

PRETIOX

TITANIUM DIOXIDE

PRETIOX titanium dioxide is unique,
versatile and safe in its intended uses.
It is thermally stable, chemically inert
and non-flammable.



MAKING THE WORLD COLOURFUL

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 dispersibility.

PRETIOX Titanium Dioxide

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, 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 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 AV01FG

Exceptionally pure anatase easy dispersed pigment with high brightness and good opacity. Warranting all the legal requirements for direct food additives (INS 171) recommended for colouring foodstuffs as well as suitable colorant (E171) for cosmetic application.

PRETIOX AV01PhG

High purity anatase pigment achieving a high standard of chemical and microbiological purity. Intended mainly for pharmaceutical application (pharmaceutical excipient). Suitable also as colorant in cosmetic application.

PRETIOX FS

A micronized anatase and rutile mixture with a low inorganic surface treatment, 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.

PRETIOX R200C

Pure rutile pigment with high brightness and good opacity. Recommended for cosmetic application (colorant E171) and warranting all the legal requirements for direct food additives (INS 171) for colouring foodstuffs.

PRETIOX R200M

An ultra-fine milled rutile titanium dioxide, 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. This grade of TiO_2 is suitable for undemanding plastic manufacturing applications: injection moulding, **rolling, casting, the production of plates, polyolefins products, PVC etc.** Recommended for products with a limited service life, which are designed for indoor and/or outdoor use. In the paper industry, it is used mainly in the production of barrier papers.

PRETIOX RGU

A universal, high-quality micronized rutile titanium dioxide with 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 also suitable 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 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 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, fiber delustering etc.**

PRETIOX RGZW

A micronized rutile titanium dioxide with an 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, 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.

Table includes the typical properties of PRETIOX products.
They are not specifications, although specifications are available.

PRETIOX	TiO ₂ content [%]	Inorganic treatment	Specific gravity [g/cm ³]	Loss at 105°C [%] ^{a)}
AV01SF	99	–	3.9	0.3
AV01Z	99	–	3.9	0.3
AVSL	65	–	1.9	–
AV01FG	99.3	–	3.9	0.3
AV01PhG	99.3	–	3.9	0.3
FS	96	Al, Si	4.0	0.4
R200C	99.3	–	4.2	0.2
R200M	99	–	4.2	0.2
RGU	95	Al, Si	4.0	0.5
RG18P	95	Al, Si	4.0	0.4
RGX	98	Al, Si	4.2	0.2
RGZW	95	Al, Zr	4.1	0.5

Bulk density tamped [g/cm ³] ^{b)}	Oil absorption [g/100g] ^{c)}	pH	Durability	ISO 591 classification	ASTM D476 designation
0.7	20 ^{d)}	7–8	very low	A1	I
0.7	–	7–8	very low	A1	I
–	–	8–10	very low	A1	I
0.7	–	6–8	very low	A1	I
0.7	–	6–8	very low	A1	I
0.9	19	7–8	low	R2	II
0.8	16	8–9	low	R1	II
0.8	16	8–9	low	R1	II
1.0	20	8–9	good	R2	II, IV
1.1	20 ^{e)}	–	very good	R2	II, IV
1.0	17 ^{e)}	–	low	R1	II
0.9	20	8–9	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 dissolvers.
- Good, stable optical properties.

