

# Tinuvin<sup>®</sup> CarboProtect<sup>®</sup>

<b>Product Description</b>	Tinuvin CarboProtect is a solid, very red-shifted benzotriazole-based UV absorber designed for solvent-based clear or semi-transparent coatings over carbon fiber-reinforced plastics (CFRP) or glass fiber-reinforced plastics (GFRP) where carbon fibers are embedded in an epoxy matrix.
<b>Key Features &amp; Benefits</b>	<ul style="list-style-type: none"><li>- Very red-shifted spectral coverage</li><li>- Excellent long term performance (photopermanence)</li><li>- Excellent thermal stability</li></ul>
<b>Chemical Composition</b>	2-(2-hydroxyphenyl)-benzotriazole derivative

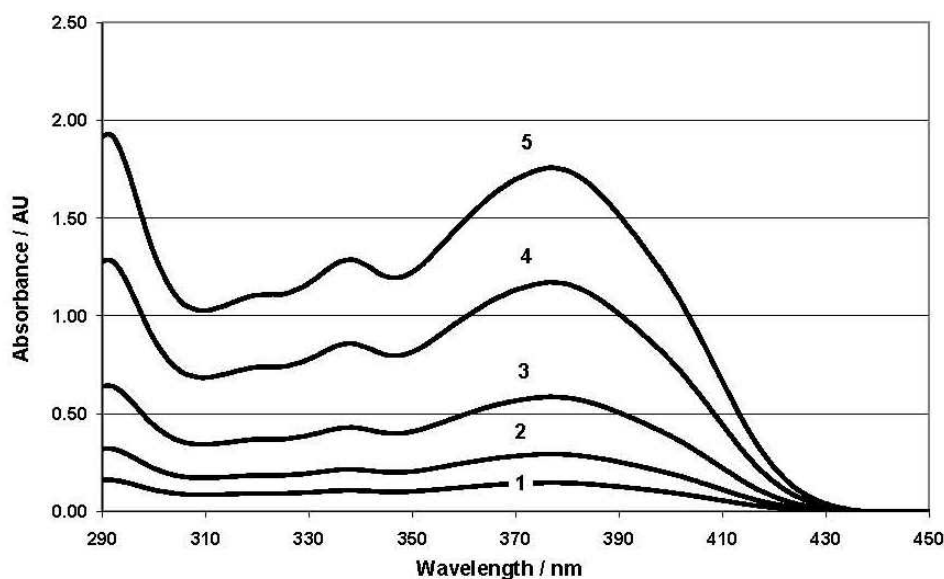
## Properties

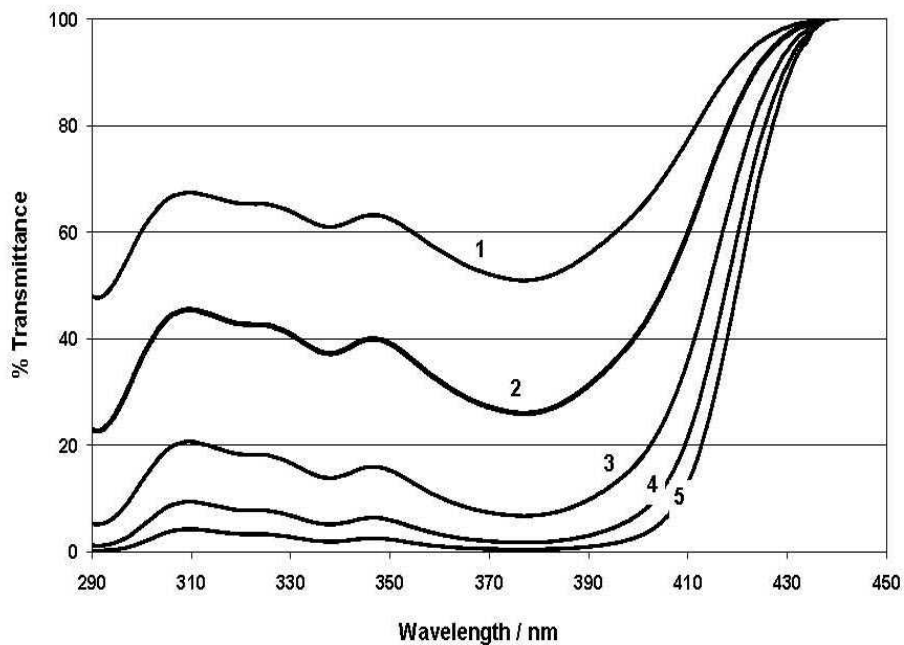
<b>Typical Properties</b>	Appearance	yellow powder
	Melting point (92/69/EEC A. 1 DSC)	°C (°F) 132 – 136 (270 – 277)
	<u>Solubility</u>	
	Butyl acetate (CAS 123-86-4)	≥ 25%
	Solvesso 100 <sup>1</sup>	≥ 50%

