

HIGH-PERFORMANCE CARBON FIBER
TORAYCA

T300/FT300 COMMERCIAL DOCUMENTATION

1) Product

The fibre is produced by the treatment of an acrylic fibre precursor, with pyrolysis, surface treatment and sizing processes.

Each bobbin of TORAYCA carbon fibre is protected against dust and packed in container to prevent damage during transportation.

2) Requirements

The fibre shall comply with the requirements given in the table (see overleaf) for a period of 24 months after production if stored under normal conditions. The fibre shall be used after a minimum of 48 hours, conditioned between 20°C and 35°C in 40% to 80% relative humidity. The fibre shall be uniform in appearance and substantially free from yarn breakage and foreign bodies.

3) Quality control

Fibre properties: all fibre properties are established on a single production lot basis

1) Definition of lot (TY-020B)

A "lot" of fibre is carbonized from one creel load of precursor and carbonized on the same equipment under one set of processing conditions.

2) Sampling plan

The sampling plan for inspection is based on ISO-3951 "Sampling Procedures and Tables for Inspection by Variables for percent Defective".

3) Testing methods

Testing methods are based on the following TORAYCA standards:

Tensile properties	TY-030B-01 (current version)
Density	TY-030B-02 (current version)
Yield	TY-030B-03 (current version)
Sizing amount	TY-030B-05 (current version)
Twist	TY-030B-06 (current version)

4) Presentation of properties

Lot properties are obtained by taking the average values of each bobbin in the sampling plan. Tensile properties of each bobbin are the mean values of measurements taken on five specimens.

4) Certification

Each lot of fibre is certified by the manufacturer as fulfilling the requirements of this specification. A conformity certificate is sent to the customer with each delivery.

5) Fibre Properties

Property	Unit	Number of filaments	Nominal Value*
Tensile Strength	MPa (kgf/mm ²)		3530 (360)
Tensile Modulus	GPa (10 ³ kgf/mm ²)		230 (23.5)
Elongation	%		1.5
Density	g/cm ³	1000	1.76
		3000	
		6000	
		12000	
Yield	g/1000 m	1000	66
		3000	198
		6000	396
		12000	800
Sizing Type & Amount		40A, 40B	1.0 %
		40D	0.7 %
		50A, 50B	1.0 %
Twist		Twisted, Untwisted	

*The stated values are typical values. For design purposes, please contact us.

6) Functional Properties

Property	Unit	Number of filaments	Nominal Value
Specific Heat	Cal/g.°C		0.19
Electric Resistivity	x 10 ⁻³ Ω.cm		1.7
CTE	α10 ⁻⁶ /°C		-0.41
Thermal Conductivity	Cal/cm.s.°C		0.025
Cross Sectional Area	mm ²	1000	0.04
		3000	0.11
		6000	0.23
		12000	0.45
Filament Diameter	µm		7

7) Composite Properties *

Property	Unit	Number of filaments	Nominal Value
Tensile Strength	MPa (kgf/mm ²)		1760 (180)
Tensile Modulus	GPa (10 ³ kgf/mm ²)		132 (13.5)
Tensile Strain	%		1.3
Compressive Strength	MPa (kgf/mm ²)		1570 (160)
Flexural Modulus	GPa (10 ³ kgf/mm ²)		125 (13.0)
ILSS	MPa (kgf/mm ²)		110 (11)

* Toray 3631- 180°C resin system. Measured temperature: RT. Normalized to 60% fiber volume.

TORAY CARBON FIBERS EUROPE

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 Toray Carbon Fibers Europe	MATERIAL SAFETY DATA SHEET	No.	SE 105 EV
	TORAYCA® CARBON FIBRE	Date	Oct. 2015

1. Chemical Product and Company Identification

1.1 Product identification

Name of product: **TORAYCA carbon fibre**

Description of product: Carbon fibres in the form of bobbins or fabric.
 Substance/mixture/article: Article

1.2 Product use:

Manufacturing of composite materials.