Areas of application in various types of decorative coatings

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

■ Recommended ■ Suitable

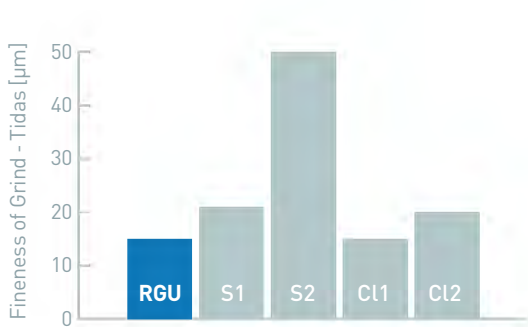


Industrial paints

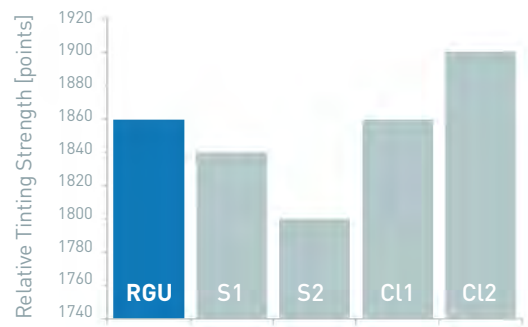
The basic requirements for titanium dioxide used in the production of sophisticated industrial coating materials are:

- 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.

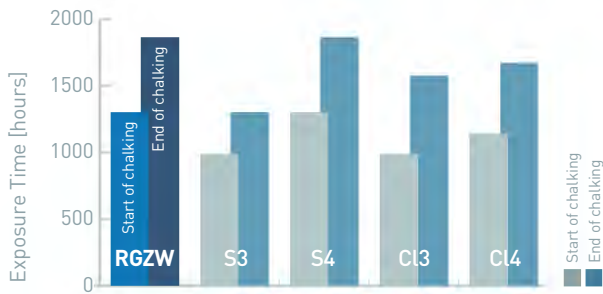
PRETIOX RGU: excellent dispersion properties, (mill base for solvent-based, decorative or industrial coatings, dispersed using a high-speed dissolver at 8000 rpm for 15 minutes), compared with sulphate /S/ and chloride /Cl/ competitive samples used in this application.



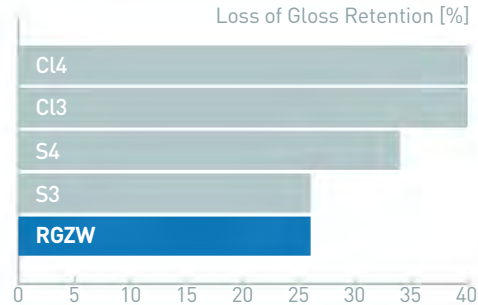
The relative tinting strength of **PRETIOX RGU** pigment in a traditional air-drying long oil alkyd (PVC 17%), compared with sulphate /S/ and chloride /Cl/ competitive samples used in this application.



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	RGU	RGZW
Powder coatings			■	■
Coil coatings			■	■
Can coatings				■
Metal containers (can coatings)			■	■
Domestic electrical 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

