

GRAFIL 34-700

Grafil 34-700 carbon fiber is a continuous, high strength, PAN based fiber. It is available in 12K and 24K filament count tows. They can be supplied in either round tow or flat tow formats. The flat tow (designated by 'WD') is the ideal fiber to use in applications where spreading is required, e.g., tape production. The round tow is used in applications where spreading is not necessarily required, e.g., braiding and weaving.

Typical Fiber Properties

| | | | | |
|------------------------|-----------------|---------------|---|--------|
| Tow Tensile | Strength | 700 4830 | ksi MPa | SRM 16 |
| | Modulus | 34 234 | msi GPa | |
| Typical Density | | 0.065 1.80 | lb.in ³ g/cm ³ | SRM 15 |
| Typical Yield | 12K | 620 800 | yds/lb mg/m | SRM 13 |
| | 24K | 310 1600 | yds/lb mg/m | SRM 13 |

Typical Mechanical Properties

| | | | | | |
|-------------------------------|-----------------|-----------------|--------------|-------------------------------------|-------------------------------------|
| Tensile Properties | 0° | Strength | 373 2572 | ksi MPa | ASTM D3039 / 0°8ply |
| | | Modulus | 19.9 137 | msi GPa | ASTM D3039 / 0°8ply |
| | 90° | Strength | 11.17 81 | ksi MPa | ASTM D3039 / 0°16ply |
| | | Modulus | 1.34 9.2 | msi GPa | ASTM D3039 / 0°16ply |
| Compressive Properties | 0° | Strength | 198 1365 | ksi MPa | ASTM D3410 / 0°16ply |
| | | Modulus | 18.5 127 | msi GPa | ASTM D3410 / 0°16ply |
| | 90° | Strength | 28.5 196 | ksi MPa | ASTM D3410 / 0°20ply |
| | | Modulus | 1.49 10.2 | msi GPa | ASTM D3410 / 0°20ply |
| Flexural Properties | 0° | Strength | 253 1745 | ksi MPa | ASTM D790 / 0°16ply, L/D=32, Vf=61% |
| | | Modulus | 19.1 132 | msi GPa | ASTM D790 / 0°16ply, L/D=32, Vf=61% |
| | 90° | Strength | 14.9 102 | ksi MPa | ASTM D790 / 0°16ply, L/D=16, Vf=61% |
| | | Modulus | 1.28 8.8 | msi GPa | ASTM D790 / 0°16ply, L/D=16, Vf=61% |
| ILSS | Strength | 14.1 97 | ksi GPa | ASTM D2344 / 0°16ply, L/D=4, Vf=59% | |

- 250F Epoxy Prepregs
- Resin: Mitsubishi Rayon #340 resin system
- Tensile and compressive properties are normalized to 60% fiber volume

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03/2010
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Important: The technical information contained herein is not to be construed as warranties and no patent liability can be assumed. This information can be used for material selection purposes only.

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

1.1. Product identifier

Product form : Article
Product name : Grafil Carbon Fiber Size Code "A"

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

1.2.1. Relevant identified uses

Use of the substance/mixture : Structural material

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

MITSUBISHI CHEMICAL CARBON FIBER AND COMPOSITES GmbH
UK Branch
6 Orchard Court
Binley Business Park
Binley
Coventry
CV3 2TQ
UK

1.4. Emergency telephone number

Emergency number : (+1) 916 386-1733 (9:00 am - 5:00 pm, M - F, PST)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Skin Sens. 1 H317

Full text of hazard classes and H-statements : see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



GHS07

Signal word (CLP) : Warning
Hazardous ingredients : Reaction product: bisphenol-A-(epichlorhydrin), epoxy resin (number average molecular weight ≤ 700)
Hazard statements (CLP) : H317 - May cause an allergic skin reaction
Precautionary statements (CLP) : P272 - Contaminated work clothing should not be allowed out of the workplace
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P302+P352 - IF ON SKIN: Wash with plenty of soap and water
P333+P313 - If skin irritation or rash occurs: Get medical advice/attention
P362+P364 - Take off contaminated clothing and wash it before reuse
P501 - Dispose of contents/container to a hazardous or special waste collection point

2.3. Other hazards

Other hazards not contributing to the classification : This product meets the definition of an "article" as defined in Regulation (EC) No. 1907/2006 (REACH), and is therefore out of scope of CLP.

