General Properties

Chemical Structure	Cr/Sb/Ti-oxide
Colour Index Part I	P.Br. 24
Colour Index Part II	77310
CAS Number	68186-90-3
Physical Form	Powder, Fine Granules
Colour Shade	Yellow

Preparations

(Other) preparations can be made on special request.

Colouristical Properties Org.

Hue Grade in PVC 1/9 SD	68.7
Chroma in PVC 1/9 SD	45
Red. Ratio in PVC 1/9 SD	0.79
Hue Grade in PVC 1/25 SD	71.9
Chroma in PVC 1/25 SD	29
Red. Ratio in PVC 1/25 SD	3.39
Hue Grade in PE-LD 1/9 SD	68.6
Chroma in PE-LD 1/9 SD	44.9
Red. Ratio in PE-LD 1/9 SD	0.77
Ease of Dispersion	<10

Physical Properties

Density	4.4	g/cm³
Bulk Density	0.9	g/cm³
Index of pH	7-8	
Conductivity	125	µS/cm
Specific Surface	2	m²/g

Fastness properties

Heat stability	320	°C
Light fastness	8	
Weather fastness		
Migration fastness	5	
Infl. on warping of PE-HD	No	
Fastness to chemicals:		
HCl conc.	>6	Months
HCl 10%	>6	Months
H2SO4 conc.	>6	Months
H2SO4 10%	>6	Months
HNO3 conc.	3	Months

HNO3 10%	>6	Months
NaOH conc.	>6	Months
Na2CO3 sat.	>6	Months

Criteria for the fastness to chemicals was a possible colour change of the coloured plastic material during the storage in the test medium.

Recommendations for applications

PVC-p	Suitable
PVC-u	Suitable
PUR	Suitable
LD-PE	Suitable
HD-PE	Suitable
PP	Suitable
PS	Suitable
SB	Suitable
SAN	Suitable
ABS/ASA	Suitable
PMMA	Suitable
PC	Suitable
PA	Suitable
PETP	Suitable
CA/CAB	Suitable
UP	Suitable

UCC: Under certain conditions

Recommendations for food applications

BgVV	Suitable
FDA	Suitable
France	Suitable

UCC: Under certain conditions

Product Specification - SICOTAN® YELLOW K 2112

PROPERTIES

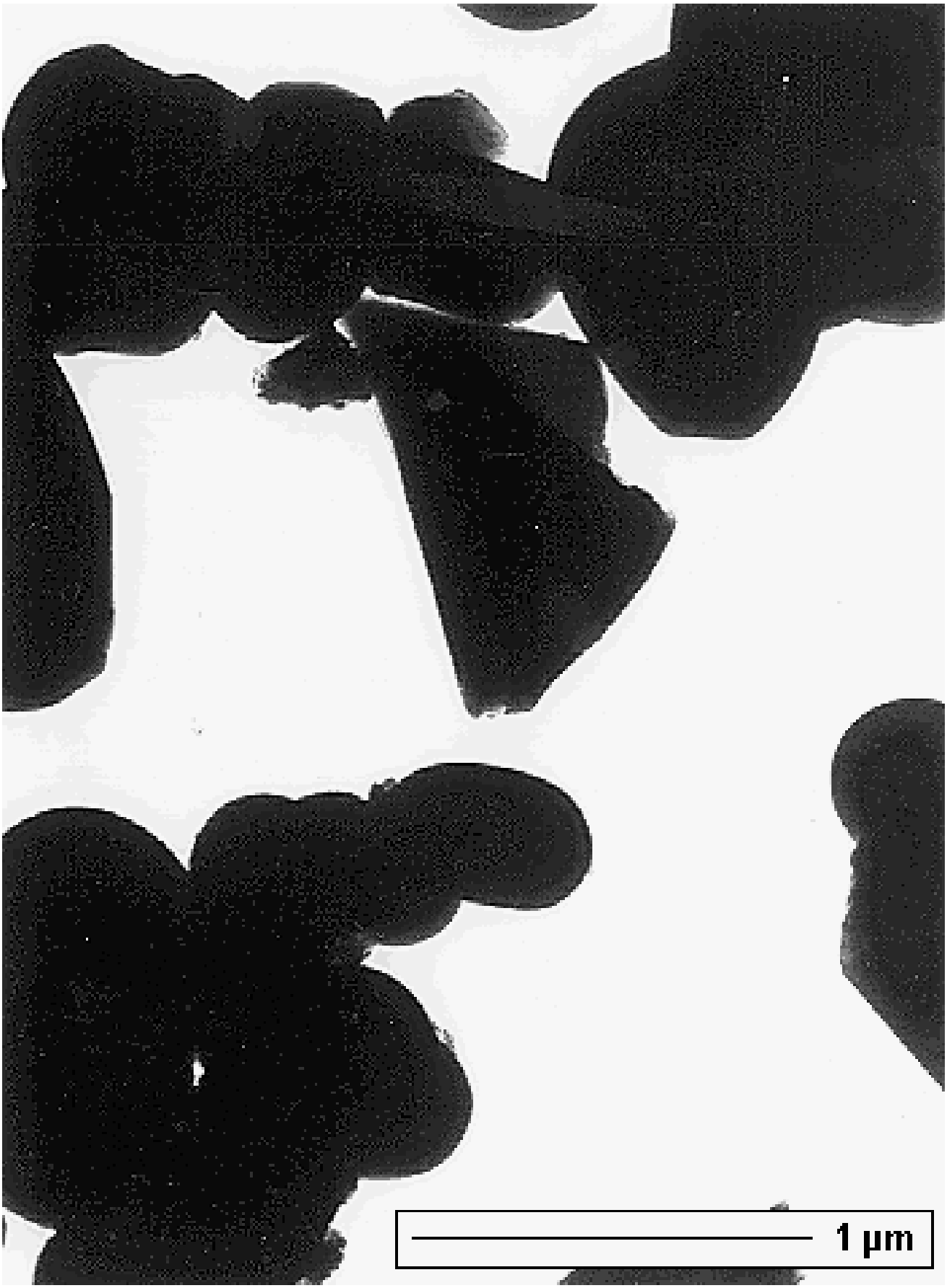
Pigment type:	Cr/Sb/Ti oxide
Colour Index:	Pigment Brown 24
Application:	Colourant for plastics
Physical form:	Powder, Fine Granules
Storage:	practically unlimited shelf life
Food packaging:	approved according to "Empfehlung IX des BgVV".

