SAFETY DATA SHEET (SDS)

according to European Union Regulation (EC) No 1907/2006 (REACH), COMMISSION REGULATION (EU) 2015/830, CLP Regulation (EC) No. 1272/2008
and COMMISSION REGULATION (EU) No 453/2010

Composite Carbon Fiber for CFC printer, TS 20.59.59–001–46468932–2018
FEACN code 6815 99 000 9

Release Date: November 26, 2018

1. SECTION 1: IDENTIFICATION

1.1. Product Identifier

Product name:	Composite carbon fiber (CCF)
Chemical name (IUPAC):	N/A
Synonyms:	No
CAS number:	N/A
EU number:	N/A
Registration number (REACH):	Not included

1.2. Intended Use of the Product

Product Application:	The CCF is intended for use as a reinforcement in composite parts manufactured by method of layer-by-layer fusion of reinforced thermoplastic polymer, CFC printing (Composite Filament Co-extrusion)
Non-recommended usages:	It is not allowed to use the fiber at temperature exceeded maximum processing temperature 270°C. If the CCF was transported or stored at a temperature below 10°C, it must be kept for at least 8 hours at the manufacturing facility conditions at a temperature not lower than 18°C. At temperatures above 35°C there may be a deviation from the standard (deterioration) of the final product quality.

1.3. Name, Address, and Telephone of the Responsible Party

Company:	Anisoprint LLC Address: 143026, Russia, Moscow, Skolkovo Innovation Center, Bolshoy Boulevard street 42 bld. 1
Phone:	+7 (495) 142-57-31
Email:	info@anisoprint.com

1.4 Emergency Telephone Number

Information on actions in emergency situations:	112 (Russia, European Union), 112 and 911 (United States, Canada)
Other information:	www.anisoprint.com

2. SECTION 2: HAZARDSIDENTIFICATION

2.1. Classification of the Substance or Mixture

According to The CLP Regulation (CE) 1272/2008 and Globally Harmonised System of Classification and Labelling of Chemicals:	There is no hazard classification. During transportation, storage and use the hazardous effect of the CCF may be due to possible release of carbon dust and epoxy binder vapors containing a small portion of epichlorohydrin.

2.2. Label Elements

	Signal Word:	No
	Hazard Pictograms:	N/A
	Hazard Statements:	Not required
	Precautionary Statements:	Not required
2.3.	**Other Hazards**	
		Flammable, non-explosive. Dust and fumes irritate the eyes mucosa and upper respiratory tract, have a negative effect on the central nervous and respiratory systems, the morphological composition of peripheral blood, liver, kidneys, blood-forming organs

2.4 Unknown Acute Toxicity

No data available

3 SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Chemical name, formula	CAS No.	EU number	Mass fraction,%
Technical carbon, C	1333-86-4	215-609-9	65 ... 75
Epoxy resin, $[[C_{15}H_{16}O_2]_m[C_3H_5ClO]_n]_x$	25068-38-6	500-033-5	25 ... 35

4. SECTION 4: FIRST AID MEASURES

4.1. First aid measures

First-aid Measures General:	When working with the CCF, one should follow personal hygiene measures; avoid inhalation of aerosols and contact with eyes. At temperatures over 180°C, toxic products of thermal decomposition (including epichlorohydrin) can be released into air of a working area
First-aid Measures After Eye Contact:	In case of contact with aerosols: rinse with running water with a widely opened palpebral fissure
First-aid Measures After Skin Contact:	Rinse with running water and soap
First-aid Measures After Inhalation of Aerosols:	Bring the victim to fresh air, provide warmth and rest
If swallowed:	Drink a plenty of water, activated carbon, saline laxative

4.2. Most Important Symptoms and Effects Both Acute and Delayed

Symptoms/Injuries After Eye Contact:	In terms of the aerosol action, mechanical irritation is possible, accompanied by redness and lacrimation.
Symptoms/Injuries After Skin Contact:	Does not irritate skin
Symptoms/Injuries After Inhalation:	The CCF does not have a harmful effect under normal conditions; its direct inhalation is impossible. Harmful effects can only be caused by polyvinyl alcohol aerosols released during manufacturing and during packaging operations. When inhaled, inactivity, drowsiness, decreased motor activity and reactions to external stimuli and shallow breathing may be observed.

