



DuPont™ Light Stabilizer 210
FOR USE IN PLASTICS



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DuPont™ Light Stabilizer 210 is an ultrafine titanium dioxide product. It has been designed to provide exceptional protection from the effects of ultraviolet (UV) light. DuPont™ Light Stabilizer 210 contains surface-modified composite oxide particles tailored to absorb and scatter ultraviolet light as efficiently as possible. These particles are non-migratory and possess extraordinary stability in use.

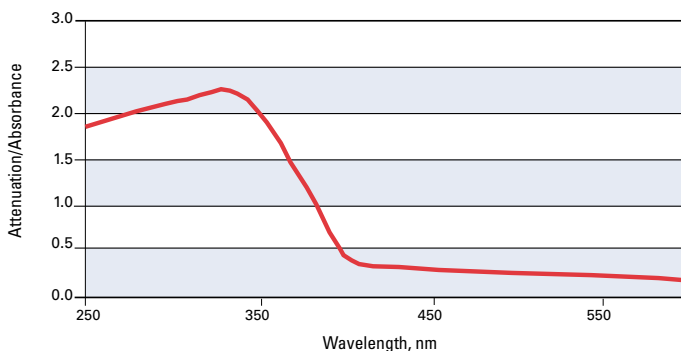
Key Features

- High UV attenuation
- Excellent discoloration resistance
- No migration from polymer

High UV Attenuation

DuPont™ Light Stabilizer 210 has broad-spectrum UV screening capability, able to attenuate UV across both UVA and UVB regions (Figure 1). Attenuation is defined as the total UV screening effect, due to both UV absorbance and scattering. An attenuation of 1.0 is equivalent to 10% transmission in a polyethylene film, while an attenuation of 1.3 is equivalent to 5% transmission.

Figure 1: Typical UV-Visible Attenuation versus Wavelength – DuPont™ Light Stabilizer 210 Has Broad-Spectrum UVA and UVB Attenuation.

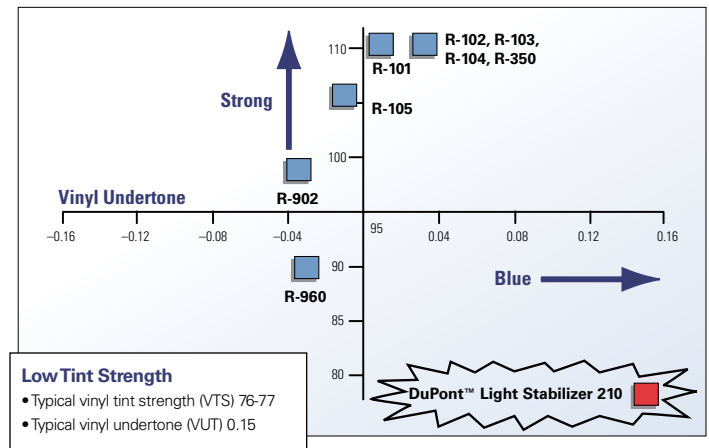


2 mil LDPE films with 1.0 wt% loading

Appearance

- DuPont™ Light Stabilizer 210 is an ultrafine TiO₂ product with a small particle size that provides low tint strength and very blue undertone (Figure 2).
- Particle size distribution is optimized for high UV attenuation.
- In order to provide this high level of UV screening, the appearance of systems containing DuPont™ Light Stabilizer 210 is necessarily translucent.

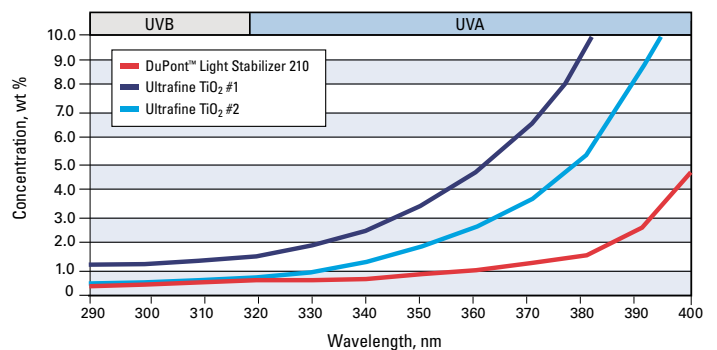
Figure 2: Optical Properties of Titanium Dioxide



- Low Tint Strength**
- Typical vinyl tint strength (VTS) 76-77
 - Typical vinyl undertone (VUT) 0.15

Use Less – Maximize Performance

Figure 3: Concentration to Maintain <5% Transmission



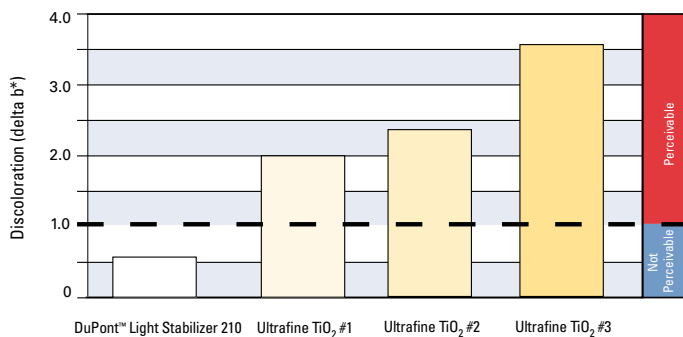
2 mil LDPE film

At 340 nm, 2-4x more competitive ultrafine TiO₂ is required to achieve the same level of UV screening as DLS 210.

