

# PRETIOX

## TITANIUM DIOXIDE

PRETIOX titanium dioxide produced by PRECHEZA is a universal white inorganic pigment of top quality; it is an essential partner in many everyday uses. This white pigment is characterized by high covering power and easiness of dispersability.



## PRETIOX TITANIUM DIOXIDE

# TAKE IT BRIGHTLY

In the PRETIOX titanium dioxide manufacturing process, we use our long-established production experience in order to achieve maximum benefits for the customer and for the final processor. We offer a high standard of quality while meeting the strict requirements for each specific application. PRETIOX titanium dioxide is offered in several different variants allowing it to be used in a wide range of applications.

### **PRETIOX AV01SF**

A universal, ultra-fine milled anatase titanium dioxide, with an organic surface treatment, possessing a high degree of whiteness, opacity and dispersibility. It is used in interior solvent-based and water-based paints. PRETIOX AV01SF is also suitable for undemanding plastic manufacturing applications: injection moulding, rolling, casting, the production of plates, polyolefin products, PVC etc. Ready made products have a limited life time and are intended both for interior or exterior use. It can also be used for the pigmentation of rubber mixtures, and can be used for direct injection into paper pulp, barrier paper, and paper coatings.

### **PRETIOX AV01Z**

An ultra-fine milled anatase titanium dioxide, with a very high level of whiteness and good opacity. This is a special grade possessing a very high level of chemical purity which complies with the statutory requirements for the pigmentation of cigarette paper and cigarette filters.

### **PRETIOX AVSL**

A highly concentrated anatase slurry, developed for simple, rapid processing in water-based applications, especially in paints. It is also suitable for direct injection into paper pulp.

### **PRETIOX FS**

A micronized anatase and rutile mixture, possessing good covering power, whiteness and dispersibility. Although it is mainly used in the manufacturing of construction materials, it can also be used in basic types of water-based, solvent-based and powder coating materials. It is also suitable for undemanding polyolefin products.

### **PRETIOX R200M**

An ultra-fine milled rutile titanium dioxide with an organic surface treatment, possessing a high degree of whiteness, opacity, and dispersibility. It can be used in various decorative paints and coatings where extra resistance to climatic conditions is not required, i.e. primers, undercoats, fillers and pastes, interior paints and paints for road markings. A low concentration of volatile substances makes it perfect for use in systems which are sensitive to high levels of heat and humidity. In the paper industry, it is used mainly in the production of barrier papers.

### **PRETIOX R200H**

An ultra-fine milled rutile with an organic treatment, possessing a high degree of whiteness, opacity, dispersibility, and a low concentration of volatile substances. This is a special grade for the manufacture of epoxy paints used in the coating of iron surfaces, i.e. for heavy duty transport, containers etc., where it is necessary to create an extra hard, protective coating.

## **PRETIOX R200P**

An ultra-fine milled rutile with an organic treatment, possessing a high degree of whiteness, opacity, and dispersibility. This grade of TiO<sub>2</sub> is suitable for undemanding plastic manufacturing applications: injection moulding, rolling, casting, the production of plates, polyolefins products, PVC etc. Ready made products have a limited life time and are intended for both interior and exterior use.

## **PRETIOX RGU**

A universal, high quality micronized rutile titanium dioxide with an organic and increased inorganic surface treatment with aluminum and silicon compounds, with aluminum ion modification in the crystal structure. Characterized by a combination of outstanding dispersion and optical parameters. It mixes readily using standard equipment and technology. It is recommended for both decorative paints and common industrial coating materials which require stable optical parameters and excellent resistance to climatic conditions, i.e. for the dispersion of water-soluble paints, emulsions, air drying synthetic enamel paints, heat curing, two-compound, and acid curing systems. This titanium dioxide is suitable also for plastics manufacturing applications. In the paper industry, it is used mainly for surface coatings for paper, or for barrier papers.

## **PRETIOX RG18P**

A special micronized rutile grade, with an hydrophobic organic and medium inorganic surface treatment with aluminium and silicon compounds, with aluminum ion modification in the crystal structure. It possesses good optical properties, opacity, dispersibility, and an excellent degree of resistance to climatic conditions. This grade of titanium dioxide is suitable for demanding plastics manufacturing applications, and for products for interior and exterior use, e.g. injection moulding, rolling, casting, the production of window profiles, plates, hollow objects, polyolefin products, PVC, engineering plastics etc.

