Industrial Coatings

Technical Data Sheet

Tinuvin® CarboProtect®

We create chemistry

Product Description

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 fibers are embedded in an epoxy matrix.

Key Features & Benefits

- Very red-shifted spectral coverage
- Excellent long term performance (photopermanence)
- Excellent thermal stability

Chemical Composition

2-(2-hydroxyphenyl)-benzotriazole derivative

Properties

Typical Properties

Appearance	yellow powder
Melting point	
(92/69/EEC A. 1 DSC)	132 – 136°C (270 – 277°F)

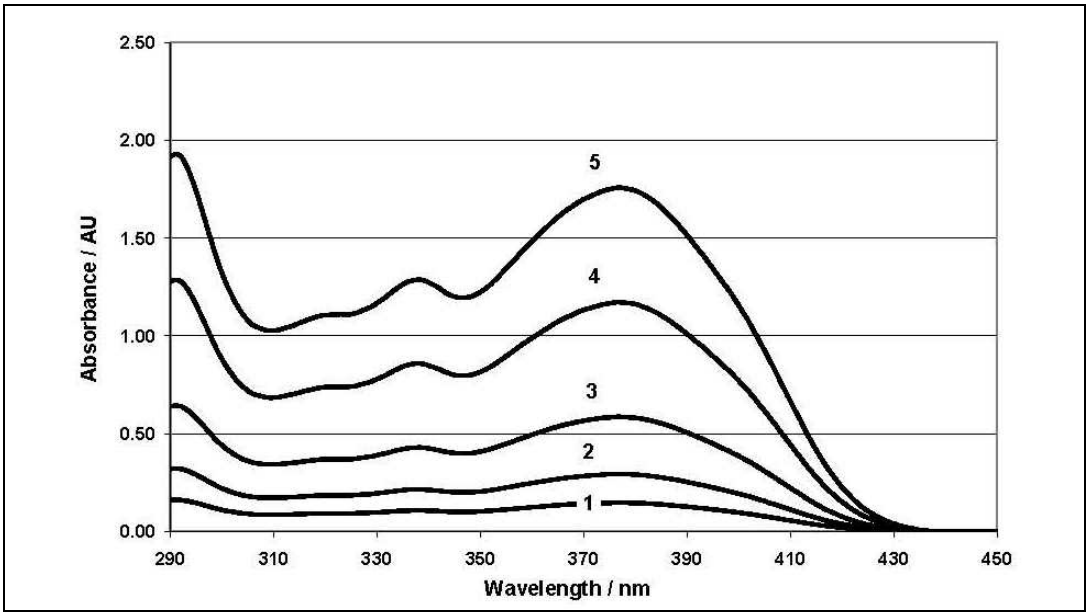
Solubility

Butyl acetate (CAS 123-86-4)	≥ 25%
Solvesso 100[1]	≥ 50%

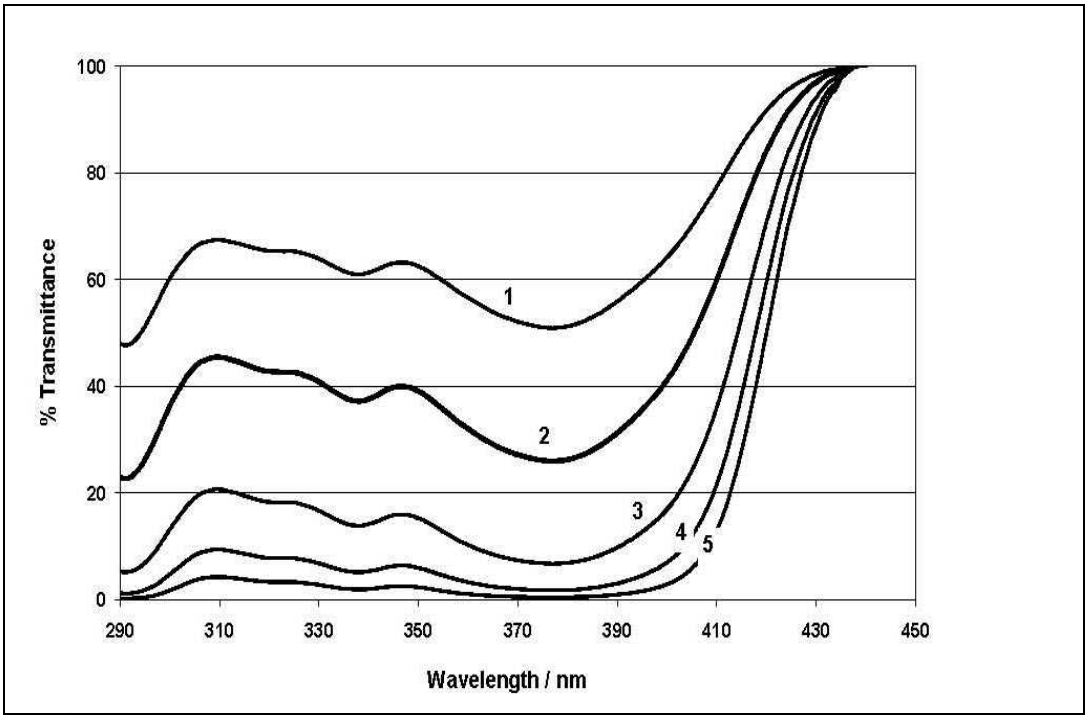
[1] *registered trademark of Exxon Mobil Corporation*

These typical values should not be interpreted as specifications.

Spectral Absorbance



Spectral Transmittance



Line one: 10 mg/l (0.001% ≈ 0.25% active in 40 µm)
Line two: 20 mg/l (0.002% ≈ 0.50% active in 40 µm)
Line three: 40 mg/l (0.004% ≈ 1.00% active in 40 µm)
Line four: 60 mg/l (0.006% ≈ 1.50% active in 40 µm)
Line five: 80 mg/l (0.008% ≈ 2.00% active in 40 µm)

The theoretical concentration in an applied 40 µm 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 (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 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).

Safety

General

The usual safety precautions when handling chemicals must be observed. These include the measures 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 Tinuvin® CarboProtect®.

Important

While the descriptions, designs, data and information contained herein are presented in good faith and believed to be accurate, they are provided for guidance only. Because many factors may affect processing or application/use, BASF recommends that the reader make tests to determine the suitability of a product for a particular purpose prior to use. **NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESCRIPTIONS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS.** In no case shall the descriptions, information, data or designs provided be considered a part of BASF's terms and conditions of sale. Further, the descriptions, designs, data, and information furnished by BASF hereunder are given gratis and BASF assumes no obligation or liability for the descriptions, designs, data or information given or results obtained all such being given and accepted at the reader's risk.

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U.S & Canada
BASF Corporation
24710 W Eleven Mile Road
Southfield, MI 48033
ph: 1(800) 231-7868
fax:1(800) 392-7429
Email: Custserv_charlotte@basf.com
Email: edtech_info@basf.com
www.basf.us/dpsolutions

Mexico
BASF Mexicana, S.A. de C.V.
Av. Insurgentes Sur # 975
Col. Ciudad de los Deportes
C.P. 03710
Mexico, D.F.
Phone: (52-55) 5325-2756
Fax: (52-55) 5723-3011