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- *Super bluish undertone* 超级蓝底相
- *Outstanding dispersion* 杰出分散性
- *Excellent opacity* 超高遮盖力

High-end plastic grade TiO_2

高端塑料应用钛白粉

DR-2588

泛华化学 INTER-CHINA　东昊 DONGHAO

Joint manufacture

Introduction 产品介绍

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.

DR-2588是一种专为塑料应用而设计的金红石型钛白粉颜料，具有强烈的蓝底相色调、优秀的着色亮度和优异的遮盖力等性能。其特殊的表面处理确保了产品极低的吸湿性能、极低的高温挥发分、超低的吸油量和在塑料中杰出的分散性及加工流动性能。

Property /参数	Typical value /典型值
TiO_2 content, % TiO_2 含量，%	98.0
Inorganic treatment 无机表面处理物	$Al_2O_3 \cdot nH_2O$
Organic treatment 有机表面处理物	Organic silicon / 有机硅
Oil absorption, g/100g pigment 吸油量，g/100g颜料	13
Loss at 105 ℃, % 105°C挥发物，%	0.15
[1] Color in white PVC-P(L*) [1]在白色PVC-P中的颜色 (L*)	97.5
[2] Tinting strength in grey PVC-P(compared with STD) [2]在灰色PVC-P中的消色力（与标准样品比）	103
[2] Carbon black tinting strength in grey PVC-P(compared with STD) [2]在灰色PVC-P中的炭黑着色底相（与标准样品比）	17
[3] Melt flow rate(MFR), g/10mins [3]熔体质量流动速率（MFR），g/10mins	23
[4] Filtration pressure value(FPV), bar/g [4]过滤压力值（FPV），bar/g	0.03
[5] Volatile at high temperature(300 ℃), % [5]高温挥发物（300°C），%	0.1
Specific gravity, g/cm³ 真密度，g/cm³	4.1
International Standard Classification ISO 591 国际标准ISO 591分类	R1
USA MRS Standard Classification ASTM D476 美国材料试验学会ASTM D476分类	Ⅱ

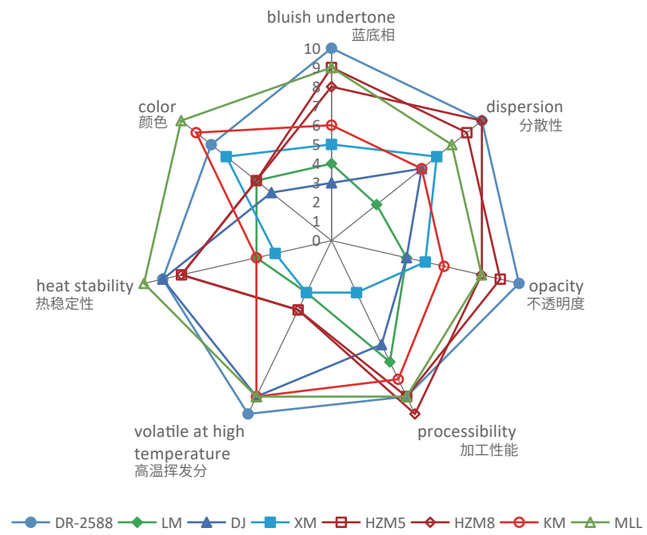
NOTE / 注：
1. Test in white PVC-P containing plasticizer. TiO_2 content is 4PHR.
2. Test in grey PVC-P containing plasticizer and carbon black. TiO_2 content is 4PHR.
3. Test in master batch made of TiO_2 and LLDPE (MFR is 25g/10min) mixture. TiO_2 content is 70%.
4. Following the ISO 23900-5:2015,LDPE 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°Cfor 2hrs and calculate the reduction.

1.在钛白粉含量为4PHR的含增塑剂聚氯乙烯体系（PVC-P）中测试。
2.在钛白粉含量为4PHR的含增塑剂和炭黑的聚氯乙烯体系（PVC-P）中测试。
3.在钛白粉含量为70%的线性低密度聚乙烯（熔融指数为25g/10min）色母粒中检测。
4.采用低密度聚乙烯（LDPE）作为基础树脂将钛白粉含量为70%的线性低密度聚乙烯色母粒稀释至钛白粉含量为8%的色母粒，按照ISO 23900-5:2015标准检测过滤压力值（FPV）。
5.钛白粉检测完105°C挥发物后，放入300°C恒温的烘箱中加热2小时，检测加热减量。

Special features 产品特性

- 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

- 超级蓝底相和高消色力
- 杰出的分散性
- 超高的遮盖力
- 优异的加工流动性能
- 超低高温挥发分
- 优秀的耐热稳定性能
- 极具竞争力的颜色表现



Main applications 主要应用

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.