## **PRETIOX RGX**

A special micronized rutile grade with a low inorganic and hydrophobic organic surface treatment, possessing good optical properties, opacity, and an excellent degree of dispersibility. This grade of titanium dioxide is suitable for demanding plastics manufacturing applications, e.g. injection moulding, rolling, casting, the production of thin and multi-layered foils, of plates and hollow objects, polyolefins products, PVC, the fiber delustering etc.

## **PRETIOX RGZW**

A micronized rutile titanium dioxide with an organic and special inorganic surface treatment with aluminum and zirconium compounds, with aluminum ion modification in the crystal structure. It possesses an excellent degree of resistance to climatic conditions with a high level of gloss retention, very good optical parameters, colouring power, a low specific conductivity, and excellent dispersibility. This is suitable for the production of water-soluble and solvent-soluble coating materials, such as top varieties of decorative paints and top quality industrial coating systems which require extraordinary resistance to climatic conditions. Suitable for paints, air drying and heat curing acrylic and alkyd enamel paints, polyurethane coating materials, powder paints, coil coatings and can coatings etc.

## **PRETIOX RGLP2**

A top quality, micronized rutile titanium dioxide with an organic and special inorganic surface treatment with aluminum and silicon compounds. It is characterized by a combination of good dispersibility and optical parameters, and has a good degree of retention in paper pulp. The high light fastness of this special TiO<sub>2</sub> grade makes it suitable for use in papers for decorative laminates.

Classification and summary of the typical properties of PRETIOX products

PRETIOX	TiO <sub>2</sub> content [%]	Inorganic treatment	Organic treatment
AV01SF	99	–	hydrophilic
AV01Z	99	–	hydrophilic
AVSL	65	–	hydrophilic
FS	96	–	hydrophilic
R200H	99	–	hydrophilic
R200M	99	–	hydrophilic
R200P	99	–	hydrophilic
RGU	95	Al, Si	hydrophilic
RG18P	95	Al, Si	hydrophobic
RGX	98	Al, Si	hydrophobic
RGZW	95	Al, Zr	hydrophilic
RGLP2	91	Al, Si	hydrophilic



Specific gravity [g/cm <sup>3</sup> ]	Loss at 105°C [%] <sup>a)</sup>	Bulk density tamped [g/cm <sup>3</sup> ] <sup>b)</sup>	Oil absorption [g/100g] <sup>c)</sup>	pH	Durability	ISO 591 classification	ASTM D476 designation
3.9	0.3	0.7	20 <sup>d)</sup>	7–8	very low	A1	I
3.9	0.3	0.7	–	7–8	very low	A1	I
1.9	–	–	–	8–10	very low	A1	I
4.0	0.4	0.9	19	7–8	very low	R2	II
4.2	0.2	0.8	16	8–9	low	R1	II
4.2	0.2	0.8	16	8–9	low	R1	II
4.2	0.2	0.8	16	8–9	low	R1	II
4.0	0.5	1.0	20	8–9	good	R2	II, IV
4.0	0.4	1.1	25 <sup>e)</sup>	–	very good	R2	II, IV
4.2	0.2	1.0	17 <sup>e)</sup>	–	low	R1	II
4.1	0.5	0.9	20	8–9	very good	R2	II, IV
4.0	0.6	0.9	–	6–7	very good	R2	II, IV

a) Measured within 48 hours of production  
b) Based on ISO 787/11 c) Based on ISO 787/5  
d) Water absorption e) DINP absorption

# PRETIOX TITANIUM DIOXIDE

## PAINT INDUSTRY

PRETIOX titanium dioxide for paints and coating materials possesses an optimal size and a very narrow particle distribution, a high colouring power, and a neutral or bluish undertone.

The high degree of light dispersion produced by the pigment particles, and their inferred ability to reflect light intensely, (especially in the visible part of the spectrum), offers many advantages within current applications. With regard to their optical parameters, the homogeneous nature of the various micronized rutile products allows their application in a variety of toning systems. The efficient surface treatment minimizes flocculation in coating systems, promoting easy mixing and a good level of stability in the relevant application.

### Decorative paints

The basic requirements of titanium dioxide for efficient decorative paint production are:

- Universal application in water-based and solvent-based systems, both for interior and exterior use.
- Easy dispersibility, with the possibility of using solvents.
- Good, stable optical properties.