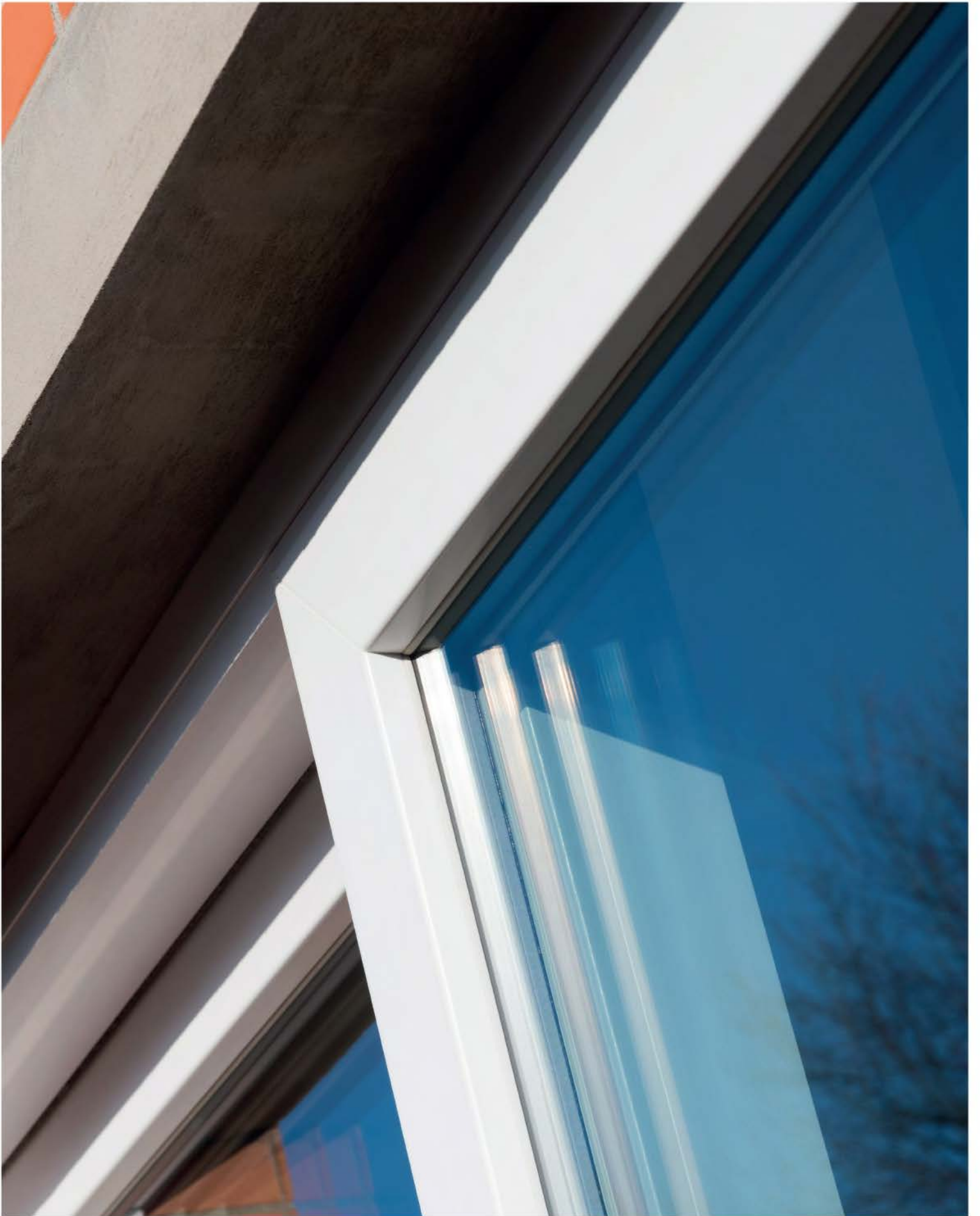
Titanium dioxide is one of the most frequently used pigments in the plastics industry as even very low loadings not only guarantee the required white or pastel shade of the final product, but can also provide the plastic with sufficient protection against destructive UV radiation.

PRETIOX titanium dioxide for plastics can be produced with different particle size distribution as an ultra-fine milled or micronized powder. Thanks to the variability in the amount and type of inorganic surface treatment, it offers a wide range of options in different applications. PRETIOX titanium dioxide is characterized by an excellent degree of dispersibility, low humidity and good, stable optical properties.

Areas of application in various plastics technologies

PRETIOX	AV01SF	R200M	RGX	RG18P
Polyolefins	■	■	■	■
Premixes / Masterbatches	■	■	■	■
High content of TiO ₂ 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:

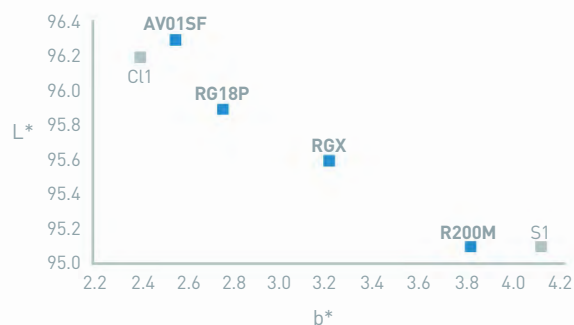
- Good, stable optical properties.
- Easy dispersibility, low humidity and stabilizer consumption, excellent light fastness.
- Heat resistance at temperatures used for polymer processing.
- Chemical inactivity in formulation and a low ability of reagglomeration in the liquid polymer mix.