DR-2588推荐用于室内用的各种塑料，具有广泛的适用性。如：

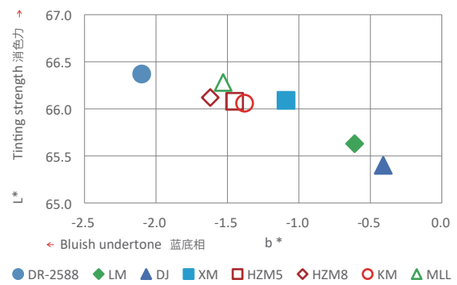
- 聚烯烃色母粒，尤其是高浓度色母粒
- 超薄膜，流延膜
- 工程塑料
- 各种对分散性、挥发分有高要求的塑料

Super bluish undertone and high tinting strength
超级蓝底相和高消色力

- 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.

- 在含增塑剂的灰色聚氯乙烯树脂(PVC)中测试。
- 得益于细小的晶粒尺寸、集中的粒径分布、优秀的表面处理技术和杰出的分散性，DR-2588具有出众的消色力和领先于行业的超级蓝底相。
- 高消色力和超蓝底相能更容易消除塑料树脂中天然的黄色相，帮助塑料制品获得更明亮和令人愉悦的颜色。
- 细小的晶粒尺寸使得单位重量的钛白粉获得更多数目的粒子，在杰出的分散性帮助下更易得到优秀的遮盖力。

Undertone and tinting strength in PVC-P
（TiO_2 content: 4PHR）
在PVC-P中的底相和消色力
（钛白粉含量：4PHR）

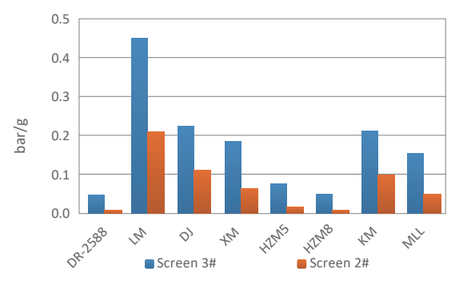


Outstanding dispersion
杰出的分散性

- Make DR-2588 and LLDPE mixture into master batch by twin screw extruder. DR-2588 content in MB is 70%. Following the ISO 23900-5:2015,LDPE as the base resin,dilute the master batch and lower the TiO_2 content to 8% to test FPV (Filtration Pressure Value).
- Data is collected when it is filtering through respectively standard screen 3# (10μm) and screen 2# (20μm).
- 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.

- 采用双螺杆挤出机将DR-2588与线性低密度聚乙烯(LLDPE)混合制成70%浓度的色母粒，按照国际标准ISO 23900-5:2015的要求，采用低密度聚乙烯(LDPE)作为基础树脂将色母粒稀释至8%的钛白粉浓度的混合料，检测过滤压力值(FPV)。
- Screen 3#数值、Screen 2#数值分别是指采用符合标准要求的3#过滤网(孔径约10μm)和2#过滤网(孔径约20μm)进行过滤测试所得。
- 对比样品均为色母粒用钛白粉，都具有较好的分散性。
- 得益于DR-2588创新和高效的去除粗粒子技术、优秀的表面处理技术和解聚技术，DR-2588具有极具竞争力的分散性和极低的粗粒子含量。

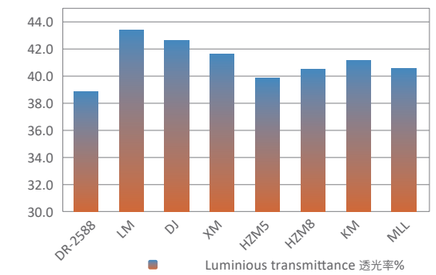
Filtration Pressure Value（FPV）
Test under ISO 23900-5:2015
过滤压力值(FPV)
(按照国标标准ISO 23900-5：2015检测)



Top-level opacity
超高的遮盖力

- 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 TiO_2 content to 8% and make into 20 μm plastic film in blowing machine. Test the transmittance under the USA ASTM D1003-21.
- High luminous transmittance (low opacity) means that the plastic film' s covering ability is poor. In this case,it needs more TiO_2 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.
- TiO_2 with good opacity can cut the production cost by reducing the TiO_2 dosage. What is more,it can lower the TiO_2 impact on the mechanic performance of final plastic products.