Areas of application in various types of decorative coatings

PRETIOX	AV01SF	AVSL	R200M	RGU	RGZW
Interior	■	■	■	■	■
Exterior			■	■	■

■ Recommended ■ Suitable

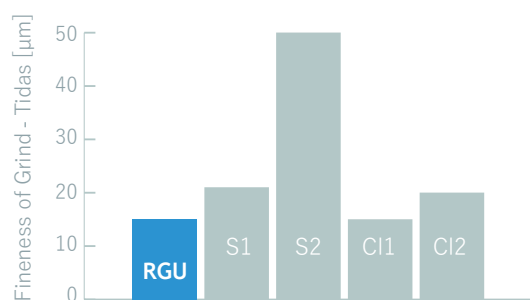


## Industrial paints

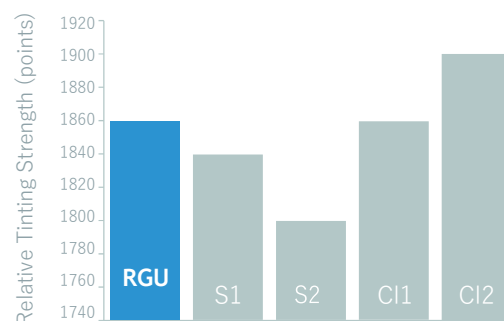
The basic requirements for titanium dioxide used in the production of sophisticated industrial coating materials are:

- Optimization of properties when used in a given coating film application.
- Very good dispersibility.
- A high degree of resistance to aggressive environmental and weather conditions.
- A very good level, and stability, of such optical parameters as colouring power, opacity, whiteness, and undertone.

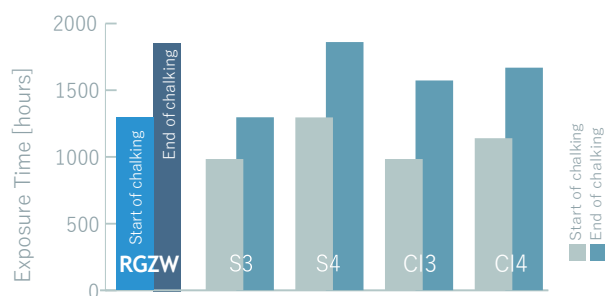
**PRETIOX RGU:** excellent dispersion properties, (mill base for solvent-based, decorative or industrial coatings, dispersed using a high-speed dissolver at 8000 rpm for 15 minutes), compared with sulphate /S/ and chloride /Cl/ competitive samples used in this application.



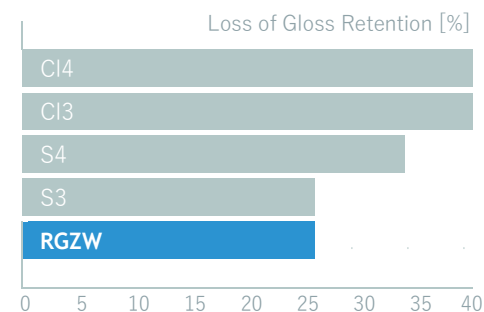
The relative tinting strength of **PRETIOX RGU** pigment in a traditional air-drying long oil alkyd (PVC 17%), compared with sulphate /S/ and chloride /Cl/ competitive samples used in this application.



**PRETIOX RGZW:** high chalking retention, (QUV-Exposure, ASTM D 4587-01), in a traditional air-drying long oil alkyd, (PVC 18%), compared with sulphate /S/ and chloride /Cl/ competitive samples used in this application.



**PRETIOX RGZW:** loss of 60° gloss retention, (QUV-Exposure, ASTM D 4587-01), in a traditional acrylic water-based paint, (PVC 25%), compared with sulphate /S/ and chloride /Cl/ competitive samples used in this application.