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	Symptoms/Injuries After Ingestion:	Ingestion the CCF is impossible. Cases of acute aerosol poisoning under production conditions are not described.
4.3.	**Indication of Any Immediate Medical Attention and Special Treatment Needed**	
		In cases of Inhalation of aerosols and their contact with eyes

5. SECTION 5: FIRE-FIGHTING MEASURES

5.1.	**Extinguishing Media**	
	Suitable Extinguishing Media:	Carbon dioxide (CO_2), chemical foam, sprayed water, water with wetting agents, chemical powders; in rooms - volumetric extinguishing, foam or carbon dioxide fire extinguishers, sand, fire blanket, asbestos blanket. In case of large fires - isolate a dangerous threat, extinguish the fire from the maximum distance with air-mechanical foam or carbon dioxide
	Unsuitable Extinguishing Media:	Unknown
5.2.	**Special Hazards Arising From the Substance or Mixture**	
	Hazardous Products Forming in Fire:	The main products of thermal decomposition of epoxy resin: carbon oxides, epichlorohydrin, hydrocarbon vapors causing heaviness, pressure in the head, dizziness, drowsiness, intoxication, coordination impairment, runny nose, cough, sore throat, pain in the eyes, nausea, vomiting, confusion consciousness; in severe cases - loss of consciousness and respiratory paralysis
5.3.	**Advice for Firefighters**	
		Packaging may be involved in the burning process. In case of fire in warehouses and in transport containers, extinguish the flame wearing a gas mask and protective clothing. The need for evacuation in the emergency area is determined on the basis of the local evacuation plan.

6. SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1.	**Personal Precautions, Protective Equipment and Emergency Procedures**	
		Material is non-hazardous as sold
6.2.	**Environmental Precautions**	
		Prevent entry to sewers and public waters. Inform the authorities of sanitary and epidemiological supervision if the CCF has caused harm to environment
6.3.	**Methods and Materials for Containment and Cleaning Up**	
		Collect the CCF and send it for cleaning or recycling
6.4.	**Reference to Other Sections**	
		See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

7 SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

		Transportation is carried out by all types of transport in accordance with the rules for the goods transportation applicable to the particular type. Avoid contact with water or heavy pressure during transportation.
7.2.	**Conditions for Safe Storage, Including Any Incompatibilities**	
	Storage Conditions:	The CCF is stored in a packed form in closed clean, dry warehouses; in places protected from moisture and direct sunlight, at a temperature from +5 to +35°C and relative humidity not more than 75%, at a distance of not less than 1 m from heating and hot devices. Alkalis, acids and other aggressive substances should not be stored in the room with the CCFs.
	Means and Materials of Packaging:	The CCF is wound on spools, which are then placed individually in boxes of cardboard or composite materials or in plastic bags. Boxes and packages are placed on a pallet in rows, covered with a single layer of non-chlorine-containing polymer film on top and wrapped in a spiral with plastic film or non-chlorine-containing synthetic tape
7.3.	**Special Instructions**	It is allowed to use other packaging means, durable, clean, without oil stains, excluding the possibility of contamination or deterioration of the CCF during transportation, ensuring proper preservation of the CCF during the stated shelf life.

8. SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1.	**Control Parameters**	The maximum permissible concentration in the air of the working area is taken according to carbon aerosols: - / 4 mg / m^3, hazard class 3 (moderately hazardous substance) and epichlorohydrin vapor: 1 mg / m^3, hazard class 2 (highly hazardous substance)
8.2.	**Exposure Controls**	
	Recommended Control Procedures:	The content of harmful substances in the air of the working area should be maintained below the established threshold values (MAC) and checked by the metrologically certified method at least 1 time per month.
	Appropriate Engineering Controls:	The CCF should be handled in the open air or in well-ventilated areas. The following ventilation devices are to be applied: cyclones, bag filters. Forced ventilation systems should be designed according to local conditions: the air flow should go away from the source of emission of harmful substances and people. The air containing aerosols is subjected to purification up to the established maximum permissible emission standards before being released into the atmosphere. Working premises should be cleaned at the end of each working shift. Food storage, eating, smoking are not allowed in the premises where the work with the CCF is carried out. Wash hands and rinse your mouth before eating.
	Personal Protective Equipment:	
	- Eye / Face Protection:	Safety glasses with side shields or goggles

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- Skin Protection (Hand Protection / Other):	Wear protective gloves (cotton gloves) to protect from thorns. Dermatological products, protective clothing to protect against general industrial pollution.

