High-end plastic grade TiO₂

- Super bluish undertone
- Outstanding dispersion
- Excellent opacity

High-end plastic grade TiO₂

DR-2588

Joint manufacture
DR-2588 is titanium dioxide rutile specially designed for plastic applications. It has super bluish undertone, outstanding tinting strength and hiding power. DR-2588 particular surface treatment guarantees super low moisture absorption, volatile at high temperature and oil absorption as well as excellent dispersion and processibility.

<table>
<thead>
<tr>
<th>Property</th>
<th>Typical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TiO$_2$ content, %</td>
<td>98.2</td>
</tr>
<tr>
<td>Inorganic treatment</td>
<td>$\text{Al}_2\text{O}_3 \cdot n\text{H}_2\text{O}$</td>
</tr>
<tr>
<td>Organic treatment</td>
<td>Organic silicon</td>
</tr>
<tr>
<td>Oil absorption, g/100g pigment</td>
<td>13</td>
</tr>
<tr>
<td>Loss at 105°C, %</td>
<td>0.15</td>
</tr>
<tr>
<td>$^1$ Color in white PVC-P(L*)</td>
<td>97.4</td>
</tr>
<tr>
<td>$^2$ Tinting strength in grey PVC-P(compared with STD)</td>
<td>103</td>
</tr>
<tr>
<td>$^3$ Carbon black tinting strength in grey PVC-P(compared with STD)</td>
<td>17</td>
</tr>
<tr>
<td>$^4$ Melt flow rate(MFR), g/10mins</td>
<td>23</td>
</tr>
<tr>
<td>$^4$ Filtration pressure value(FPV), bar/g</td>
<td>0.03</td>
</tr>
<tr>
<td>$^5$ Volatile at high temperature(300°C), %</td>
<td>0.08</td>
</tr>
<tr>
<td>Specific gravity, g/cm$^3$</td>
<td>4.1</td>
</tr>
<tr>
<td>International Standard Classification ISO 591</td>
<td>R1</td>
</tr>
<tr>
<td>USA MRS Standard Classification ASTM D476</td>
<td>II</td>
</tr>
</tbody>
</table>

**NOTE:**
1. Test in white PVC-P containing plasticizer. TiO$_2$ content is 4PHR.
2. Test in grey PVC-P containing plasticizer and carbon black. TiO$_2$ content is 2PHR.
3. Test in master batch made of TiO$_2$ and LLDPE (MFR is 25g/10mins) mixture. TiO$_2$ content is 70%.
4. Following the European Standard EN13900-5:2005, LDPE as the base resin, dilute the master batch TiO$_2$ content from 70% to 8% to test FPV (Filtration Pressure Value).
5. After the test of loss at 105°C, put it into constant temperature oven at 300°C for 2hrs and calculate the reduction.
**Special features**

- *Super bluish undertone and high tinting strength*
- *Outstanding dispersion*
- *Top-level opacity*
- *Excellent processibility*
- *Super low volatile at high temperature*
- *Good heat stability*
- *Good color performance*

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**Main applications:**

DR-2588 is recommended widely in various interior plastic applications, such as:

- Polyolefin master batch, especially high-loading master batch.
- Super-thin film & casting film.
- Engineering plastics.
- Various plastics which have high request on dispersion and volatile at high temperature.
Super bluish undertone and high tinting strength

- Test in grey PVC containing plasticizer.
- Thanks to the fine particle size and concentrated particle size distribution as well as good dispersion, DR-2588 is enabled to have a very good tinting strength and super bluish undertone.
- The good hiding power and super bluish undertone will eliminate the natural yellow color of resin to get a more bright and pleasant color.
- It has more particles in a unit weight thanks to its tiny particle size. With the advantage of good dispersion, DR-2588 is easier to get a better hiding power.

Outstanding dispersion

- Make DR-2588 and LLDPE mixture into master batch by twin screw extruder. DR-2588 content in MB is 70%. Following the European Standard EN13900-5:2005, LDPE as the base resin, dilute the master batch and lower the TiO₂ content to 8% to test FPV (Filtration Pressure Value).
- Data is collected when it is filtering through respectively standard screen 3# (10/μm) and screen 2# (20/μm).
- The contrast samples are all white master batch with good dispersion.
- DR-2588’s efficiency removal of the coarse-grained, excellent surface treatment and depolymerization enable DR-2588 to have a good dispersion and very low coarse particle content.
Top-level opacity

- Make DR-2588 and LLDPE mixture into master batch by twin screw extruder. DR-2588 content in MB is 70%. Using LDPE as the base resin, dilute the master batch and lower the TiO₂ content to 8% and make into 20 µm plastic film in blowing machine. Test the transmittance under the USA MRS ASTM D1003-13.

- High luminous transmittance (low opacity) means that the plastic film’s covering ability is poor. In this case, it needs more TiO₂ to reach the ideal opacity.

- Thanks to good surface treatment, dispersion, small particle size as well as concentrated particle size distribution, DR-2588 is enabled to have outstanding opacity.

- TiO₂ with good opacity can cut the production cost by reducing the TiO₂ dosage. What is more, it can lower the TiO₂ impact on the mechanic performance of final plastic products.

Excellent processibility

- Make 70% content master batch by twin screw extruder out of DR-2588 and LLDPE (MFR=25g/10mins). Test the melt flow rate under the ISO 1133-1:2011. Temperature is 190 °C, load is set as 2.16kgs.

- TiO₂ with high MFR has a good processibility. When mixed with resin, it can efficiently low the machine torque to save energy and increase the productivity.

- Thanks to good surface treatment, super low oil absorption, outstanding dispersion and concentrated particle size distribution, DR-2588 MFR is excellent and makes DR-2588 very competitive.
Super low volatile at high temperature

- Loss at 105 °C depends on the air humidity and storage time, data here is only for reference.
- DR-2588 surface treatment guarantees the outstanding dispersion and the super low volatile at high temperature.
- The low volatile component is a request in high temperature plastic processing.
- The low volatile component can help effectively eliminate the cracks, holes etc. defects in high temperature processing plastic products.

Good heat stability

- TiO₂ powder heat stability: In room temperature, put TiO₂ into oven which has set the temperature for 30mins. Then pressed the powder into a shape of cake and test the color by colorimeter and calculate the color difference.
- Mix 70%(TiO₂ content) master batch and polypropylene, inject at 220 °C and test the injected panel color by a spectrophotometer. And then stay at 220 °C, 240 °C, 260 °C and 280 °C for 30mins respectively and inject, test the panel color, and calculate the color difference.
- The good surface treatment and good control on impurity enable DR-2588 to have excellent heat stability.
- DR-2588 excellent heat stability and low moisture absorption can satisfy the injection processing at high temperature.
Thanks to the excellent control on impurity and surface treatment, DR-2588 is now far beyond other sulphate process TiO₂ with its super bluish undertone, opacity and outstanding dispersion. DR-2588 now has similar performance as western chloride TiO₂.

When used in plastic, DR-2588 whiteness has a bright bluish undertone.

Color in plastics

Color in PVC-P
(TiO₂ content: 4PHR)

Color in PP injection
(TiO₂ content: 3PHR)

Color in ABS injection
(TiO₂ content: 5PHR, injection temperature 280°C)
The information and data provided in this brochure are based on our current knowledge and experience. They are only references. Considering different customers have different processes and applications, also in view of many factors that may affect them. We cannot guarantee the final products’ performance. Please do adequate test before using this product. If there is any special requirement please contact our technology service department: tech@chinatio2.com