Areas of application in various types of plastics

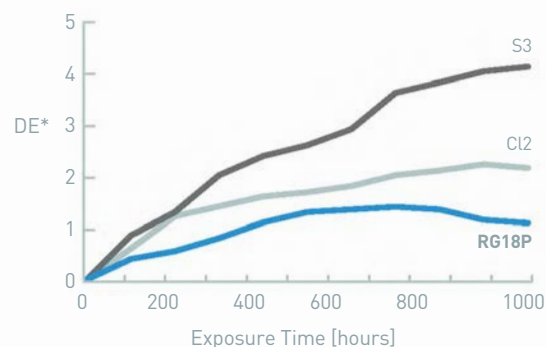
PRETIOX	AV01SF	R200M	RGX	RG18P
Injection moulding – interior	■	■	■	■
Injection moulding – exterior			■	■
Production film – interior			■	■
Production film – exterior			■	■
Production of BOPP foils			■	
Fabrication of boards	■	■	■	■
Production of blown films – interior			■	
Production of hollow bodies – by injection	■	■	■	■
Production of hollow bodies – by extrusion	■	■	■	■
Production of hollow bodies – by rotational moulding			■	■
Shaping of polyolefins	■	■	■	■
Rolling	■	■	■	■
Casting	■	■	■	■

■ Recommended ■ Suitable

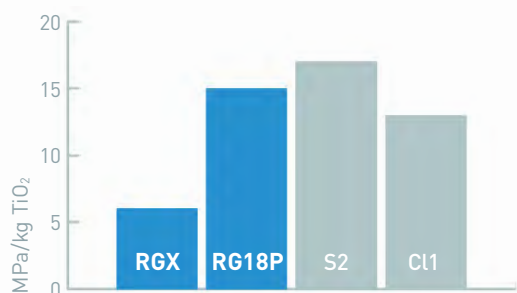
Comparison of the optical properties of **PRETIOX** titanium dioxide grades with sulphate /S/ and chloride /Cl/ competitive samples in white LDPE films with a 4% TiO₂ content.



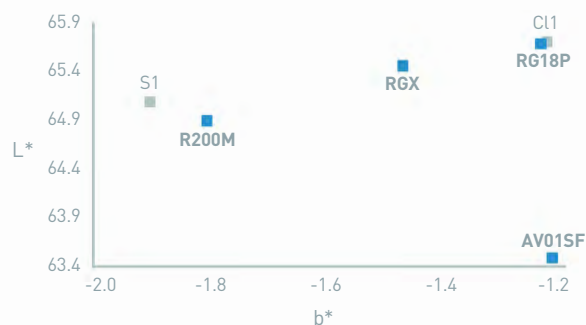
Comparison of the changing optical properties of PVC window profiles containing **PRETIOX** RG18P titanium dioxide and sulphate /S/ and chloride /Cl/ competitive samples in Q-SUN.



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 of the PRETIOX product portfolio in plastics ranges from cups and plastic buckets, through the production of water pipes to multilayer foils and window profiles.

Hygienic certification for use in contact products with food is an advantage that opens up a wide 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 distribution.
- A high degree of whiteness in anatase grades.
- Strong covering power in rutile grades.

Areas of application in various types of paper products

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

■ Recommended ■ Suitable

PRETIOX TITANIUM DIOXIDE

FOODSTUFFS, PHARMACY AND COSMETICS

PRECHEZA long-term experience
in manufacturing of titanium dioxide
PRETIOX has been applied to develop
special grades of titanium dioxide
for food/pharma and cosmetic sectors.