1.3 Company identification:

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 Route de LAGOR
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 France
 Tel: +33 559 605 725
 Email: fds@toray-cfe.com

1.4 Emergency Phone Numbers:

TORAY CARBON FIBERS EUROPE (24 hours service): +33 559 607 100
 Emergency phone number:
 ORFILA: +33 145 425 959

2. Hazard identification

2.1 Classification

Classification according to Regulation (EC) No 1272/2008:
 Classification not possible

Classification according to Directive 1999/45/EC:

R – Phrases

Not applicable

Classification has been prepared in accordance with DPD (Directive 1999/45/EC) and Regulation (EC) No 1272/2008.

2.2 Label elements

Labeling according to CLP Regulation (EC) No 1272/2008:

Hazard pictogram

Not applicable

2.3 Main hazards / harmful effects

Hazards that do not directly lead to a classification:

- Carbon fibre is an electricity conducting material, it may break up into fine particles.
- Finely dispersed carbon fibre may irritate skin, eyes and mucous membranes.
- Carbon fibre dust may cause electrical short-circuits when contacted to electrical devices.

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3. Composition/Information on components

3.1 Hazardous components or hazardous complex substances

This product is not considered to be hazardous in the sense of the Directive 1999/45/EC and Regulation (EC) No 1272/2008 (CLP).

3.2 Other substances that are not considered to be dangerous to health and environment

Name	CAS No.	Content %
Fibre or carbon fibre fabric (PAN-based)	7440-44-0	> 98
Partially cured epoxy resin	Registered	< 2

4. First aid

In case of contact with eyes:

- In case of dust, thoroughly rinse eyes with clean water for at least 15 minutes. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.
- Remove contact lenses if any before continuing to rinse.
- Do not let the victim rub his eyes.

In case of inhalation:

- Move the victim to fresh air.

In case of contact with skin:

- Thoroughly wash the affected area with water until irritation stops.

In case of ingestion:

- Give water to the victim if conscious, but do not make him vomit. In case of vomiting, do not let the victim swallow the vomit. Do not give anything to ingest to unconscious or convulsing victim.

5. Measures in case of fire

Suitable extinguishing methods:

- Use foam, dry powder, carbon dioxide or water-mist.

Dangerous combustible products and related risks:

- Emission of toxic gases: nitrogen oxide, carbon monoxide.

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Protection of rescue teams:

- Wear high-pressure self-respiratory protection apparatus.

Physical and Chemical data on flammability and explosiveness:

- Flash point: NA
- Ignition point: NA
- Explosiveness lower limits: NA
- Explosiveness upper limits: NA

Specific risks relating to fire fighting measures:

- When the product is burnt, fine carbon fibre particles may be produced. They may cause electrical short-circuits when contacted to electrical devices.

6. Measures to take in case of accidental dispersion

Individual precautions: NA

Environmental precautions:

- Avoid worsening the dispersion

Precautions when handling dispersed substances:

- Because fine particles may be dispersed, it is advised to wear a dust mask with P3 type filter.

7. Handling and storage

Handling:

- Technical measures:

Material to be handled with care – Do not cut the carbon fibre unnecessarily. Electricity conducting material, do not allow contact with electric current sources.

- Handling precautions:

Avoid the dispersion of loose fibres – Handle the fibre in well ventilated premises (the ventilation devices should have a filter to avoid discharging loose fibres into open air) where there are no electrical appliances or said appliances are protected in sealed or pressurised cases -

Insulating varnish may be applied to electronic boards and electrical terminals.

- Advise for use and incompatibility with other materials:

Avoid friction which may create loose and flying debris

Storage:

- Storage conditions do not have an influence on the product properties, but it is advised to store the product in a clean and dry place, away from dust, in its original packaging.