SPECIFICATION

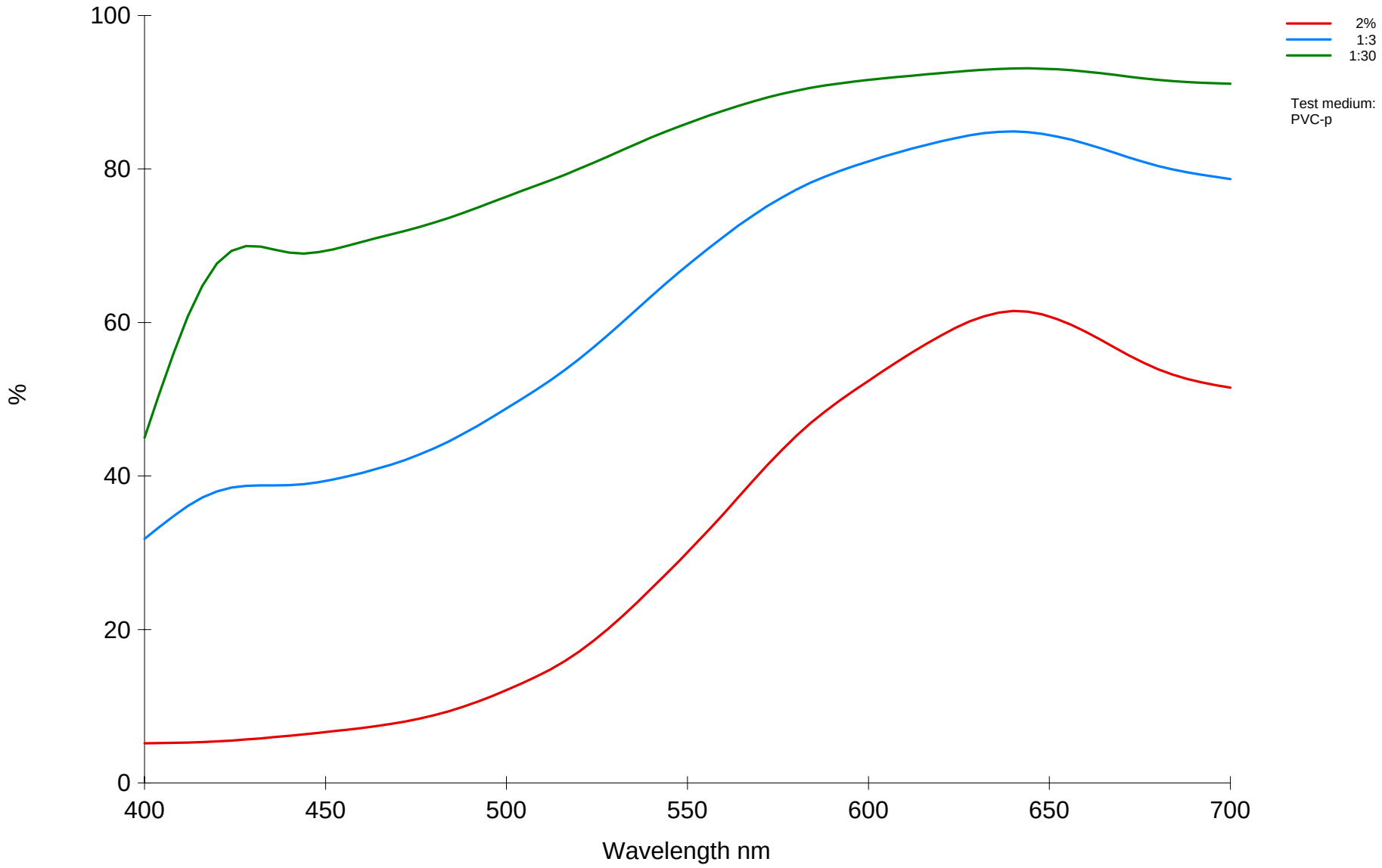
Colour tolerances:	dH* ± 0.7; dC* ± 0.7; dL* ± 0.7; dE* <= 1.0; da* ± 0.7; db* ± 0.7
Strength equivalence:	100 ± 5 %
Test method:	BASF test method 11.3.3.3

