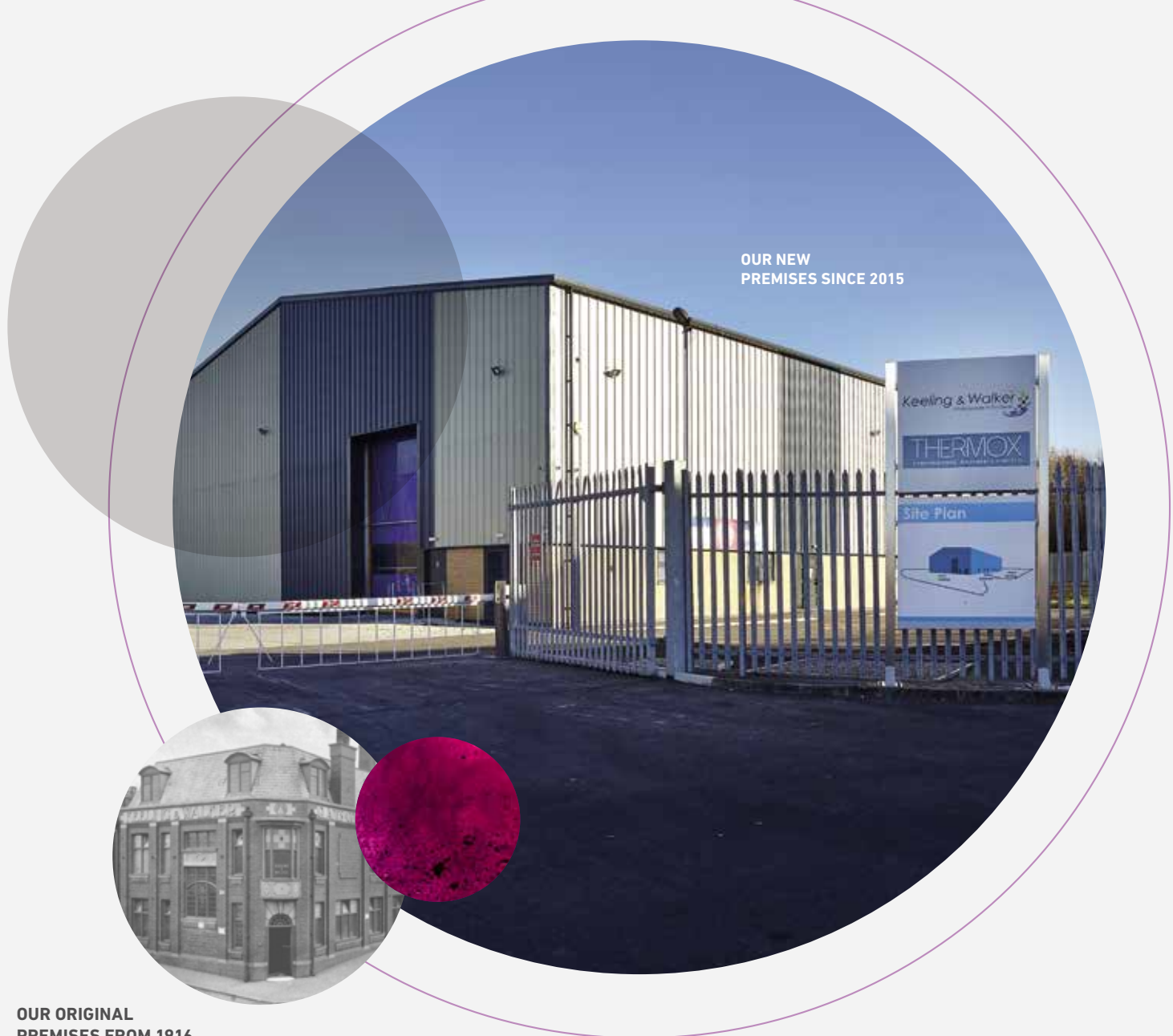


Product Programme

OVERVIEW



OUR NEW
PREMISES SINCE 2015



OUR ORIGINAL
PREMISES FROM 1916

Based in Stoke-on-Trent, the heartland of the British ceramics industry, Keeling & Walker was founded in 1916 as a supplier to the local potteries.

