SAFETY DATA SHEET
Effective date: 02 September 2020
Replaced edition from: 25 April 2018
Distribution date: 02 September 2020

TRADE NAME
ZOLTEK™ PX CARBON FIBER

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

1.1 Product identifier

<table>
<thead>
<tr>
<th>Product name</th>
<th>ZOLTEK™ PX Carbon Fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms</td>
<td>n/a</td>
</tr>
<tr>
<td>Chemical family</td>
<td>carbon fiber</td>
</tr>
<tr>
<td>Product description</td>
<td>continuous, split-tow (Kassen), chopped, milled carbon fiber or fabric</td>
</tr>
</tbody>
</table>

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

1.2.1 Relevant uses

industrial applications

1.2.2 Uses advised against

none known

1.3 Details of the supplier of the safety data sheet

Company

Zoltek Companies, Inc.
3101 Mckelvey Road
St. Louis, MO 63044
USA
(314) 291-5110
www.zoltek.com

E-mail enquiry

sds@zoltek.com

1.4 Emergency telephone number

+1 (314) 291-5110 8AM-5PM / M-F
SECTION 2: Hazards Identification

2.1 Classification of the substance or mixture

Product definition article

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

not classified

2.1.2 Classification according to Regulation 67/548/EEC or 1999/45/EC

Hazard symbols none
R-phrases none

The product does not require a hazard warning label, in accordance with OSHA HazCom and EC-directives

2.2 Label elements

Labeling according to Regulation 67/548/EEC or 1994/45/EC

Hazard symbols none
R-phrases none
S-phrases none
Special labeling not applicable

2.3 Other hazards

Physio-chemical hazards see SECTION 10
In the supplied form the product itself is not explosive at all; however, the build-up of fines and dust can lead to a risk of dust explosions.

Human health dangers see SECTION 11 and below

Eye Dust may cause temporary irritation.

Skin Dust may cause mild irritation. In some cases, the dust may cause allergic skin reactions.

Inhalation Dust may cause mild irritation.

Environmental hazards see SECTION 12

Other hazards This product and its dusts are electrically conductive
SECTION 3: Composition/information on ingredients

3.1 Product-type article

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS. #</th>
<th>EC #</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon fiber (carbon) / polyacrylonitrile (PAN)-based (Nitrogen)*</td>
<td>7440-44-0</td>
<td>231-153-3</td>
<td>91-100</td>
</tr>
<tr>
<td>(Oxygen)*</td>
<td>(7727-37-9)</td>
<td>(231-783-9)</td>
<td>(0-7%)</td>
</tr>
<tr>
<td>*as part of carbon fiber</td>
<td>(7782-44-7.)</td>
<td>(231-956-9)</td>
<td>(0-2%)</td>
</tr>
<tr>
<td>Sizing</td>
<td>proprietary</td>
<td>n/a</td>
<td>0-9</td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures

4.1 Description of first aid measures

General information not applicable

Inhalation Remove from the area of the dust to fresh air. Seek medical attention if you feel unwell.

Skin contact Remove by tapping skin with adhesive surface material, such as Scotch® clear cellophane tape. Wash affected areas thoroughly with soap and water.

Eye contact Flush eyes with water for 15 minutes.

Ingestion In the event of deliberate ingestion, do not induce vomiting unless directed to do so by consulting with a doctor.

4.2 Most important symptoms and effects, both acute and displayed no data available

4.3 Indication of any immediate medical attention and special treatment no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media normal firefighting media and procedures

Unsuitable extinguishing media dependent on processing plant conditions
5.2 Special hazards arising from the substance or media
airborne fibers are electrically conductive
CO₂, CO and a minute amount of N₂, HCN and H₂O vapors may be formed during combustion

5.3 Advice for firefighters
self-contained breathing apparatus (SCBA)

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel
not applicable

6.1.2 For emergency responders
not applicable

6.2 Environmental precautions
not applicable

6.3 Methods and material for containment and cleaning up

6.3.1 For containment
In case of spill, collect the spilled materials. If the material is not contaminated, put it into a clean container and it can be reused. Otherwise, dispose of it properly.

6.3.2 For cleaning up
Because the dust is electrically conductive and may become airborne, clean up with a vacuum. If an electrical appliance is used, take the steps necessary to avoid the risk of electrical shock.

6.4 Preventative measures against second disasters
Remove possible sources of ignition in the surrounding area

SECTION 7: Handling and storage

7.1 Precautions for safe handling
No special measures necessary if used properly.

7.2 Conditions for safe storage, including any incompatibilities
Airborne particles and filaments should be controlled so as to minimize skin irritation and electrical shorts in switch gears, etc. due to conductivity of fiber.

Do not store together with oxidizing agents

7.3 Specific end use(s)
see section 1.2
SECTION 8: Exposure controls/personal protection

8.1 Control parameters

**Occupational exposure limits**

OSHA and ACGIH (USA) have not established air contamination for carbon fibers. Under certain conditions this substance may be a nuisance dust. OSHA has an established standard for particulates not otherwise regulated (nuisance dust) set at 5 mg/m$^3$ (respirable fraction) and 15 mg/m$^3$ (total dust). ACGIH has established an exposure value of 3 mg/m$^3$ (respirable fraction) and 10 mg/m$^3$ (total).

Japan Society of Occupational Health sets 0.5mg/m3 limit for inhalation dust and 2.0mg/m3 as the total dust that are classified as “Class 1 dust” by the Japanese regulation (2011)

NHFPC (PRC) has an established standard for carbon fiber’s particulates not otherwise regulated set at 6mg/m$^3$ ESTL (total dust) and 3mg/m$^3$ TWA (total dust),

Belgium has established an Occupational Exposure Limit for carbon fiber as 2 fiber/cm$^3$ TWA.