Compliance with purity standards

Identification

INCI name	Titanium Dioxide
Chemical formula	TiO ₂
Molecular weight	79.88
CAS No.	13463-67-7
EINECS No.	236-675-5
Colour Index	77891
Colour Name	Pigment White 6

	PRETIOX AV01FG	PRETIOX AV01PhG	PRETIOX R200C
E-171 Food Colour Specification 231/2012/EC	■	■	■
Food and Drug Administration FDA 21 CFR	■	■	■
FAO JECFA Specification Monograph 32 (2024)	■	■	■
Cosmetic Regulation 1223/2009/EC	■	■	■
US Pharmacopoeia USP-NF		■	
Japanese Pharmacopoeia JP		■	
Kosher	■	■	■
Halal	■	■	■

Application

	PRETIOX AV01FG	PRETIOX AV01PhG	PRETIOX R200C
Foodstuffs ¹⁾	■		■
Cosmetics	■	■	■
Pharmaceuticals		■	



1) EU: not authorised food additive E-171 (Commission Regulation (EU) 2022/63)
USA: not to be used in amounts greater than 1 % w/w in food products

PRETIOX TITANIUM DIOXIDE

CONSTRUCTION INDUSTRY

TiO₂ 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, silicone 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 TiO₂ is calculated based upon the total weight of the plaster mix; the usual loading being 4–5%.

Concrete

Particularly architectural and concrete brut elements, which are produced from white concrete, use TiO₂ pigment.

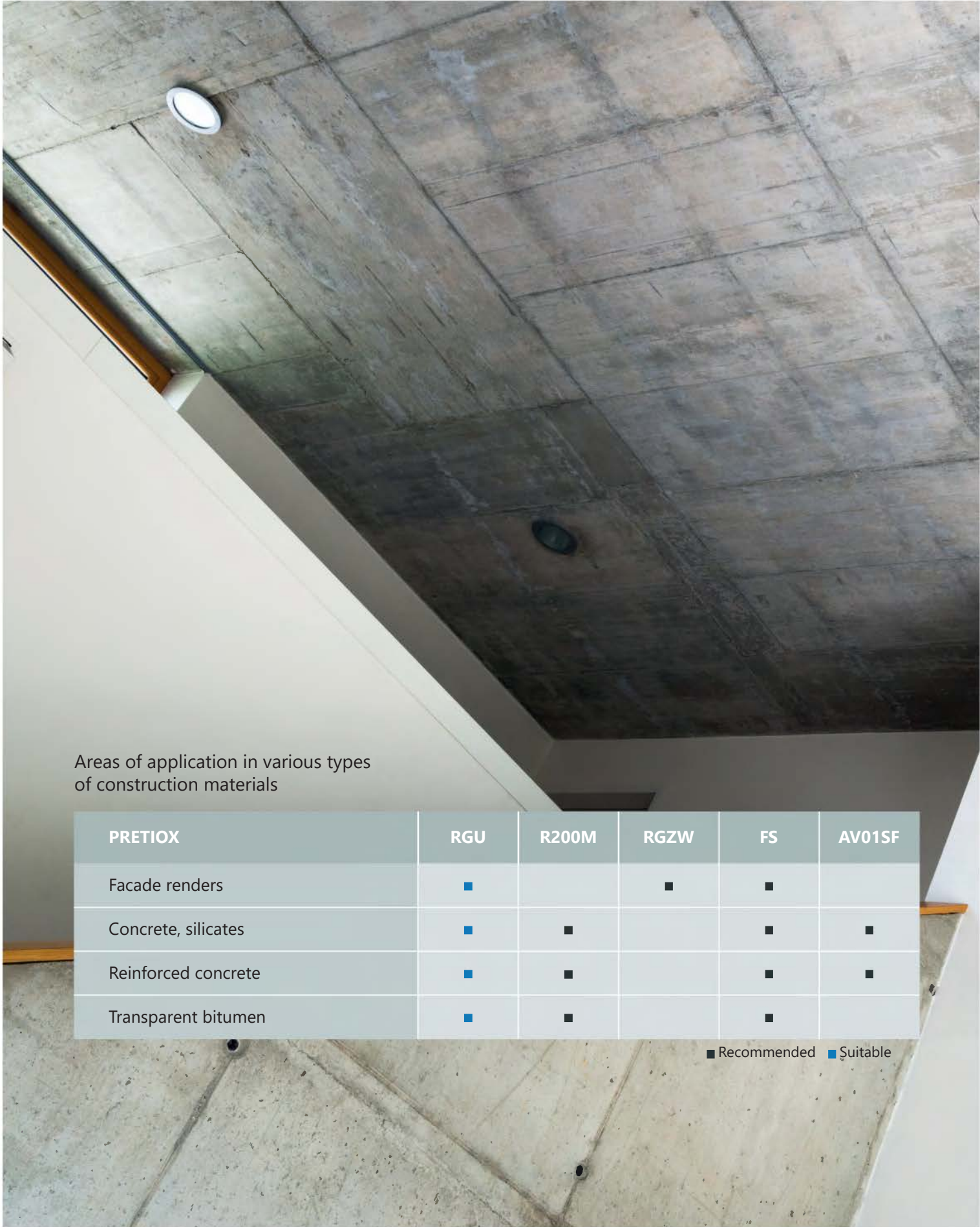
Another possibility is the pigmentation of grey concretes and grey concrete products in order to achieve a lighter shade, or to emphasize the colour when using coloured inorganic pigments. The TiO₂ loading, (within the range of 4–10%), is related to the proportion of the binding agent. It is necessary 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 TiO₂ loading based on the total weight of the mixture is between 2–5%. Combinations with coloured pigments are also recommended.