The company quickly realised the importance of tin oxides as a key raw material for ceramic colour pigments and glazes, and by the 1930s it had established a unique manufacturing process which has set the industry standard to the present day.

Today Keeling & Walker is the world-wide leading manufacturer of tin oxides and its SUPERLITE brand is the most recognised on the market.

Tin oxides are used in a wide variety of modern industrial applications. Keeling & Walker offers a broad range of tin oxide grades tailored to the particular demands of the glass, friction materials, automotive, polymer, electrical and electronic industries.

The company is renowned for pioneering antimony tin oxides, which excel in their antistatic and infrared light absorbing properties. This and other early developments laid the groundwork for Keeling & Walker's current portfolio of functional pigments for the polymers industry. NIR absorption, laser marking and laser direct structuring pigments all form part of the company's offering to the plastics market.

TIN OXIDES

Keeling & Walker's range of tin oxides is the result of many years' work developing high-quality, tailored solutions to its customers.

The SUPERLITE brand is the company's best-known tin oxide grade and is suitable for a wide range of applications. Keeling & Walker also produces speciality tin oxides, stannic acids and high purity materials which cater to the individual demands of a variety of different industries.

SUPERLITE TIN OXIDES

Product	Bulk density (g/l)	BET surface area (m ² /g)*	Particle size D50 (µm)	Remark	Recommended use
SUPERLITE	600	7-9	0,8	Most versatile grade	Pigments, glazes, polishing agent
SUPERLITE A	1100	7-8	0,8	Higher bulk density	Pigments, glazes
SUPERLITE C	600	7-9	0,8	Pb < 100 ppm	Pigments, glazes, cosmetics
SPG	700	8	0,8	Cost-effective material	Colour pigments
SV5	1500	3	1,4	Free flowing material	Polymer additive, welding additive
Vertex	1000	6	0,9		Pigments
PFO150	1350	1	Approx. 75	Coarsest grade	Sintering

SPECIALITY OXIDES

Product	Bulk density (g/l)*	Tap density (g/l)*	BET surface area (m ² /g)*	Particle size D50 (µm)	Recommended use
CS1	550	800	1,3	1,5	Electrodes
CS1-L	550	800	2,0	1,2	Electrodes
CS3	750	1500	0,6	2,8	Glass refining additive
CVS4	1000	2000	0,3	4,0	Electrical contact materials, Glass refining additive
CVS6	1000	2000	0,2	6,0	Contact materials
CSC/DW	800	1600	0,6	2,8	Contact materials
CSM/DW	700	1450	1,1	1,8	Contact materials
CSF2/DW	750	1500	1,3	1,5	Contact materials

* Approximate value

THERMOX GRADES

Product	Bulk density (g/l)	Tap density (g/l)	BET surface area (m ² /g)	Particle size D50 (µm)	Recommended use
RL	300	600	11	0,2	Colour pigments
EFGE	500	1000	7	0,4	Pigments / glazes
VN	650	1300	5	0,5	Friction materials
VS	850	1700	4	0,7	Electrodes
R39	900	1800	3,5	0,75	Glazes

HIGH PURITY GRADES

Product	Purity	Bulk density (g/l)	Tap density (g/l)	LOI (%)	BET surface area (m ² /g)	Particle size D50 (µm)	Recommended use
RL-HP	99,995%	300	600	< 3	11 - 17	0,2	Sputtering targets
RL-IV	99,99%	300	600	< 3	11 - 17	0,2	Sputtering targets
HPTO	99,99%	1400	2200	< 5	4 - 6	2 - 5	High purity glass
TL-HP	99,995%	350	700	< 3	8 - 9	0,3-0,4	Sputtering targets

