

SAFETY DATA SHEET

Effective date: 02 August 2018
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TRADE NAME

ZOLTEK™ PX MILLED CARBON FIBER

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

1.1 Product identifier

| | |
|----------------------------|---|
| Product name | ZOLTEK™ PX Milled Carbon Fiber |
| Synonyms | milled fiber |
| Chemical family | carbon fiber |
| Product description | PX30 / PX32 / PX35 milled carbon fibers |

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 |
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| | |
|---------------------------------------|---------------------------------|
| 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/GHS]

not classified as hazardous

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

| <u>Component</u> | <u>CAS. #</u> | <u>EC #</u> | <u>%</u> |
|---|--------------------------|--------------------------|---------------|
| Carbon fiber (carbon) / polyacrylonitrile (PAN)-based (Nitrogen)* | 7440-44-0 (7727-37-9) | 231-153-3 (231-783-9) | >99 (0-7%) |
| (Oxygen)* <i>*as part of carbon fiber</i> | (7782-44-7.) | (231-956-9) | (0-2%) |

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/m³ (respirable fraction) and 15 mg/m³ (total dust). ACGIH has established an exposure value of 3 mg/m³ (respirable fraction) and 10 mg/m³ (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/m³ ESTL (total dust) and 3mg/m³ TWA (total dust),

Belgium has established an Occupational Exposure Limit for carbon fiber as 2 fiber/cm³ 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 disposable protective garments 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

| | |
|--|--------------------------------------|
| Appearance | black fiber |
| Odor | odorless |
| pH | not applicable |
| Melting point / freezing point | ~ 3,500°C |
| Initial boiling point and boiling range | not applicable |
| Flashpoint | not applicable |
| Evaporation rate | not applicable |
| Flammability (solid, gas) | not applicable |
| Upper/lower flammability or explosive limits | not applicable |
| Vapor pressure | not applicable |
| Vapor density | not applicable |
| Specific gravity (relative density) | 1.81 (H ₂ O @ 4°C = 1.00) |
| Solubility(ies) water | negligible (dispersible) |
| Partition coefficient n-octanol/water | not applicable |
| Auto ignition temperature | not applicable |

Decomposition temperature (in Air)

>650°C

Viscosity

not applicable

Explosive properties:

potential for weak explosion with milled fiber or dusts

Class St 1* / <50 K_{st} (bar·m/s)

*OSHA CPL 03-00-008 – Combustible Dust National Emphasis Program

Oxidizing properties

not applicable

9.2 Other information

no other information available

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

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|-----------------------------------|--|
| 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 >3 μ m / 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 |
| IECSC Status | Listed - all components listed on China IECSC |

| | |
|--|--------------------------|
| 15.2 Chemical safety assessment | has not been carried out |
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SECTION 16: Other information

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|-----------------------------------|--|
| Revision date: | 02 August 2018, CN: 1726 |
| Previous revision: | 25 April 2018 |
| Abbreviations and acronyms | <p>ADN = Accord européen relative au transport international des marchandises dangereuses par voie de navigation intérieure</p> <p>ADR = Accord européen relative au transport international des marchandises Dangereuses par Route</p> <p>CAS = Chemical Abstracts Service</p> <p>CLP = Classification, Labelling and Packaging</p> <p>EEC = European Economic Community</p> <p>EINECS = European Inventory of Existing Commercial Chemical Substances</p> <p>ELINCS = European List of Notified Chemical Substances</p> <p>IBC-Code = International Coder for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk</p> |

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 ferroviaire de marchandises dangereuses

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