- Respiratory Protection:	Filtering half mask (respirator). At significant concentrations - filtering gas mask

- Thermal Effect Protection:	N/A
Other Protective Measures:	For rinsing eyes, there must be access to running water. Contaminated clothing should be systematically washed. Shoes, gloves and glasses are to be regularly washed with water. Communications and current collectors in the areas of possible formation of static electricity charges must be grounded, workplaces must be equipped with rubber mats.

9. SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Appearance:	Thread with circular cross-section
Color:	Black (Carbon)
Odor:	No
Odor Threshold:	N/A
pH:	N/A
Melting Point:	N/A
Decomposition Temperature	N/A
Freezing Point:	N/A
Boiling Point:	N/A
Flash point:	No data available
Auto-ignition Temperature:	No data available
Flammability:	N/A
Upper/Lower Explosion limit:	N/A
Relative Density:	N/A
Specific Gravity (water = 1):	1.4-1.6
Vapor Density (air = 1):	N/A

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Vapor Pressure:	N/A
Evaporation Rate:	N/A
Water Solubility:	Not soluble
Solubility in Other Substances:	Not soluble in fats
Partition Coefficient: N-Octanol/Water:	N/A
Viscosity:	N/A
Oxidizing properties:	N/A
Relative molecular weight:	N/A

9.2. Other Information

Degree of Curing:	96 ... 100%
Porosity:	0 ... 0.1%
Effective Diameter:	0.37±0.02 mm
Linear Density:	(160 ±20) tex
Critical Bending Diameter:	8 ... 20 mm
Tensile Strength:	Not less than 1500 MPa
Elasticity (Young's modulus) under tension:	120 GPa
Elongation at break:	Not less than 1.3%

10. SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

The CCF is insoluble in water and fats . It can reacts with strong acids, strong bases, strong oxidizers.

10.2. Chemical Stability

The CCF is stable under normal conditions of use, transportation and storage; does not oxidize, does not decompose. Release of thermooxidative degradation products under normal conditions does not occur.

10.3. Possibility of Hazardous Reactions

Hazardous reactions are unknown

10.4. Conditions to Avoid

Direct sunlight, extremely high temperatures, heat, hot surfaces, sparks, open flames, incompatible materials, and other ignition sources.

10.5. Incompatible Materials

Strong acids, strong bases, strong oxidizers.

10.6. Hazardous Decomposition Products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. SECTION 11: TOXICOLOGICAL INFORMATION

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11.1.	**Information on Toxicological Effects**	
	Skin Corrosion/Irritation:	Does not irritate skin. Does not have a skin resorptive effect.
	Serious Eye Damage/Irritation:	Hit an eye with the CCF is impossible. Aerosols may cause mechanical irritation of eye mucosa.
	Inhalation:	Inhalation of the filament is not possible. Aerosols and vapors irritate respiratory system.
	If swallowed:	Swallowing the CCF is impossible. Aerosols are safe in minor doses. Getting them into mouth can cause discomfort in digestive system and diarrhea; in case of systematic ingestion liver and kidney dysfunctions may occur.
	Chronic toxicity:	No information available.
	Acute toxicity:	No information available. *For epichlorohydrin:* DL_{50} = 150 mg / kg (oral, rat); DL_{50} = 515 mg / kg (dermal, rabbits); LC_{50} = 1.3 mg / l (inhaled, rabbits, 4 h); *For technical carbon:* DL_{50} > 8,000 mg / kg (rats, oral); when applied to skin: rabbits: does not cause irritation at exposure index of 0.6 / 8 (4.0 = severe edema); when applied to eyes: rabbits: does not cause irritation, the indicator on the Draize scale is 10 ... 17/110 (100 = maximum irritation); inhalation: 1.0 mg / m^3, (rats, 90 days). Organs under study: lungs. Consequences: inflammation, hyperplasia, fibrosis
	Respiratory Sensitization:	Probably allergenic (sensitizing) action during prolonged inhalation of vapors (taking epichlorohydrin)
	Skin Sensitization:	Not classified
	Mutagenic effect:	Epichlorohydrin contained in epoxy resin has a mutagenic effect.
	Carcinogenicity::	Carbon contained in the filament has a carcinogenic effect by inhalation
	Reproductive Toxicity:	Epichlorohydrin contained in the epoxy resin exerts embryo atropine, gonadotoxic and teratogenic effects.
	Specific Target Organ Toxicity:	Carbon contained in the CCF has a fibrogenic effect (causes lung disease after prolonged inhalation)
11.2.	**Other Information**	Weak cumulativeness