STANNIC ACIDS

Product	BET surface area (m ² /g)	Particle size D50 (µm)	Bulk density (g/l)	pH (50% w/w aqueous slurry)	Loss on ignition (@1000°C in %)	Recommended Use
MSA	> 160	3 - 10	1600	0,5 - 2,0	9	Colour pigments, gas sensors
HSATO	35 - 45	12 - 15	1700	3	1	Catalysts, battery material
HPASA	> 160	75 - 150	1800	2,5	11 - 15	Radiopharmaceutical application

TIN OXIDE NANODISPERSION

Product	Stabilizer	Solids content (%)	Specific gravity (g/cm ³)	pH	Recommended Use
HTOD	KOH	27 - 30	1,3 - 1,4	10 - 14	Coating
ADTOS	NH ₃ *H ₂ O	10	1,1	10 - 12	Coating
AMSOL	Aminoalcohol	17 - 21	1,1 - 1,2	10 - 12	Coating
Dispersion DQ	Dispersant	25	1,2	7	Polishing agent

DOPED TIN OXIDES

Keeling & Walker has been a pioneer in the development of doped tin oxides.

Originally developed as permanent antistatic additives for

paints and coatings, the NIR absorption capability of doped tin oxides quickly caught the attention of many industries. No other manufacturer offers as broad a range of doped tin oxides as Keeling & Walker.

STANOSTAT CP GRADES

StanoStat CP grades are light coloured Antimony Tin Oxides, allowing great colour flexibility. They are designed for non transparent applications.

Product	Colour	L-Value	Resistivity (ohm*cm)	BET surface area (m ² /g)*	Particle size D50 (µm)	Recommended use
CP15G	Light blue-grey	82 - 86	10	6	0,8	Polymer additive, antistatic glaze
CP40W	Off-white	90 - 94	100	4,4	0,8	Polymer additive
CP05	Blueish	< 65	3	2	1,4	Laser Direct Structuring (LDS) additive
CP5C	Blueish-grey	78 - 82	4	3	1,0	LDS and laser marking additive
CP5R	Light grey	86 - 90	8	7	0,4	NIR absorbing fibres
CP5RM	Pale greenish-grey	78 - 82	15	9	n.a.	NIR absorbing fibres
CP8C	Light grey	84 - 87	8	6	0,9	Laser marking
CP150C	Light grey	87 - 89	8	5	1,2	Laser marking

STANOSTAT CPM GRADES

StanoStat CPM grades are deep blue-grey coloured pigments with primary particle sizes in the low nanometer range, making them most suitable for transparent applications.

Product	BET surface area (m ² /g)*	Resistivity (ohm*cm)	Bulk density (g/l)	Recommended use
CPM02C	30	11	1000	Sputtering target
CPM05C	35	0,3	1000	Reheating additive for PET, NIR Absorber
CPM10C	50	0,3	1000	Antistatic additive, NIR Absorber
CPM10F	50	0,3	1100	Laser Additive, NIR Absorber
CPM10M	35	12	2200	Reheating additive for PET, NIR Absorber

FLUORINE DOPED TIN OXIDE

Product	Colour	L-Value	Resistivity (ohm*cm)	BET surface area (m ² /g)*	Particle size D50 (µm)	Recommended use
FTO	Light grey	> 90	< 5	10 - 15	0,3	Conductive glass coating, electrodes

* Approximate value

INDIUM TIN OXIDES

Indium tin oxides are a type of transparent conductive mixed oxide.

These oxides can be adapted depending on the manufacturing process in question. Best known for their application in touch screens, indium tin oxides are used in solar control film, antistatic coatings and gas sensors.

Product	Composition	Colour	Thermal stability	Max. IR powder absorption	Recommended use
IRASORB YITO	Indium tin oxide	Yellow	800°C	1700 nm	Sputtering target
IRASORB BITO	Indium tin oxide	Blue	800°C	1100 nm	NIR absorber, laser marking additive, transparent electrodes
IRASORB BITO M40	Indium tin oxide	Light blue	300°C	1100 nm	NIR absorber improved dispersability in polymers
IRASORB GITO	In ₄ Sn ₃ O ₁₂	Dark yellow	1400°C	1500 nm	Gas sensor

DOPED TUNGSTEN OXIDES

Doped tungsten oxides offer superior transparency to visible light and the strongest near infrared absorption from all known materials.