Areas of application in various types of industrial coatings

PRETIOX	AV01SF	R200M	R200H	RGU	RGZW
Powder coatings				■	■
Roll on emails (coil coatings)					■
Metal containers (can coatings)				■	■
Domestic electric appliances				■	■
Routine maintenance				■	■
Steel construction				■	■
Epoxy paints			■		■
Wood coatings, exterior				■	■
Wood coatings, interior (furniture)				■	■
Road marking paints	■	■	■	■	■
Construction and agricultural machinery				■	■

■ Recommended ■ Suitable

## PRETIOX TITANIUM DIOXIDE

# PLASTICS INDUSTRY

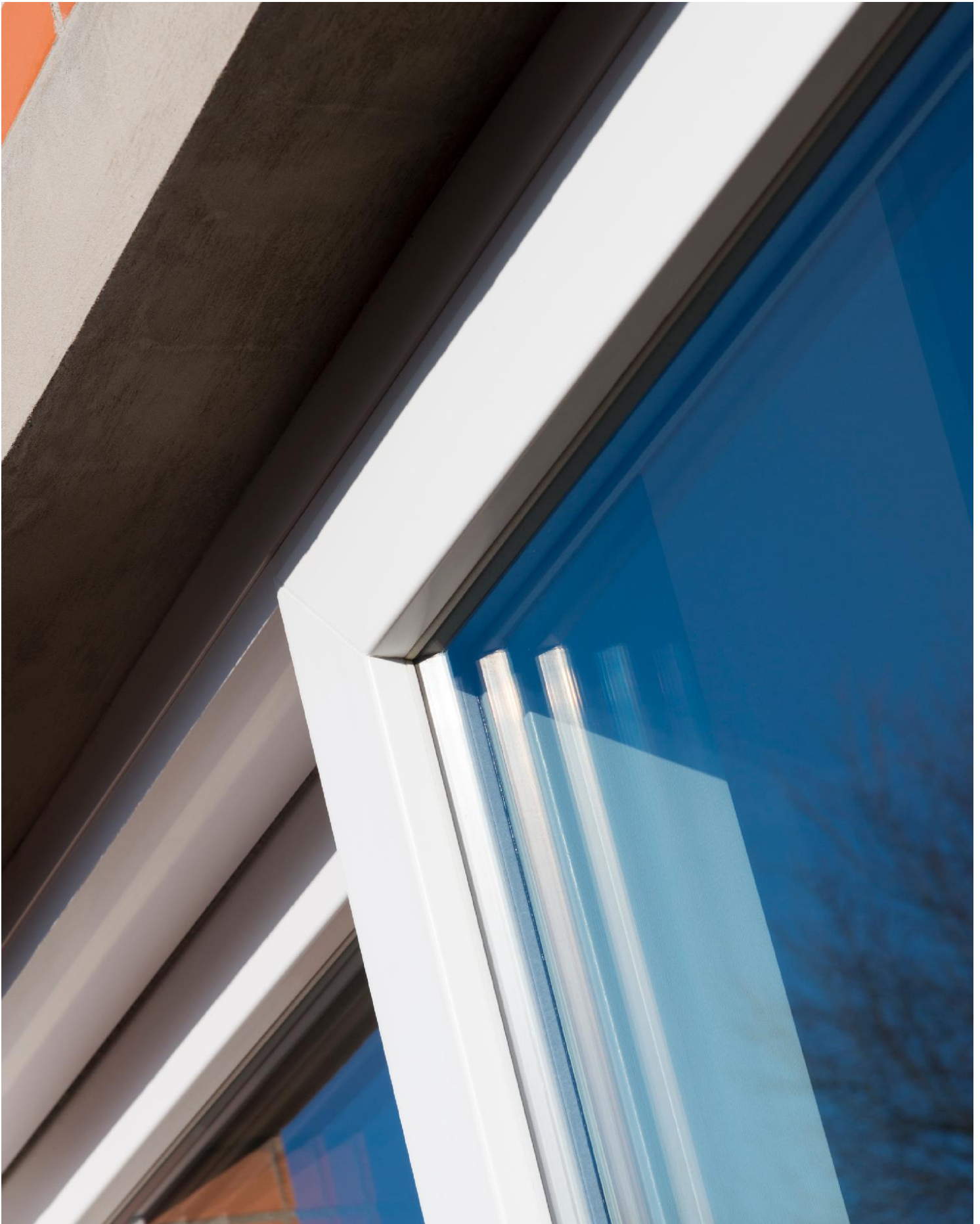
Titanium dioxide is one of the most frequently used pigments in the plastics industry as even very low loadings not only guarantee the required white or pastel shade of the final product, but also can provide the plastic with sufficient protection against destructive UV radiation.

PRETIOX titanium dioxide for plastics can be produced with different particle size as an ultra-fine milled or micronized powder. With the combination of organic and inorganic surface treatment offers a wide range of opportunities in various applications. PRETIOX titanium dioxide is characterised with easy dispersibility, low humidity and good, stable optical properties.