The transmittance in plastic film
Test under ASTM D1003-21
透光率(按照美国材料试验学会标准ASTM D1003-21检测)

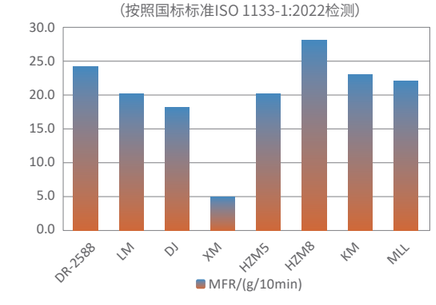


- 采用双螺杆挤出机将钛白粉与线性低密度聚乙烯(LLDPE)混合制成70%浓度的色母粒，然后将色母粒与低密度聚乙烯(LDPE)混合在吹膜机上吹成钛白粉含量为8%、厚度为20um的薄膜，按照美国材料实验学会标准ASTM D1003-13检测透光率。
- 透光率高则薄膜的遮盖力差，意味着需要使用更多的钛白粉来达到同样的不透明度。
- 得益于DR-2588优秀的表面处理、杰出的分散性和晶粒细小且分布集中，DR-2588具有优异的遮盖力。
- 高遮盖力等级的钛白粉可以减少钛白粉用量从而为客户节省成本，并将钛白粉对塑料力学等性能的影响降到最低。

Excellent processibility
优异的加工流动性能

- Make 70% content master batch by twin screw extruder out of DR-2588 and LLDPE (MFR=25g/10min).Test the melt flow rate under the ISO 1133-1:2022. Temperature is 190°C, load is set as 2.16kgs.
- TiO_2 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.

Melting flow rate（MFR）
Test under ISO 1133-1:2022
熔体质量流动速率(MFR)
(按照国标标准ISO 1133-1:2022检测)



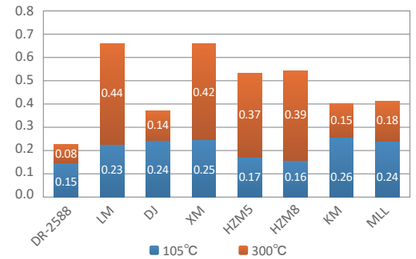
- 采用双螺杆挤出机将钛白粉与MFR为25g/10min的线性低密度聚乙烯(LLDPE)混合制成70%浓度的色母粒，按照ISO 1133-1:2011标准检测熔体质量流动速率(MFR)，检测参数设定：温度为190°C，负荷为2.16kgs。
- MFR高的产品具有良好的加工流动性，与树脂混合熔融加工时能有效降低机器扭矩从而降低能耗和提高生产速度。
- 得益于DR-2588优秀的表面处理、极低的吸油量、杰出的分散性和集中的粒径分布，DR-2588具有优秀的MFR，在塑料应用中极具竞争力。

Super low volatile at high temperature
超低高温挥发分

- 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.

- 105°C挥发分的数值取决于空气的湿度和储存时间，数据仅供参考。
- 得益于DR-2588优秀的无机表面处理技术和有机处理技术，在保证杰出的分散性的同时达到了极低的高温挥发分。
- 低高温挥发分是满足塑料体系高温加工趋势的必须要求。
- 低高温挥发分可以帮助客户在塑料高温加工时有效消除塑料制品的裂孔、纹路等缺陷。

Volatile at high temperature
（105 ℃ and 300 ℃ stay for 2hrs）
高温挥发分
（105°C和300°C分别停留2小时）

