# 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 $TiO_2$. 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 $TiO_2$ 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 $TiO_2$. Ti-Pure™ R-105 is a fine, dry powder with the following general properties.

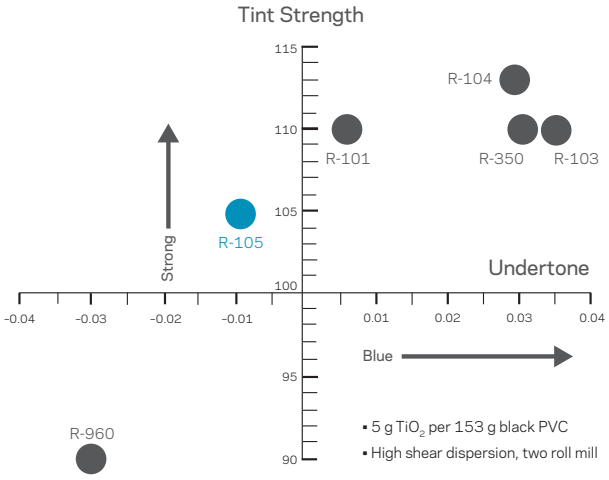
**Table 1.** Physical Properties

| | |
|---|---|
| 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 $TiO_2$ 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 $SiO_2$ encapsulation for durability. By providing a uniform, complete coating of the $TiO_2$ surface, the $SiO_2$ layer acts as a barrier to prevent the surface of the $TiO_2$ from reacting with the polymer or additives. This is especially important in outdoor applications where the UV energy absorbed by the $TiO_2$ particle may induce photocatalytic reactions. Ti-Pure™ R-105 provides excellent gloss retention in outdoor PVC applications (**Table 3**).

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**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 |

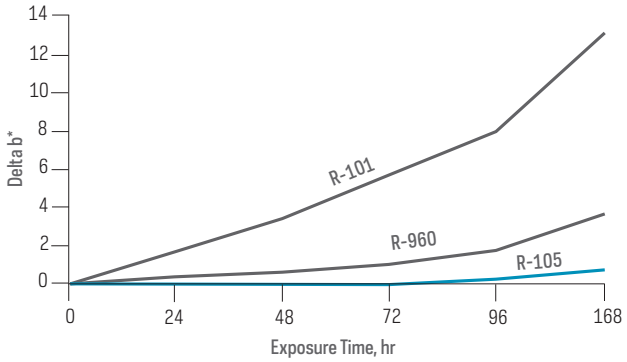
**Table 3.** Gloss Retention—Lead Stabilized PVC Profile

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

## Discoloration Resistance

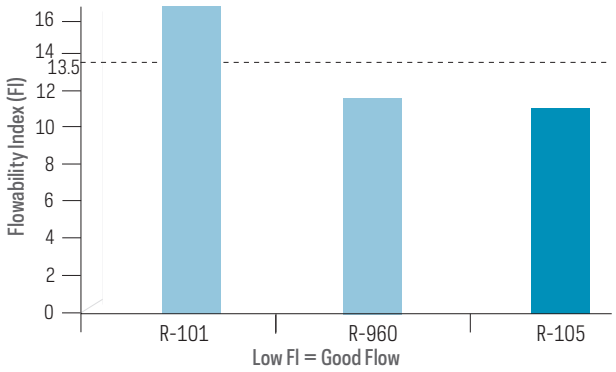
The combination of surface treatments used in Ti-Pure™ R-105 provides excellent resistance to photo-induced discoloration. Ti-Pure™ R-105 minimized lead graying in PVC systems and phenolic yellowing in polyethylene systems (**Figure 2**).

**Figure 2.** Discoloration Resistance




*Delta b as a function of UV exposure time. The test was conducted on LDPE with 2.6 wt% $TiO_2$. The system was stabilized with 0.3% piperidyl HALS and 0.3% BHT. Exposure was made using an F15T8/BLB blacklight illuminating the samples at 25 cm.

**Figure 3.** Bulk Flow Performance




Note: $TiO_2$ 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.

For more information, visit www.titanium.chemours.com



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