<sup>1</sup> registered trademark of Exxon Mobil Corporation

These typical values should not be interpreted as specifications.

## Spectral Absorbance





- Line one: 10 mg/l (0.001%  $\approx$  0.25% active in 40  $\mu$ m)
- Line two: 20 mg/l (0.002%  $\approx$  0.50% active in 40  $\mu$ m)
- Line three: 40 mg/l (0.004%  $\approx$  1.00% active in 40  $\mu$ m)
- Line four: 60 mg/l (0.006%  $\approx$  1.50% active in 40  $\mu$ m)
- Line five: 80 mg/l (0.008%  $\approx$  2.00% active in 40  $\mu$ m)

The theoretical concentration in an applied 40  $\mu$ m clear coat was calculated as a function of the concentration in toluene with the help of the Lambert-Beer law. Spectra were recorded in toluene, light path length = 1 cm.

## Applications

Tinuvin CarboProtect was developed to stabilize carbon-fiber-reinforced plastics, making it possible to visibly display the embedded carbon fibers. Carbon-fiber-reinforced plastics are used as building elements, for example, in aerospace or automotive applications. Tinuvin CarboProtect blocks the destructive radiation from UV and near-UV visible light and keeps the matrix intact. This allows customers, besides benefiting from the excellent mechanical properties, to also utilize the high aesthetical value of carbon-fiber-reinforced plastics for design purposes.

Tinuvin CarboProtect is recommended in applications such as:

- Coatings over carbon fiber-reinforced plastics (CFRP) or glass fiber-reinforced plastics (GFRP) embedded in an epoxy matrix
- General coatings or substrates needing protection up to 420 nm
- General coatings over substrates very sensitive to UV-A energy

For outdoor applications, Tinuvin CarboProtect needs to be combined with a hindered amine light stabilizer (HALS) such as Tinuvin 123 or Tinuvin 249 (for acid catalyzed systems) or Tinuvin 292 (for 2K PUR).

## Binder Systems

Tinuvin CarboProtect is recommended in binder systems such as:

- 1K and 2K PUR (acrylic/NCO, PES/NCO, ...)
- Thermosetting (acrylic/melamine, PES/melamine, ...)
- Thermoplastic (acrylic, vinylic, ...)

**Recommended Concentrations** The concentration of Tinuvin CarboProtect depends on dry-film thickness and desired degree of protection. The amount required for optimum performance should be determined in laboratory trials covering a concentration range.

Dry-film thickness	by weight on binder solids
10 – 20 µm	10.00 – 5.00%
20 – 40 µm	5.00 – 2.50%
40 – 60 µm	2.50 – 1.25%

For optimum spectral coverage, Tinuvin CarboProtect can be combined with a triazine-based UV absorber such as Tinuvin 400 (in liquid paints) and Tinuvin 405 (in powder coatings).

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## **Safety**

### **General**

The usual safety precautions when handling chemicals must be observed. These include the measure described in Federal, State and Local health and safety regulations, thorough ventilation of the workplace, good skin care, and wearing of protective goggles.

### **Safety Data Sheet**

All safety information is provided in the Safety Data Sheet for Tinuvin CarboProtect.

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## **Storage**

Please refer to the “Handling and Storage of Polymer Dispersions” brochure.

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## Important

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