8.2 Exposure controls

- **8.2.1 Appropriate engineering controls** local exhaust for airborne fiber removal.

- **8.2.2 Personal protection equipment**
  - **8.2.2.1 Eye and face protection** safety glasses
  - **8.2.2.2 Skin protection**
    - **Hand protection** protective gloves
    - **Other skin protection** Recommend garments (i.e. long pants and long sleeve shirts) to eliminate possible skin irritation
  - **8.2.2.3 Respiratory protection** Personal dust respirators applicable if high degree of fiber fly is experienced.
  - **8.2.2.4 Thermal hazards** not applicable

- **8.2.3 Environmental exposure controls** see SECTION 6 & 7
SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>black fiber</td>
</tr>
<tr>
<td>Odor</td>
<td>odorless</td>
</tr>
<tr>
<td>pH</td>
<td>not applicable</td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>~ 3,500°C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>not applicable</td>
</tr>
<tr>
<td>Flashpoint</td>
<td>not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>not applicable</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>not applicable</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td>not applicable</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>not applicable</td>
</tr>
<tr>
<td>Vapor density</td>
<td>not applicable</td>
</tr>
<tr>
<td>Specific gravity (relative density)</td>
<td>1.81 (H₂O @ 4°C = 1.00)</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td>negligible (dispersible)</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td></td>
</tr>
<tr>
<td>n-octanol/water</td>
<td>not applicable</td>
</tr>
<tr>
<td>Auto ignition temperature</td>
<td>not applicable</td>
</tr>
<tr>
<td>Decomposition temperature (in Air)</td>
<td></td>
</tr>
<tr>
<td>sizing preparation;</td>
<td>&gt;240°C</td>
</tr>
<tr>
<td>carbon fiber</td>
<td>&gt;650°C</td>
</tr>
<tr>
<td>Viscosity</td>
<td>not applicable</td>
</tr>
<tr>
<td>Explosive properties:</td>
<td>potential for weak explosion with milled fiber or dusts</td>
</tr>
<tr>
<td>Class St 1* / Kst (bar·m/s)</td>
<td></td>
</tr>
<tr>
<td>*OSHA CPL 03-00-008 – Combustible Dust National Emphasis Program</td>
<td></td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>not applicable</td>
</tr>
<tr>
<td>9.2 Other information</td>
<td>no other information available</td>
</tr>
</tbody>
</table>

SECTION 10: Stability and reactivity

10.1 Reactivity                              see SECTION 10.3
10.2 Chemical stability                      stable under normal ambient and anticipated storage and handling conditions of temperature and pressure
10.3 Possibility of hazardous reactions      can react with strong oxidizing agents
10.4 Conditions to avoid                     see SECTION 7
10.5 Incompatible materials                 see SECTION 10.3
10.6 Hazardous decomposition products

Products of combustion and decomposition will depend on other materials present in the fire and the fire conditions. Burning will produce CO₂, CO, and minute amounts of N₂, HCN and H₂O.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

- Acute toxicity: no data available
- Skin corrosion/irritation: no data available
- Serious eye damage/irritation: no data available
- Respiratory or skin sensitization: no data available
- Germ cell mutagenicity: no data available
- Carcinogenicity: no data available
- Reproductive toxicity: no data available
- STOT-single exposure: no data available
- STOT-repeated exposure: no data available
- Aspiration hazard: not an inhalation hazard filament diameter >3µm / non-respirable (IARC)

SECTION 12: Ecological information

12.1 Toxicity: not data available
12.2 Persistence and degradability: no data available
12.3 Bioaccumulative potential: no data available
12.4 Mobility in soil: no data available
12.5 Results of PBT and nPvB assessment: no data available
12.6 Other adverse effects: ecological data not available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste materials must be disposed of in accordance with the Directive on waste 2008/98/EC and any other applicable national or local regulations.
SECTION 14: Transport information

14.1 UN number

see SECTION 14.2

14.2 UN proper shipping name

not Dangerous Goods
ADR/RID (land)
ADN (inland navigation)
IMDG (marine)

14.3 Transport hazard class(es)

see SECTION 14.2

14.4 Packing group

see SECTION 14.2

14.5 Environmental hazards

see SECTION 14.2

14.6 Special precautions to user

see SECTION 6 to 8

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

not applicable

SECTION 15: Regulatory information

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

TSCA Status
Exempt - satisfies ‘article’ definition under 40 CFR 704.3

15.2 Chemical safety assessment

has not been carried out

SECTION 16: Other information

Revision date: 02 September 2020, CN: 1985
Previous revision: 25 April 2020, CN: 1685
Abbreviations and acronyms

ADN = Accord européen relative au transport international des marchandises dangereuses par voie de navigation intérieure
ADR = Accord européen relative au transport international des marchandises Dangereuses par Route

CAS = Chemical Abstracts Service
CLP = Classification, Labelling and Packaging
EEC = European Economic Community
EINECS = European Inventory of Existing Commercial Chemical Substances
ELINCS = European List of Notified Chemical Substances
IBC-Code = International Coder for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk
IMDG = International Maritime Code for Dangerous Goods
MARPOL = International Convention for the Prevention of Marine Pollution from Ships
OSHA = Occupational Safety and Health Administration
PBT = Persistent, Bioaccumulative and Toxic substance
RID = Règlement concernant le transport international ferroviare de marchandises dangereuses

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