Discoloration Resistance

DuPont™ Light Stabilizer 210, in addition to being non-migratory, has a unique surface treatment that blocks the interaction of the particle surface with additives, especially during UV exposure as shown in Figures 4 and 5. DuPont™ Light Stabilizer 210 has excellent discoloration resistance which allows it to be used with a wide variety of polymer additives, with minimal yellowing.

Figure 4: Discoloration of Polypropylene upon UV Exposure



Delta b* for polypropylene plaques prepared at 2.0 wt.% ultrafine TiO₂ loading and exposed to UVA radiation for a total of 4 weeks.

Figure 5: Discoloration of LDPE with Additives After UV Exposure

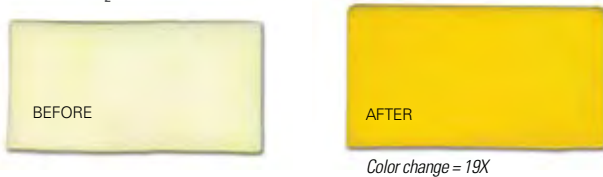
DuPont™ Light Stabilizer 210



Ultrafine TiO₂ #1



Ultrafine TiO₂ #2



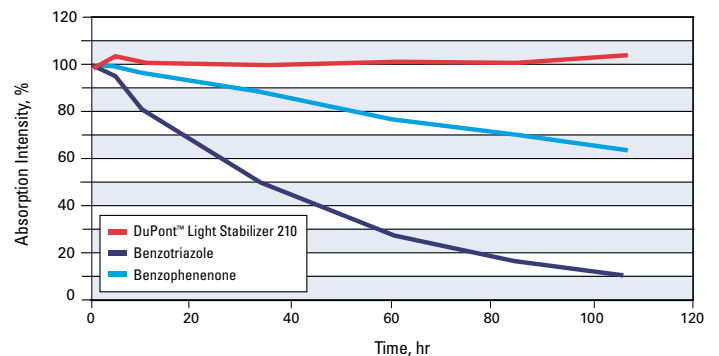
2.6 wt% TiO₂ UV Light Exposure in LDPE with 0.3 wt% BHT, 0.3 wt% HALS, 216 hours

Migration

The migration of organic UV absorbers out of a polymer matrix lessens their ability to protect. DuPont™ Light Stabilizer 210 is not prone to migration.

The Accelerated Migration Study (Figure 6) documents the accelerated aging of polypropylene films containing typical organic UV absorbers versus DuPont™ Light Stabilizer 210. Under these conditions, the DuPont™ Light Stabilizer 210 is completely stable while the organic compounds show significant migration.

Figure 6: Accelerated Migration of Light Stabilizers

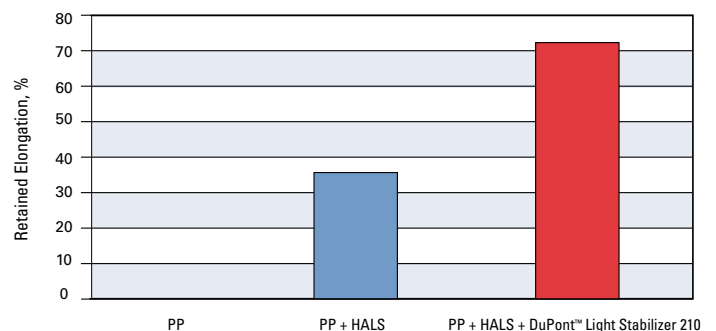


Presence of each component followed by attenuation/absorbance at optimum wavelength.

Retention of Mechanical Properties

The use of DuPont™ Light Stabilizer 210 in conjunction with hindered amine light stabilizers (HALS) enhances the retention of mechanical properties in thick sections. In Figure 7, the performance advantage is demonstrated in molded parts.

Figure 7: Retained Elongation After UV Exposure – Polypropylene Injection Molded Parts



ASTM G154, Cycle 4, Four Weeks Exposure
1/16" parts molded from polypropylene homopolymer 2 wt% DuPont™ Light Stabilizer 210, 0.5 wt% HALS

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DuPont™ Light Stabilizer 210 meets the performance requirements for multiple markets

	UV attenuation	Appearance	Non-migratory	Discoloration Resistance	Mechanical Retention
Transportation	●		●	●	
Building and Construction	●	●	●	●	●
Fibers	●	●	●		●
Non-food Packaging	●	●	●	●	
Agricultural Films	●		●		

For use and handling information please refer to the DuPont™ Light Stabilizer 210 Properties, Uses, Storage and Handling brochure, available at www.titanium.dupont.com

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