Keeling & Walker
World Leader in Tin Oxide

Engineered Oxides for Demanding Applications

STANOSTAT | ANTIMONY DOPED TIN OXIDES

Member of the AMC Group

Keeling & Walker
World Leader in Tin Oxide

Founded in the early 1900s in Stoke on Trent, the heartland of the British ceramics industry, Keeling & Walker started as a supplier to the local potteries.

OUR ORIGINAL PREMISES FROM 1916

OUR NEW PREMISES SINCE 2015

Founded in the early 1900´s in Stoke on Trent, the heartland of the British ceramics industry, Keeling & Walker started as a supplier of the local potteries. The company quickly realised the importance of tin oxide as one of the key raw materials for colour pigment production and by the 1930's had established their own manufacturing process, which has set the industry standard to the present day.

In the following years Keeling & Walker focussed on Tin Oxide and in SUPERLITE created the most recognised brand in the ceramics industry today.

With this background Keeling & Walker pioneered the development of StanoStat Antimony Tin Oxide Nanomaterials, which excel in their antistatic and infrared light absorbing properties. Today Keeling & Walker is the worldwide leading manufacturer of doped Tin Oxides.

State of the art production facilities supported by a rigorous Quality Management System based on ISO 9001, 14001 and 50001 made it possible to introduce StanoStat products into a wide range of applications ranging from ceramics, special inks and coatings, polymer additives to high-tech electronics.

Keeling & Walker´s technical consultancy and service ensures that StanoStat products deliver optimal performance and are adapted to any application requirement.

Continuous Investment into Research & Development guarantees that the next generation of further improved and tailored products is on its way.

ANTIMONY TIN OXIDES

Tin Oxide is a white, inert and very stable material. Reacting Tin Oxide with other Metal Oxides leads to the formation of colour pigments, which are widely used in the ceramics industry.

Based on this experience it was discovered that the introduction of different elements into the crystal structure of Tin Oxide not only changes the colour but also influences other physical properties.

Doping Tin Oxide with Antimony has wide ranging effects: the electrical insulator Tin Oxide is converted into a semi-conducting oxide. The optical properties change as well. A strong absorption of near infrared light occurs, whereas the transparency in the visible range is maintained in thin films.

The environmentally friendly profile of Tin Oxide is largely not influenced by the dopant, because the Antimony is fixated inside the crystal structure, leaving the toxicological performance unchanged.

Keeling & Walker has converted these findings into a range of highly sophisticated products, and manufactures by proprietary processes two distinct product lines: StanoStat CP and StanoStat CPM.

STANOSTAT CP RANGE

The StanoStat CP range of Antimony Tin Oxides combine semi-conductive properties with a very light grey colouration.

Compared to other ATO grades, where the blue shade is dominant, the StanoStat CP greades offer great variability in colouration of the finished product.

The CP range has a ceramic nature and shows high inertness, which provides high durability and makes them stable against chemical and environmental impact.

The CP range typically has a spherical particle shape. They deagglomerate easily and disperse well in coatings and inks. No high energy grinding is suggested. For polymer applications special grades of surface treated oxides are available which offer excellent dispersibility.

CP products are designed for non-transparent applications, but opaque or translucent formulations are possible.

	Colour	L-value	Conductivity (ohm*cm)	BET Surface Area (m^2/gr)	Particle Size D50 in µm
CP15G	Light blue-grey	82 – 86	10	6	0,8
CP40W	Light grey	90 – 94	100	4,4	0,8
CP05	Blueish	> 65	3	2	1,4
CP5C	Blueish-grey	78 – 82	4	3	1,0
CP5R	Light grey	88	8	7	0,4
CP5RM	Pale greenish- grey	78 – 82	15	9	N/A
CP8C	Light grey	84 – 87	8	6	0,9
CP150C	Light grey	87 – 89	8	5	1,2

APPLICATIONS

The unique properties – light colours, good electrical conductivity and high Absorption of Infrared and Laser Light - are exploited in a number of applications.

Predominantly CP materials provide antistatic properties in coatings usually in non- transparent, thin layers. Their low colour and the permanency of the antistatic effect are advantages over other antistatic additives. A concentration over the percolation point is necessary to achieve good antistatic effects.

Thanks to their IR absorption capability CP grades shorten at already low levels quite significantly the drying time of IR dried coatings.

This enables shorter processing times and higher throughput of the drying units.

The good absorption of Laser light and its conversion into heat are the features for applying the CP Oxides as Laser Marking Additives. The StanoStat products can be used as sole marking agent or in specific formulations.

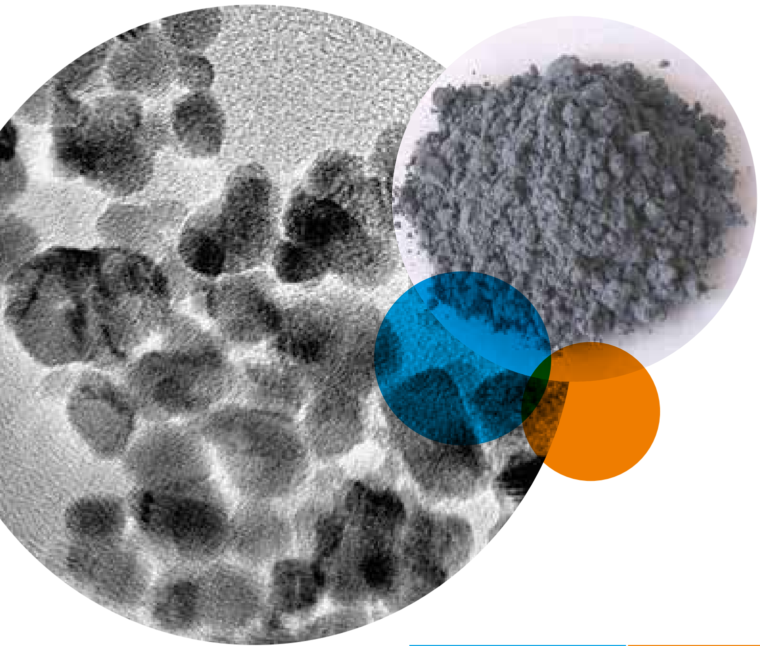
In Laser Direct Structuring processes for polymers or ceramics StanoStat oxides have a double function: they interact with the Laserlight to provide the structuring and act as catalyst for the subsequent metallization process.