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8. Exposure control / Individual protection

Exposure limits: NA

Individual protection:

If dust is created and ventilation is inadequate, it is advised to wear a dust mask, eye protection, gloves and clean and dry work attire.

- Respiratory protection: Use protection mask with P3 type filter in case of dispersion of dust.
- Hand protection: always wear protective gloves conform to EN 374-1/2/3 and EN 420 when handling the product.
- Eye protection: wear protective goggles or dustproof goggles.

9. Physical and chemical properties

Physical properties:

- Form: Filament
- Odour: Odourless
- Colour: Black
- Volumic mass: 1.6 to 2.0 g/cm³

Specific temperature at which physical state changes:

- Boiling point: NA
- Melting point: NA

Flash point: NA
 Self-combusting point: NA
 Explosiveness: NA
 Steam pressure: NA
 Steam density: NA
 Density: NA

Solubility: (solubility and solvents)

- Water: insoluble
- Others: sizing agent soluble in chlorinated solvents, acetone, DMF

Others:

- Electricity conducting material

10. Stability and reactivity

10.1 Stability:

Stable but possible dangerous reactions.

10.2 Conditions to avoid:

Excess heat. Vigorous hardening may release toxic gases and create dangerous decomposition products.

10.3 Materials to avoid:

Oxidizing agents, strong acids and bases

10.4 Dangerous decomposition products:

Emission of nitrogen oxides and carbon monoxide.

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11. Toxicological information

Exposure risks:

- Ingestion:
Possible irritation of throat.
- Inhalation:
Possible irritation of respiratory apparatus.
- Skin contact:
May cause irritations.
- Contact with eyes:
May cause irritations.

12. Ecological information

Environmental exposure from substances of this preparation is limited due to the physical form of the product.

Carbon fibre is an electricity conducting material. It may cause short-circuits on contact with electrical devices, especially when loose fibres are dispersed in the area.

Do not incinerate the product.

13. Considerations concerning disposal

Product disposal according to the regulation on waste in force:

- EWC (European Waste Catalogue): recommendation: 16 03 06
- 16 kind of wastes not described on the list
- 16 03 Manufacturing defective products and unused products
- 16 03 06 other organic wastes than those listed on 16 03 05*

Disposal of polluted packages according to the regulation on waste in force:

- EWC (European Waste Catalogue): recommendation: 15 01 05
- 15 packages and packaging wastes, absorbents, wipers, filtering materials and protection attire unspecified elsewhere
- 15 01 packages and packaging wastes (including town wastes collected separately)
- 15 01 05 Composite packages

According to the origin and the waste form, other EWC numbers should apply.

14. Information regarding transportation

Codes and classifications of international regulations: NA

Specific transport conditions: NA

15. Regulations information

Information on EU labelling

- Symbols : NA
- Chemical Risk phrases (R-phrases) : NA
- EINECS No. :

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All the components of this product are specified on the lists EINECS or ELINCS, except those mentioned on 67/548/EEC directive.

16. Other information

Type of revision:

Section 2, 3 and 16: Introduction of CLP Regulation
Based on directive/regulation

Sections modified: 2, 3 and 16

Last update: May 2012

Based on directive/regulation:

D.67/548/EEC, updated: D.92/32/EEC
D.1999/45/EC
2001/118/EC
D.2004/73/EC
(EC) No. 1907/2006 (REACH)
(EC) No 1272/2008 (CLP)

We believe that the information contained in this safety data sheet is correct to the best of our knowledge. However, the information contained in this sheet is not exhaustive. Final determination of suitability of any material is the sole responsibility of user. All materials may present unknown hazards and should be used with care. Although certain hazards are described herein, we cannot guarantee that they are the only existing hazards. The information contained in this data sheet represents the best information currently available to us. However, no warranty is made with respect to its completeness and we assume no liability resulting from its use. Users are advised to make their own tests to determine the safety and suitability of each such product or combination for their own purposes.