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according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

| Name | Product identifier | % | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
|---|---|---------|--|
| Carbon fibres | (CAS-No.) 7440-44-0 (EC No.) 231-153-3 | 99 | Not classified |
| Reaction product: bisphenol-A-(epichlorhydrin), epoxy resin (number average molecular weight ≤ 700) | (CAS-No.) 25068-38-6 (EC No.) 500-033-5 (EC index No.) 603-074-00-8 | 0.5-1.4 | Eye Irrit. 2, H319 Skin Irrit. 2, H315 Skin Sens. 1, H317 Aquatic Chronic 2, H411 |

Full text of H-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

- First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
- First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If symptoms develop, obtain medical attention.
- First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. If fibers are imbedded in the skin, remove with tweezers. If skin irritation or rash occurs: Get medical advice/attention.
- First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If symptoms develop, obtain medical attention.
- First-aid measures after ingestion : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth. Give 100 - 200 ml of water to drink. If symptoms develop, obtain medical attention.

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

- Symptoms/effects after skin contact : May cause an allergic skin reaction. Repeated and/or prolonged skin contact may cause irritation.
- Symptoms/effects after eye contact : Dust in eyes may cause mechanical irritation.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Foam, powder, carbon dioxide (CO₂), water spray.
- Unsuitable extinguishing media : Do not use water jet.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : None known.
- Hazardous decomposition products in case of fire : Carbon monoxide. Carbon dioxide. Ammonia. Hydrogen cyanide. acrylonitrile.

5.3. Advice for firefighters

- Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

- Protective equipment : Use personal protective equipment as required.
- Emergency procedures : Ventilate area. Avoid breathing dust. Avoid contact with skin and eyes. Evacuate unnecessary personnel.

6.1.2. For emergency responders

- Protective equipment : Wear suitable protective clothing and eye or face protection.
- Emergency procedures : Ventilate area. Avoid breathing dust. Avoid contact with skin and eyes.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if large amounts of the product enters sewers or public waters.

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6.3. Methods and material for containment and cleaning up

Methods for cleaning up : On land, sweep or shovel into suitable containers. Store away from other materials.

6.4. Reference to other sections

Section 8: Exposure controls/personal protection. SECTION 13: Disposal considerations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Provide appropriate exhaust ventilation at places where dust is formed. Avoid breathing dust. Avoid contact with skin, eyes and clothing.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Contaminated work clothing should not be allowed out of the workplace.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep only in the original container in a cool well ventilated place. Keep container closed when not in use.

7.3. Specific end use(s)

Structural material.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

| Grafil Carbon Fiber Size Code "A" | | |
|-----------------------------------|------------------------------|--|
| United Kingdom | WEL TWA (mg/m ³) | 10 mg/m ³ inhalable dust 4 mg/m ³ respirable dust |
| Carbon fibres (7440-44-0) | | |
| United Kingdom | Local name | Graphite |
| United Kingdom | WEL TWA (mg/m ³) | 10 mg/m ³ inhalable dust 4 mg/m ³ respirable |

8.2. Exposure controls

Appropriate engineering controls:

Provide adequate ventilation, including appropriate local extraction, to ensure that occupational exposure limits are not exceeded. Provide appropriate exhaust ventilation at places where dust is formed.

Personal protective equipment:

Avoid all unnecessary exposure.

Hand protection:

Protective gloves. Latex. Standard EN 374 - Protective gloves against chemicals. Gloves should be removed and replaced if there are any signs of degradation or breakthrough

Eye protection:

In case of dust production: protective goggles. Standard EN 166 - Personal eye-protection

Skin and body protection:

Long sleeved protective clothing

Respiratory protection:

Not required for normal conditions of use. In case of insufficient ventilation and possible dust formation, wear suitable respiratory equipment

Thermal hazard protection:

Not required for normal conditions of use.