Areas of application in various plastics technologies

PRETIOX	AV01SF	R200P	RGX	RG18P
Polyolefins	■	■	■	■
Premixes / Masterbatches	■	■	■	■
High content of TiO <sub>2</sub> in concentrates	■	■	■	■
PVC – exterior				■
PVC – interior	■	■	■	■
Flexible PVC	■	■	■	■
PVC – plastisols	■	■	■	■
Engineering plastics				■
Synthetic fibres			■	■

■ Recommended ■ Suitable



## Polyolefins PE and PP

The basic requirements for titanium dioxide intended for use in polyolefins are:

- Good, stable optical properties.
- Easy dispersibility and low humidity.
- Heat resistance at temperatures used for polymer processing.
- Chemical inactivity in formulation, and a low ability of reagglomeration in the liquid polymer mix.

## Construction and engineering plastics PVC, PA, PET, PBT, ABS, PC and PMMA

The basic requirement for titanium dioxide intended for use in engineering plastics are:

- Good, stable optical properties.
- Easy dispersibility, low humidity and stabilizer consumption, excellent light fastness.
- Heat resistance at temperatures used for polymer processing.
- Chemical inactivity in formulation and a low ability of reagglomeration in the liquid polymer mix.

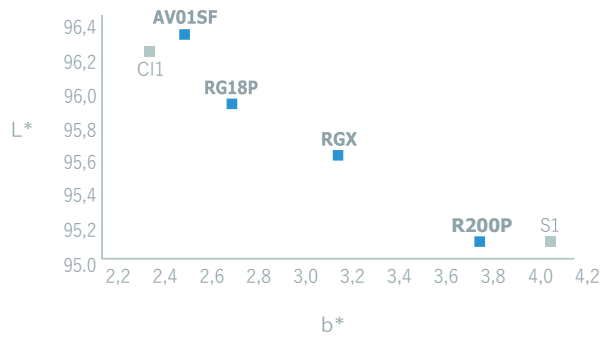
Areas of application in various types of plastics

PRETIOX	AV01SF	R200P	RGX	RG18P
Injection moulding – interior	■	■	■	■
Injection moulding – exterior			■	■
Production film – interior			■	■
Production film – exterior			■	■
Production of BOPP foils			■	
Fabrication of boards	■	■	■	■
Production of blown films – interior			■	
Production of hollow bodies – by injection	■	■	■	■
Production of hollow bodies – by extrusion		■	■	■
Production of hollow bodies – by rotational moulding			■	■
Shaping of polyolefins	■	■	■	■
Rolling	■	■	■	■
Casting	■	■	■	■

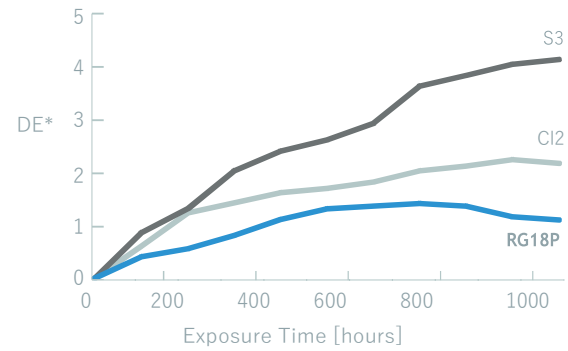
■ Recommended ■ Suitable



Comparison of the optical properties of **PRETIOX** titanium dioxide grades with sulphate /S/ and chloride /Cl/ competitive samples in white LDPE films with a 4% TiO<sub>2</sub> content.



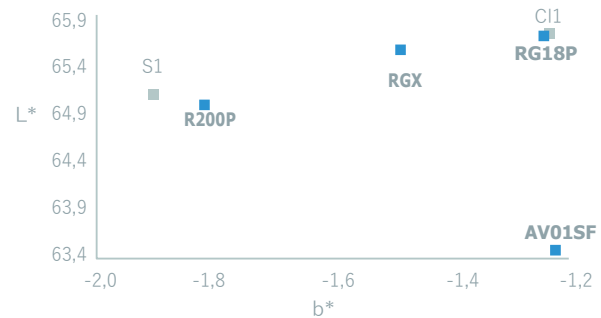
Comparison of the changing optical properties of PVC window profiles containing **PRETIOX** RG18P titanium dioxide and sulphate /S/ and chloride /Cl/ competitive samples in Q-SUN.