12. SECTION 12: ECOLOGICAL INFORMATION

12.1.	**Toxicity**	No information on the CCF. *For epichlorohydrin:* LC_{50} = 10.6 mg / l (Pimephales promelas 96 h);

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		LC_{50} = 35 mg / l (Lepomis macrochirus 96 h); LC_{50} = 18 mg / l (Menidia beryllina 96 h); EC_{50} = 23.9 mg / l (Daphnia magna 48 h); EU_{50} = 16 mg / l (Pseudokirchnerella subcapitata, 96 h); EC_{50} = 1.1 mg / l (Pseudokirchnerella subcapitata, 72 hours); *For technical carbon:* fish: LC_{50} (96 hours)> 1,000 mg / l, Brachydario rerio; invertebrates: EU_{50} (24 hours)> 5,600 mg / l, Daphnia magna (water flea); seaweed: EU_{50} (72 hours)> 10 000 mg / l, $NOEC_{50} \geq 10\,000$ mg / l; Behavior in water treatment plants: EC_0 (3 hours) ≥ 800 mg / l, Activated sludge
12.2.	**Persistence and Degradability**	Stable under abiotic conditions. Does not transform in the environment; secondary hazardous products does not form. Bioaccumulation is almost excluded.
12.3.	**Bioaccumulative Potential**	Does not oxidize biochemically (BD = BOD_5 / COD × 100% <10%)
12.4.	**Mobility in Soil**	No information available
12.5.	**Results of Bioaccumulation and Toxicity (RST) and the Presence of Rather Persistent Bioaccumulative Substances (vPvB)**	Is not RST (resistant, bioaccumulative and toxic substance) or vPvB (highly resistant and highly bioaccumulative) mixture
12.6.	**Other Adverse Effects**	Shows no harmful effect on bacteria

13. SECTION 13: DISPOSAL CONSIDERATIONS

13.1.	**Safety Measures for Waste Handling**	The safety measures for handling waste are similar to those used for handling the end products.
13.2.	**Waste Treatment Methods**	Waste is collected in a special container, non-returnable containers are formed into bales, and sent for disposal at specific places (landfills) authorized by local authorities. Elimination of sub-standard wastes and off-grade raw materials must be done in accordance with the requirements for environmental protection and legislation in effect.

14. SECTION 14: TRANSPORT INFORMATION

14.1.	**UN number**	N/A

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14.2.	**UN Proper Shipping Name**	N/A
14.3.	**Hazard Class**	Not classified as dangerous cargo.
14.4.	**Packing Group**	Not classified as dangerous cargo.
14.5.	**Risk Information for the Environment**	Not dangerous for the environment handling rules are adhered.
14.6	**Special Precautions for User**	When transport marking is applied, manipulation signs "Caution! Fragile", Protect from Sunlight and Protect from Moisture are to be used.
14.7.	**Bulk transportation in accordance with Annex II of MARPOL 73/78 Convention and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)**	Not applicable. The CCF is transported only in package.

