture: based upon the available data, the classification criteria are not met.
Aspiration hazard	Mixture: based upon the available data, the classification criteria are not met.
11.2 Information on other hazards	
11.2.1 Endocrine disrupting properties	Not applicable.
11.2.2 Other information	None known.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity	Mixture: based upon the available data, the classification criteria are not met. Estimated LC50 (Mixture): >100mg/l.
12.2 Persistence and degradability	No data for the mixture as a whole.
Carbon	No data.
12.3 Bioaccumulative potential	No data for the mixture as a whole.
Carbon	No data.
12.4 Mobility in soil	Stability expected, no data for the mixture as a whole.
Carbon	No data.
12.5 Results of PBT and vPvB assessment	None of the substances in this product fulfil the criteria for being regarded as a PBT or vPvB substance.
12.6 Endocrine disrupting properties	Not applicable.
12.7 Other adverse effects	None known.

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SECTION 13: DISPOSAL CONSIDERATIONS

13.1	Waste treatment methods	While generally a benign and stable material do not allow to enter drains, sewers or watercourses. Disposal should be in accordance with local, state or national legislation.
13.2	Additional information	Avoid release to the environment.

SECTION 14: TRANSPORT INFORMATION

	ADR/RID	IMDG	IATA/ICAO	
14.1	UN number or ID number	None assigned. For single packaging unit smaller than 3 m ³ UN1361, if transported in volume greater than 3 m ³	None assigned. For single packaging unit smaller than 3 m ³ UN1361, if transported in volume greater than 3 m ³	None assigned. For single packaging unit smaller than 3 m ³ UN1361, if transported in volume greater than 3 m ³
14.2	UN proper shipping name	None assigned. CARBON, animal or vegetable origin (only if transported in volume greater than 3 m ³).	None assigned. CARBON, animal or vegetable origin (only if transported in volume greater than 3 m ³).	None assigned. CARBON, animal or vegetable origin (only if transported in volume greater than 3 m ³).
14.3	Transport hazard class(es)	None assigned. 4.2 (only if transported in volume greater than 3 m ³).	None assigned. 4.2 (only if transported in volume greater than 3 m ³).	None assigned. 4.2 (only if transported in volume greater than 3 m ³).
14.4	Packing group	None assigned. III (only if transported in volume greater than 3 m ³).	None assigned. III (only if transported in volume greater than 3 m ³).	None assigned. III (only if transported in volume greater than 3 m ³).
14.5	Environmental hazards	Not classified.	Not classified as a marine pollutant.	Not classified.
14.6	Special precautions for user	See section 2: In cases where product bags are damaged during transport, the material must be re-packed in packaging with volume less than 3 m ³ because of the possible self-heating hazard arising from volume greater than 3 m ³ .		
14.7	Maritime transport in bulk according to IMO instruments	Not applicable.	Not applicable.	Not applicable.
14.8	Additional information	None known.	None known.	None known.

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SECTION 15: REGULATORY INFORMATION

15.1	Safety, health and environmental regulations/legislation specific for the substance or mixture	
15.1.1	EU regulations	
	Authorisations and/or restrictions on use	Not restricted.
15.1.2	National regulations	
	Germany	Water hazard class: NWG (self classification).
15.2	Chemical safety assessment	
	According to the REACH SIEF final report phase 1, the product is exempt from REACH registration.	

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: not applicable.

References:

Previous version Safety Data Sheet: Product_MSDS_PERPETUAL CARBON pellet-volume ≤ 3m³ PCX205-230 EN_V1.0

Previous version Safety Data Sheet – Biocoal Pellets MSDS v7 14122020

EU classification and labelling inventory for Carbon (CAS No. 7440-44-0)

Test Result: Biocoal – Thermal stability testing, Report issue date – 17th March 2020, Report number – S3016005479R1/2020

Test Result: Biocoal Pellets – Ignition Sensitivity, Explosion Severity & Thermal Stability Testing, Report issue date – 2nd April 2020, Report number – S3016007148BR1/2020

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REACH SIEF Final Report Phase 1

EU Classification: This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878.

Classification of the substance or mixture according to regulation (EC) No. 1272/2008 (CLP)	Classification procedure
Eye irrit. 2 – H319	Threshold calculation.
STOT SE 3 – H335	Threshold calculation.

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Legend

ADR	ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
CAS	Chemical Abstracts Service
DNEL	Derived No Effect Level
EC	European Community
EN	European Standard
EU	European Union
IATA	International Air Transport Association
ICAO/IATA	ICAO: International Civil Aviation Organization/IATA: International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Lethal concentration 50
LD50	Lethal dose 50
PBT	Persistent, Bioaccumulative and Toxic
PNEC	Predicted No Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
TWA	Time Weighted Average
UN	United Nations
vPvB	Very Persistent and very Bioaccumulative
WGK	Wassergefährdungsklasse (Germany)/water hazard class

Hazard classification/classification code	Hazard statement(s)
Eye irrit. 2: eye irritation, category 2	H319: causes serious eye irritation.
STOT SE 3: specific target organ toxicity - single exposure, category 3	H335: may cause respiratory irritation.

Training advice: consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

Disclaimers

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Annex to the extended Safety Data Sheet (eSDS)

Exposure scenarios are not applicable.