Product	Composition	Colour	Thermal stability	Max. IR powder absorption	Recommended use	Remark
IRASORB CTO20	Doped tungsten oxide	Dark blue	800°C	900 nm	NIR absorber	Excellent dispersibility in water and various solvents
IRASORB CTO M10	Doped tungsten oxide	Dark blue	350°C	900 nm	NIR absorber	Unique, patent protected doped tungsten oxide which can be easily incorporated into polymers
IRASORB RTO	Reduced tungsten oxide	Purple	600°C	1000 nm	NIR absorber	Cost effective version of CTO20
IRASORB RTOM	Doped tungsten oxide	Dark blue	350°C	1000 nm	NIR absorber	Excellent dispersibility in solvents and polymers, blocks more VIS than CTOM10
IRASORB NTO	Sodium tungsten oxide	Dark orange	600°C	1000 nm	NIR absorber, optical filter	Unique optical properties

OTHER PRODUCTS

	Composition	Colour	Purity	Recommended use
Indium oxide	In ₂ O ₃	Off white	> 99,9%	Sputtering targets, contact materials
Black tin powder	Sn	Black	99,85%	Tin chemicals, powder metallurgy

NANODISPERSIONS

Product	Chemistry	Solvent	Colour	Solids content	Particle size by DLS	pH*	Availability	Recommended use
A20W	ATO	Water	Dark blue	15 - 40%	50 - 100 nm	8 - 10	Commercial	Antistatic coating
A20WN	ATO	Water	Dark blue	20%	60-80 nm	8 - 10	Commercial	Antistatic glass coating
A20E	ATO	Exxsol D140	Dark blue	20%	< 100 nm		Pilot	3D printing
A20BA	ATO	Butylacetate	Dark blue	20%	< 80 nm		Pilot	NIR absorber
B20P	BITO	Plasticizer	Dark blue	20%	< 30 nm		Pilot	NIR absorber
B20W	BITO	Water	Dark blue	20%	< 100 nm	6 - 8	Experimental	NIR absorber
B20BA	BITO	Butylacetate	Dark blue	20%	< 60 nm		Experimental	NIR absorber
C20W	CTO	Water	Dark blue	20%	< 50 nm	3 - 4	Commercial	NIR absorber
C20BA	CTO	Butylacetate	Dark blue	20%	< 100 nm		Commercial	NIR
N20I	NTO	1-propanol	Dark blue	20%	< 80 nm		Experimental	NIR absorber

IRASORB LASER MARKING AND STRUCTURING PRODUCTS

Keeling & Walker's laser marking additives provide permanent, indestructible and high contrast marks on plastic surfaces. They are all designed to be used with 1064 nm NIR laser.

Name	Code	Composition	Colour	LDS Additive	Lasertype	Recommended Use
IRASORB	LM 001	Mixed Oxides	Cream		1064 nm / NIR / Fibre	Marking on PP, TPU, PVC
IRASORB	LM 002	Mixed Oxides	Light yellow		1064 nm / NIR / Fibre	Antimony Free; Marking on PA; PP, ABS, PBT, PE, TPU
IRASORB	LM 004	Mixed Oxides	Light yellow		1064 nm / NIR / Fibre	Marking on PP, PE, TPU; PBT,
IRASORB	LM 005	Mixed Oxides	Light grey	Yes	1064 nm / Fibre, CO ₂	Low colour LDS Additive; Marking on PC, ABS, TPU
IRASORB	LM 007	Copper Tungstate	Yellow	Yes	1064 nm / Fibre	Marking on TPU; PA, PC
CCTO		Calcium Copper Titanate	Brown	Yes	1064 nm / Fibre	LDS additive, Electroceramics

* Approximate value



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

+44 (0) 1782 744 136

sales@keelingwalker.co.uk

www.keelingwalker.co.uk



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

+49 201 12 59 622

info@zinnoxid.de

www.thermox.eu