15. SECTION 15: REGULATORY INFORMATION

GOST 19433-88	Dangerous cargo. Classification and labeling
GOST 31340-2013	Warning labeling of chemical products. General requirements
GOST 32419-2013	Hazards classification of chemical products. General requirements
GOST 32423-2013	Hazards classification of mixed chemical products by effects on the body
SanPiN (Sanitary Rules and Regulations)	
2.1.7.1322-03	Hygienic requirements for the placement and disposal of production and consumption waste
GN 2.2.5.2893-11	Maximum permissible Levels (MPL) of harmful substances skin pollution
GN 2.2.5.3532-18	Maximum permissible concentration (MPC) of harmful substances in the air working area
GN 2.1.5.1315-03	Maximum permissible Concentrations (MPC) of chemicals in the water of ponds of household and cultural and domestic water usage
GN 2.1.6.3492-17	Maximum permissible concentration (MPC) of pollutants in the atmospheric air of urban and rural settlements
P 2.2.2006-05	Guidance on the hygienic assessment of factors of the working environment and the labor process. Criteria and classification of working conditions

Information card of a hazardous chemical. A 2,2'-hydroxybisethanol polymer with (chloromethyl) oxirane .Certificate No. BT-00 2593 - M: RPOCS, 02.03.2004

"Standards of maximum permissible concentrations of harmful substances in the waters of fishery objects" (approved by Order of the Ministry of Agriculture of the Russian Federation dated December 13, 2016 No. 552)

"Unified sanitary-epidemiological and hygienic requirements for goods subject to sanitary and epidemiological supervision (control)" (approved by Decision of the Commission of the Customs Union dated May 28, 2010 No 299), chapter II, section 19 "A single list of goods subject to sanitary and epidemiological supervision (control) at the customs border and customs territory of the Customs Union", approved by Decision of the Commission of the Customs Union on May 28, 2010 No 299

PN ISO 11014-1: 2008 Standard: "Chemical Safety - Safety Data Sheet of Chemical Products".

Regulation 1907/2006 / WE on Registration, Evaluation and Authorization of Chemicals Use (REACH), establishing the European Chemicals Agency, amending Directive 1999/45 / EU and repealing Council Regulation (EEC) No 793/93 and

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Commission Regulation (EU) No. 1488/94, as well as Council Directive 76/769 / EEC and Commission Directives 91/155 / EEC, 93/67 / EEC, 93/105 / EU and 2000/21 / EU.
Regulation 1272/2008 / WE of the European Parliament and of the Council of 16 December 2008 on the classification, labeling and packaging of chemicals and mixtures, amending and repealing Directive 67/548 / EEC and 1999/45 / EC and amending the Regulation (EC) No 1907/2006.
Commission Regulation (EC) No 790/2009 of 10 August 2009, amending, in order to adapt to scientific and technological progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council regarding the classification, labeling and packaging of chemicals and their mixtures.
Commission Regulation (EC) No 453/2010 of May 20, 2010, amending the Regulation (EC) No 1907/2006 of the European Parliament and of the European Council regarding Registration, Evaluation and Authorization of Chemicals (REACH)

16. SECTION 16: OTHER INFORMATION

16.1. Accepted abbreviations

IUPAC	International Union of Pure and Applied Chemistry
CAS №	A unique numerical indicator of chemical compounds, polymers, biological sequences of nucleotides or amino acids, mixtures and alloys, entered in the Register Chemical Abstracts Service
EU №	Number determined by the European Commission for the classification and labeling of hazardous substances
BOD	Biochemical oxygen demand
COD	Chemical oxygen consumption
GOST	All Union State Standard adopted by the Interstate Council for Standardization, Metrology and Certification (ISC)
TR CU	Technical Regulations of the Customs Union
RPHCBS	Russian Register of Potentially Hazardous Chemical and Biological Substances (Database)

16.2. Denial of responsibility

The information presented in this safety data sheet is intended to characterize the CCF in terms of the required safety rules. It does not provide a guarantee of certain properties and is based on scientific information and on regulatory and technical documentation known to date. No obligations stipulated.

16.3. Regulatory documentation

State standards and regulatory documents referenced in this document are mandatory for use on the territory of the Russian Federation and the host countries of the Commonwealth of Independent States (CIS); in other countries they are advisory

Prepared by:

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" 26 " Nov 2018

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