Environmental exposure controls:

Avoid release to the environment.

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid
Appearance : Fibers.

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| | |
|--|-----------------------|
| Colour | : Black. |
| Odour | : Odourless. |
| Odour threshold | : No data available |
| pH | : No data available |
| Relative evaporation rate (butylacetate=1) | : No data available |
| Melting point | : Not applicable |
| Freezing point | : No data available |
| Boiling point | : No data available |
| Flash point | : No data available |
| Auto-ignition temperature | : No data available |
| Decomposition temperature | : No data available |
| Flammability (solid, gas) | : Non flammable |
| Vapour pressure | : Not applicable |
| Relative vapour density at 20 °C | : No data available |
| Relative density | : 1.75 - 1.85 |
| Solubility | : Insoluble in water. |
| Log Pow | : No data available |
| Viscosity, kinematic | : No data available |
| Viscosity, dynamic | : No data available |
| Explosive properties | : Not applicable. |
| Oxidising properties | : Not oxidising. |
| Explosive limits | : No data available |

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reactions known under normal conditions of use.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

None known.

10.5. Incompatible materials

Strong oxidising agents.

10.6. Hazardous decomposition products

Thermal decomposition of sizing may begin to occur at high temperatures (> 120 °C) resulting in the release of small amounts of nitrogen oxides, carbon monoxide, organic compounds, and other potentially hazardous substances.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

| | |
|------------------------|--|
| Acute toxicity | : Not classified |
| Additional information | : Based on available data, the classification criteria are not met |

| Reaction product: bisphenol-A-(epichlorhydrin), epoxy resin (number average molecular weight ≤ 700) (25068-38-6) | |
|---|--------------------------------------|
| LD50 oral rat | 11400 mg/kg |
| LD50 dermal rabbit | > 22800 mg/kg |
| Carbon fibres (7440-44-0) | |
| LC50, Inhalation, rat | > 64.4 mg/kg (Calgon Carbon Corp.) |
| LD50, oral, rat | ≥ 10,000 mg/kg (Calgon Carbon Corp.) |
| LD50, intravenous, mouse | 440 mg/kg |
| TDLo, Reproductive toxicity, subcutaneous, rat, female, pregnant | 167,000 mg/kg (8 days, continuous) |

| | |
|---------------------------|--|
| Skin corrosion/irritation | : Not classified |
| Additional information | : Based on available data, the classification criteria are not met |

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| | |
|---|--|
| Serious eye damage/irritation | : Not classified |
| Additional information | : Based on available data, the classification criteria are not met |
| Respiratory or skin sensitisation | : May cause an allergic skin reaction. |
| Germ cell mutagenicity | : Not classified (Mutagenicity : Ames test : negative) Based on available data, the classification criteria are not met |
| Carcinogenicity | : Not classified |
| Additional information | : Based on available data, the classification criteria are not met |
| Reproductive toxicity | : Not classified |
| Additional information | : Based on available data, the classification criteria are not met |
| STOT-single exposure | : Not classified |
| Additional information | : Based on available data, the classification criteria are not met |
| STOT-repeated exposure | : Not classified |
| Additional information | : Based on available data, the classification criteria are not met |
| Aspiration hazard | : Not classified |
| Additional information | : Based on available data, the classification criteria are not met |
| Potential adverse human health effects and symptoms | : May cause an allergic skin reaction. Repeated or prolonged contact may cause skin irritation. Dust in eyes may cause mechanical irritation. |

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Not classified.

