



# Ti-Pure™ R-105 Titanium Dioxide

## Product Information

### Product Description

Ti-Pure™ R-105 is a rutile titanium dioxide pigment manufactured by the chloride process that produces a bright TiO<sub>2</sub>. Rutile titanium dioxide is the most widely used white pigment. Ti-Pure™ R-105 is specially designed for outdoor plastic applications, combining neutral undertone with moderate opacity strength for easy color formulation work. Silica encapsulation technology minimizes the interaction of the TiO<sub>2</sub> surface with other materials within the plastic matrix. Ti-Pure™ R-105 also is treated with an organic-based material to provide excellent bulk flow and processing while minimizing the hygroscopic nature of inorganically coated TiO<sub>2</sub>. Ti-Pure™ R-105 is a fine, dry powder with the following general properties.

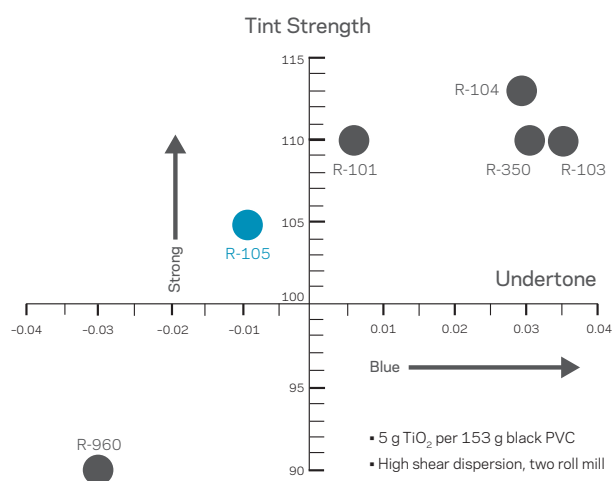
**Table 1.** Physical Properties

Titanium Dioxide, wt%, min.	92
Alumina, wt%, max.	3.2
Silica, wt%, max.	3.5
Carbon, wt%	0.2
Specific Gravity	4.0

### Suggestions for Use

Ti-Pure™ R-105 is recommended for outdoor plastics, especially PVC window profile applications. Ti-Pure™ R-105 utilizes silica encapsulation technology to minimize interaction of the TiO<sub>2</sub> surface with the surrounding environment. This minimizes “chalking,” crazing, and other surface deterioration frequently seen in outdoor applications. Ti-Pure™ R-105 surface treatment also is optimized for dry flow conveyability and dispersion within plastics.

**Figure 1.** Optical Properties



Ti-Pure™ R-105 optical performance is exceptionally useful for exterior PVC products. Ti-Pure™ R-105 has an excellent combination of brightness, neutral undertone and moderate tinting strength (Figure 1).

### Durability

Ti-Pure™ R-105 technology has optimized SiO<sub>2</sub> encapsulation for durability. By providing a uniform, complete coating of the TiO<sub>2</sub> surface, the SiO<sub>2</sub> layer acts as a barrier to prevent the surface of the TiO<sub>2</sub> from reacting with the polymer or additives. This is especially important in outdoor applications where the UV energy absorbed by the TiO<sub>2</sub> particle may induce photocatalytic reactions. Ti-Pure™ R-105 provides excellent gloss retention in outdoor PVC applications (Table 3).

**Table 2.** General Properties

Opacity Strength	Medium
Undertone Tint	Neutral
Weathering Resistance	Excellent
Dispersibility in:	
Plasticized Vinyl	Very Good
Dry Blending Operations	Excellent
Melt Compounding Operations	Very Good

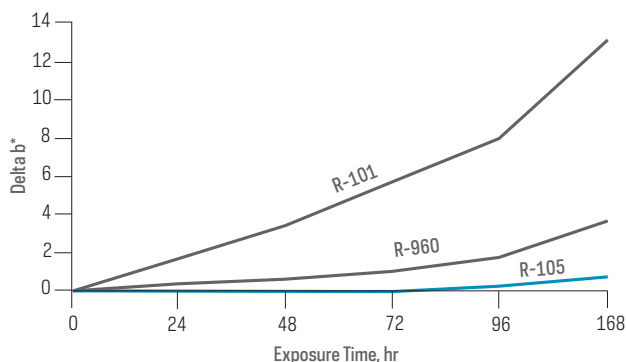
**Table 3.** Gloss Retention—Lead Stabilized PVC Profile

	% Initial Gloss	
	18 months (Florida, USA)	18 months (Bandol, France)
R-103 ("chalking" grade)	14	15
R-105	100	64

**Discoloration Resistance**

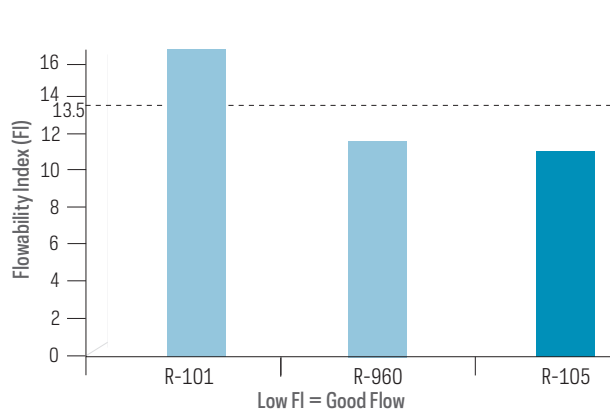
The combination of surface treatments used in Ti-Pure™ R-105 provides excellent resistance to photo-induced discoloration. Ti-Pure™ R-105 minimized lead graying in PVC systems and phenolic yellowing in polyethylene systems (Figure 2).

**Figure 2.** Discoloration Resistance



\*Delta b as a function of UV exposure time. The test was conducted on LDPE with 2.6 wt% TiO<sub>2</sub>. The system was stabilized with 0.3% piperidyl HALS and 0.3% BHT. Exposure was made using an F1518/BLB blacklight illuminating the samples at 25 cm.

**Figure 3.** Bulk Flow Performance



Note: TiO<sub>2</sub> grades with flowability values of 13.5 or less generally perform well in properly designed bulk delivery and silo storage systems.

**Conveyability**

Ti-Pure™ R-105 surface treatment allows for use in bulk delivery and conveying systems. The combination of inorganic and organic surface treatment optimizes R-105's flowability (Figure 3).

**Shipping Containers**

Ti-Pure™ R-105 rutile titanium dioxide is available in two recyclable package types to meet your needs:

- 25 kg polyethylene bags (Paper bag available in Asia Pacific only)
- 1 metric ton (1,000 kg) flexible intermediate bulk containers

Ti-Pure™ R-105 can also be delivered by bulk truck to European customers using silo systems. Please contact your local Ti-Pure™ account manager for details.

For further information about this grade or to request a sample, please see the Ti-Pure™ web site.

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