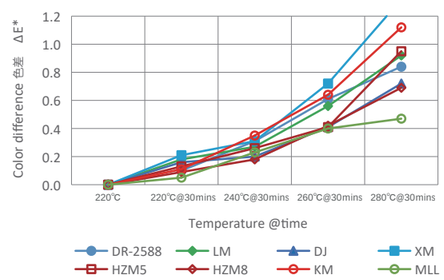


Good heat stability
优秀的耐热稳定性能

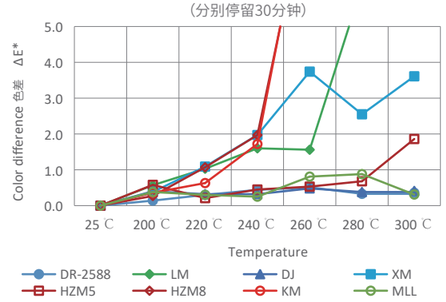
- TiO_2 powder heat stability: In room temperature, put TiO_2 into oven which has set the temperature for 30mins.Then pressed the powder into a shape of cake and test the color by colorimeter and calculate the color difference.
- Mix 70%(TiO_2 content) master batch and polypropylene,inject at 220 °C 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.

- 钛白粉粉末的热稳定性：在室温下，将钛白粉放入已设定温度的烘箱中烘烤30分钟。然后将粉末压成饼状，用色差计测试颜色并计算色差。
- 70%钛白粉含量的色母粒与聚丙烯混合，在220 °C温度下注塑，注塑板采用分光光度计测定初始颜色。然后分别在220°C、240°C、260°C和280 °C停留30分钟后注塑并测定颜色，计算色差。
- 得益于对杂质含量的有效控制、优秀的无机表面处理和有机包覆技术，DR-2588具有优秀的耐热变色性能。
- DR-2588良好的热稳定性和低吸湿性可以满足注塑高温加工的高要求。

Heat stability in PP injection
(stay for 30mins in single screw)
在PP注塑中的耐热变色性能
（在单螺杆中停留30分钟）



Heat stability of TiO_2 powder
(stay for 30mins respectively)
在钛白粉粉末中的耐热变色性能
（分别停留30分钟）

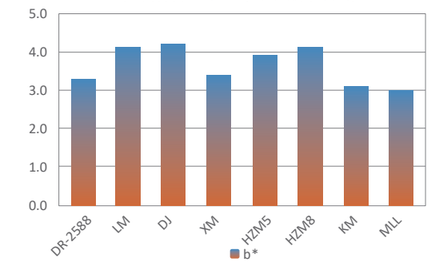


Good color performance in plastics
极具竞争力的颜色表现

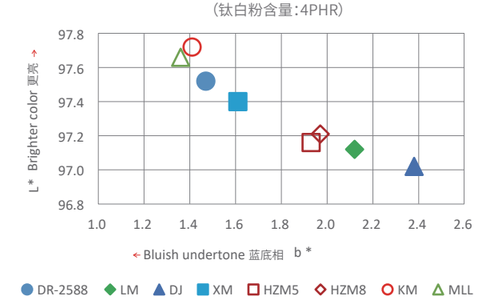
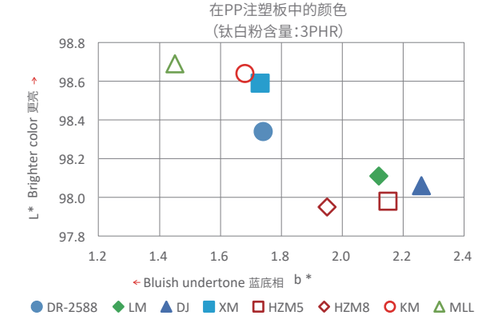
- Thanks to the excellent control on impurity and surface treatment,DR-2588 is now far beyond other sulphate process TiO_2 with its super bluish undertone, opacity and outstanding dispersion. DR-2588 now has similar performance as western chloride TiO_2.
- When used in plastic,DR-2588 whiteness has a bright bluish undertone.

- 得益于优秀的杂质含量控制、优秀的表面处理技术、强烈的蓝底相、超高消色力和杰出的分散性，DR-2588全面超越其他硫酸法产品，接近于西方氯化法产品水平。
- DR-2588可以使塑料产品的白度具有明亮的蓝色底相的特点。

Color in ABS injection
（ TiO_2 content: 5PHR, injection temperature 280 ℃ ）
在ABS注塑中的颜色
（钛白粉含量：5PHR，注塑温度280°C）



Color in PVC-P
（TiO_2 content: 4PHR）
在PVC-P中的颜色
（钛白粉含量：4PHR）



Color in PP injection
（TiO_2 content: 3PHR）
在PP注塑板中的颜色
（钛白粉含量：3PHR）