CP Oxides can be incorporated into man-made fibres for clothing with high heat retention and heat accumulation capability.

	Antistatic Coatings	Laser Marking Additives	Laser Direct Structuring	Drying Accelerator	IR Absorbing Fibres
CP15G	✔			✔	
CP40W	✔			✔	
CP05		✔	✔		✔
CP5C	✔	✔	✔		✔
CP5R		✔	✔	✔	
CP5RM		✔	✔		✔
CP8C		✔	✔	✔	✔
CP150C		✔			

STANOSTAT CPM RANGE

The StanoStat CPM range are deep blue coloured Antimony Tin Oxides with a unique set of properties.



CPM oxides in bulk are aggregates, which consist of nano-sized, spherical primary particles. This allows the products to be micronised in a variety of aqueous and organic solvents to nano-dispersions, which can be integrated into highly transparent, nearly colourless coatings.

CPM Oxides provide a high electrical conductivity and an excellent absorption of Infrared Light.

	Powder Resistivity (ohm*cm)	Particle Size D50 in µm	BET Surface Area (m^2/gr)	Primary Crystallite Size (nm)	Apparent Density (g/l)
CPM03C	11	3	30	5-10	1000
CPM05C	0,3	3	35	5-10	1000
CPM10C	0,3	3	50	5-10	1000
CPM10F	0,3	2,5	50	5-10	1100
CPM10M	12	6	35	5-10	2200
CPM20HT	0,7	3	60	5-10	1000

Nanodispersions

	Solvent	Solids Content (%)	Particle Size (nm)	pH
A20W Dispersion	Water	20 – 25	<100	5 – 8
AO20E Dispersion	Exxsol	20 – 25	10 – 30	70 – 100

APPLICATIONS

The CPM Nanoparticles find applications in areas where the functionality must meet a requirement for transparency.

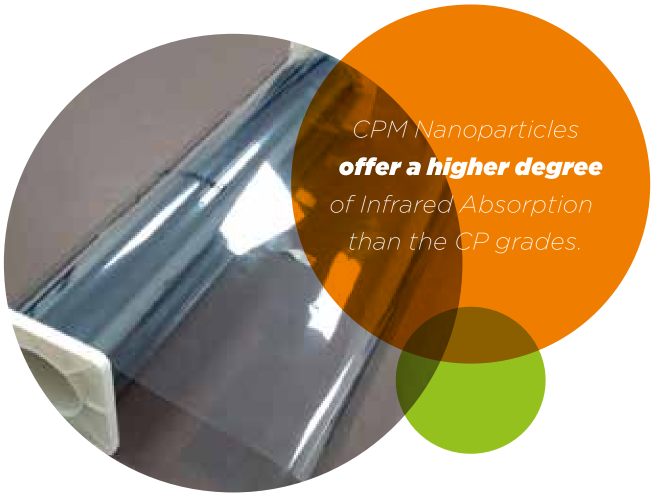
CPM Nanoparticles offer a higher degree of Infrared Absorption than the CP grades. The dispersions in water or solvents are used for the formulation of coatings and inks for film coating. Either in high end solar control films for automotive, residential applications or in agricultural films in combination with other additives, CPM materials provide an efficient IR absorption at an excellent price / performance ratio. Polymer films are not the only substrate, coating on glass or ceramics is also possible.

At higher loadings transparent Antistatic coatings can be achieved, especially to speed up printing processes on polymer films or for dust prevention on Solar Cells. The high thermal stability of CPM Oxides allows the formulation of antistatic glazes in ceramic applications.

For Brand protection CPM materials allow the creation of invisible watermark like imprints.

The high IR absorption is used for reheating applications in PET processing as well as in emerging technologies as 3D printing or powder sintering.

The high purity in combination with the uniform particle size make the CPM materials excellent raw materials for sputtering targets to generate transparent conductive oxide layers.



	Antistatic Coatings	IR Cut Films	Agricultural Films	Sputtering Targets	Brand Protection	PET Reheating Additive	Ceramic / Glass Coatings
CPM03C		✓				✓	
CPM05C	✓	✓		✓	✓	✓	
CPM10C	✓	✓	✓	✓	✓		✓
CPM10F	✓	✓	✓	✓	✓	✓	
CPM10M		✓	✓			✓	
CPM20HT							✓
A20W Dispersion	✓	✓	✓		✓	✓	✓
A020E Dispersion		✓	✓		✓	✓	✓

Keeling & Walker
World Leader in Tin Oxide

UK | WHIELDON ROAD, STOKE ON TRENT, ST4 4JA, UNITED KINGDOM

+44 (0) 1782 744 136
sales@keelingwalker.co.uk
www.keelingwalker.co.uk

THERMOX
PERFORMANCE MATERIALS GMBH

GERMANY | BREDENEYER STR. 2b, 45133 ESSEN, DEUTSCHLAND

+49 201 12 59 622
info@zinnoxid.de
www.thermox.eu

AMC
Member of the AMC Group