12.2. Persistence and degradability

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| | |
|-------------------------------|--------------------|
| Persistence and degradability | No data available. |
|-------------------------------|--------------------|

12.3. Bioaccumulative potential

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| | |
|---------------------------|--------------------|
| Bioaccumulative potential | No data available. |
|---------------------------|--------------------|

12.4. Mobility in soil

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| | |
|----------------|---------------------------|
| Ecology - soil | No information available. |
|----------------|---------------------------|

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

Additional information : Avoid release to the environment

SECTION 13: Disposal considerations

13.1. Waste treatment methods

| | |
|--------------------------------|--|
| Waste disposal recommendations | : Dispose in a safe manner in accordance with local/national regulations. |
| Additional information | : Do not incinerate carbon fibers since airborne fibers may cause electrical malfunctions. |
| Ecology - waste materials | : Avoid release to the environment. |

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA

14.1. UN number

| | |
|---------------|-----------------|
| UN-No. (ADR) | : Not regulated |
| UN-No. (IMDG) | : Not regulated |
| UN-No. (IATA) | : Not regulated |

14.2. UN proper shipping name

| | |
|-----------------------------|-----------------|
| Proper Shipping Name | : Not regulated |
| Proper Shipping Name (IMDG) | : Not regulated |
| Proper Shipping Name (IATA) | : Not regulated |

14.3. Transport hazard class(es)

ADR

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Transport hazard class(es) (ADR) : Not regulated

IMDG

Transport hazard class(es) (IMDG) : Not regulated

IATA

Transport hazard class(es) (IATA) : Not regulated

14.4. Packing group

Packing group : Not regulated

Packing group (IMDG) : Not regulated

Packing group (IATA) : Not regulated

14.5. Environmental hazards

Dangerous for the environment : No

Marine pollutant : No

Other information : No supplementary information available

14.6. Special precautions for user

- Overland transport

Not regulated

- Transport by sea

Not regulated

- Air transport

Not regulated

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

Contains no substance on the REACH candidate list > 0,1 %

Other information, restriction and prohibition regulations : Contains nonylphenol ethoxylate, an SVHC, at concentration below 0.1% wt. Maximum concentration of BPA present is 0.15 ppm.

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:

| 1 | Identification of the substance/mixture and of the company/undertaking | Modified | |
|---|--|----------|--|
| | | | |

Abbreviations and acronyms:

| | |
|--|---|
| | ADR (Accord européen relatif au transport international des marchandises Dangereuses par Route) |
| | ATE (Acute Toxicity Estimate) |
| | CAS (Chemical Abstracts Service) number |
| | CLP (Classification, Labeling and Packaging) |
| | DNEL (Derived No effect Limit) |
| | EC (European Community) |
| | EC50 (Effective Concentration 50%) |
| | EN (European Norm) |

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| | |
|--|---|
| | vPvB (very Persistent and very Bioaccumulative) |
| | UNxxxx (Number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods) |
| | TWA (Time Weighted Average) |
| | STEL (Short Term Exposure Limit) |
| | RID (Règlement concernant le transport international ferroviaire de marchandises) |
| | REACH (Registration, Evaluation and Authorisation of Chemicals) |
| | PNEC (Predicted No Effect Concentration) |
| | PMcc (Pensky-Martens Closed Cup test) |
| | IARC (International Agency for Research on Cancer) |
| | IATA (International Air Transport Association) |
| | IBC (Intermediate Bulk Container) |
| | IMDG (International Maritime Dangerous Goods Code) |
| | IMO (International Maritime Organisation) |
| | LC50 (Lethal Concentration 50%) |
| | LD50 (Lethal Dose 50%) |
| | MAC (Maximal Allowed Concentration) |
| | OW (Oil-in-Water (chemistry)) |
| | OECD (Organisation for Economic Co-operation and Development) |
| | PBT (Persistent, Bioaccumulative and Toxic) |
| | BCF (Bioconcentration factor) |

Data sources : REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

Other information : None.

Full text of H- and EUH-statements:

| | |
|-------------------|---|
| Aquatic Chronic 2 | Hazardous to the aquatic environment — Chronic Hazard, Category 2 |
| Eye Irrit. 2 | Serious eye damage/eye irritation, Category 2 |
| Skin Irrit. 2 | Skin corrosion/irritation, Category 2 |
| Skin Sens. 1 | Skin sensitisation, Category 1 |
| H315 | Causes skin irritation |
| H317 | May cause an allergic skin reaction |
| H319 | Causes serious eye irritation |
| H411 | Toxic to aquatic life with long lasting effects |

SDS EU (REACH Annex II)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product