Comparison of filter index analysis of **PRETIOX** titanium dioxide grades with sulphate /S/ and chloride /Cl/ competitive samples in LDPE.



Comparison of the optical properties of **PRETIOX** titanium dioxide grades with sulphate /S/ and chloride /Cl/ competitive samples in grey LDPE films.



## Applications of PRETIOX titanium dioxide

The use in plastics of the PRETIOX product portfolio ranges from cups and plastic buckets, to water pipes and multi-layer foils, to window profiles.

Hygienic certification for use in products intended for contact with food is an advantage opening up a broad range of applications.

# PRETIOX TITANIUM DIOXIDE

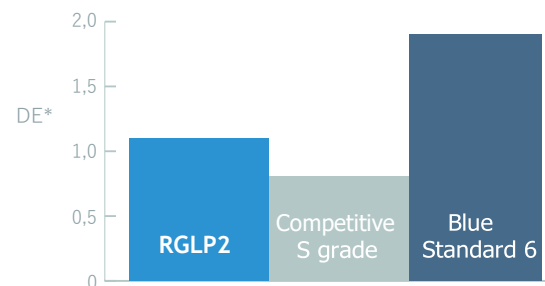
## PAPER INDUSTRY

PRETIOX titanium dioxide for paper manufacturing possesses outstanding dispersibility within an aqueous environment. Optimum particle size and a narrow distribution curve allow a high degree of retention within paper pulp and excellent optical properties.

The basic requirements for titanium dioxide used in the paper industry are:

- Good dispersibility in an aqueous environment.
- A high degree of retention within paper pulp.
- Optimal particle size.
- A high degree of whiteness in anatase grades.
- Strong covering power in rutile grades.
- A high degree of light fastness in rutile grades used for decorative laminates.

Light fastness in laminate paper



Areas of application in various types of paper products

PRETIOX	AV01SF	AVSL	AV01Z	R200M	RGU	RGLP2
Direct injection into pulp	■	■	■	■		
Cigarette paper, cigarette filters			■			
Barrier paper	■			■	■	
Surface coatings for paper	■				■	
Paper for decorative laminates						■

■ Recommended ■ Suitable



## PRETIOX TITANIUM DIOXIDE

# BUILDING INDUSTRY

TiO<sub>2</sub> pigment is used in this sector primarily for its excellent colouring ability and tinting strength; a further necessary property is its dispersibility in all applications within the construction material manufacturing sector.

Construction material manufacturers traditionally demand a high degree of resistance to atmospheric conditions, of light fastness, and of chemical resistance mainly in alkalic surroundings.

Predominantly, titanium dioxide is used for the colouring of plaster mixtures, grouting materials, concrete products, and transparent asphalt mixtures. PRETIOX RGU, R200M, AV01SF, RGZW and FS are suitable for these applications.

### Facade renders

Most often, colouring properties are utilized within the manufacture of decorative facade plasters, based upon acrylate, silicon and silicate systems.

These thin layer systems are applied directly onto thermal insulating systems which cover the majority of surfaces during modern building reconstruction and repair. The loading of TiO<sub>2</sub> is calculated based upon the total weight of the plaster mix; the usual loading being 4–5%.

### Concrete

Being produced from white concrete, architectural and concrete brut elements in particular use TiO<sub>2</sub> pigment.

Another possibility is the pigmentation of grey concretes and grey concrete products in order to achieve a lighter shade, or to emphasize the colour when using coloured inorganic pigments. The TiO<sub>2</sub> loading, (within the range of 4–10%), is related to the proportion of the binding agent. It is necessary to verify the result in an operational test or to justify it via the use of a product certificate.

### Transparent bitumen

Transparent bitumen is a clear asphalt binding agent which facilitates the production of various coloured asphalt mixes.

These can be achieved by using practically the whole spectrum of bright inorganic FEPREN pigments together with PRETIOX titanium dioxide.

Pigmentation of the underlying layer to a white shade improves safety in poor light conditions, (e.g. at dusk, in tunnels, on forest walkways). Coloured asphalts are a means of increasing road traffic safety in critical points, however they are also suitable for cycling and walking paths in parks and children's playgrounds. The recommended TiO<sub>2</sub> loading based on the total weight of the mixture is between 2–5%. Combinations with coloured pigments are also recommended.