Areas of application in various types
of construction materials

PRETIOX	RGU	R200M	RGZW	FS	AV01SF
Facade renders	■		■	■	
Concrete, silicates	■	■		■	■
Reinforced concrete	■	■		■	■
Transparent bitumen	■	■		■	

■ Recommended ■ Suitable

WEATHERING STATION

Evaluation of the light fastness of pigments in coating materials, plastics profiles and coloured concrete forms

The samples under test are evaluated at a weathering station for a two-year period as a standard, conforming with the recommendation of the European Standard EN 12878. Weathering parameters are continuously evaluated - solar energy, temperature, precipitation etc. The weathering station situated on the PRECHEZA site simulates an industrial environment at an altitude of approx. 205 m above sea level. A second weathering station in the Hostýn mountains (approx. 700 m above sea level) is located in a higher rainfall environment with intensive solar energy and lower than average temperature.

HEALTH AND THE ENVIRONMENT

Quality

The manufacture and sales of PRETIOX pigments is within the scope of the certified Management System, ISO 9001 Quality, ISO 14001 Environment, ISO 50001 Energy and OHSAS 18001 Safety.

Safety, health and the environment

Under normal conditions, PRETIOX titanium dioxide is stable and inert with regards to the majority of chemical substances. In general, it is not classified as hazardous for human health or the environment. It is not classified as a hazardous substance for transportation. Dust may occur when handling PRETIOX titanium dioxide and therefore an adequate respirator must be used for long-term dust exposure. PRETIOX titanium dioxide comes with a safety data sheet in accordance with the European legislation REACH, (Directive 1907/2006), and complies with the statutory requirements for application in materials intended for contact with food.

Packaging

PRETIOX titanium dioxide is usually packed in double layer vent paper bags to a net weight of 25 kg, or extra-large bags to 1,000 kg net weight. It is supplied on wooden pallets, (1 tonne per pallet), shrink-wrapped in polyethylene foil.



This leaflet is a general guide to the properties and fields of potential application of PRETIOX grades. Information on application is given in good faith and does not constitute any guarantee. For specific grade selection, see Product Specifications or contact Technical Service at PRECHEZA company. Material Safety Data Sheet and additional information about each products and the company is available on www.precheza.cz. Control quality of pigments is provided in all steps of the production. Samples are available on request. We recommend trial application tests.



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