Please note:
The above data will be warranted by us. These data, however, as well as the properties of any product samples do not imply any legally binding assurance of certain properties or of suitability for a specific purpose so that any liability for damages cannot be derived therefrom.

Microscopy - SICOTAN® YELLOW K 2112

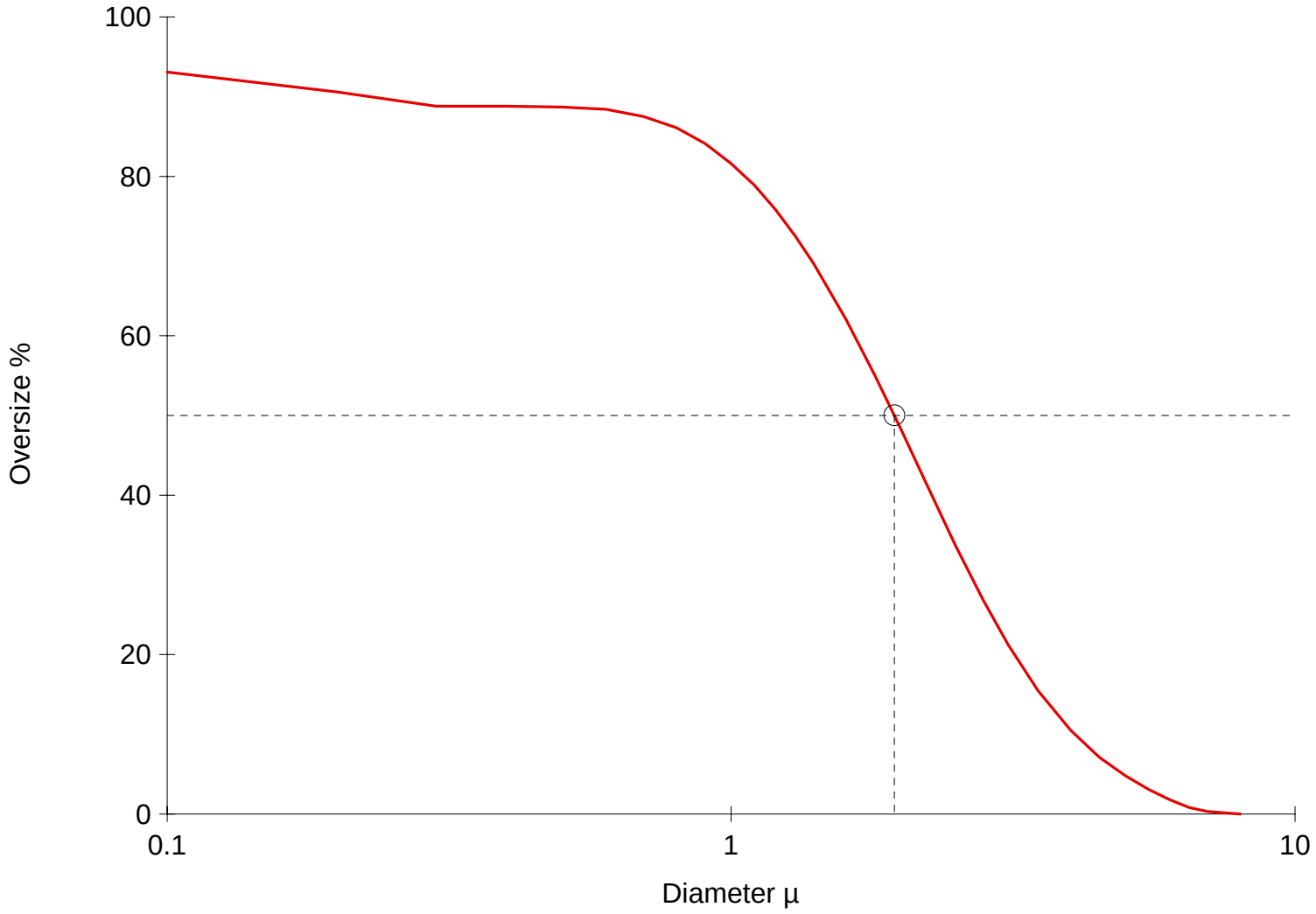


Reflection Curve
SICOTAN® YELLOW K 2112



Note: The program stores curve points (see table). The diagram shows approximations.

Particle Size Distribution
SICOTAN® YELLOW K 2112

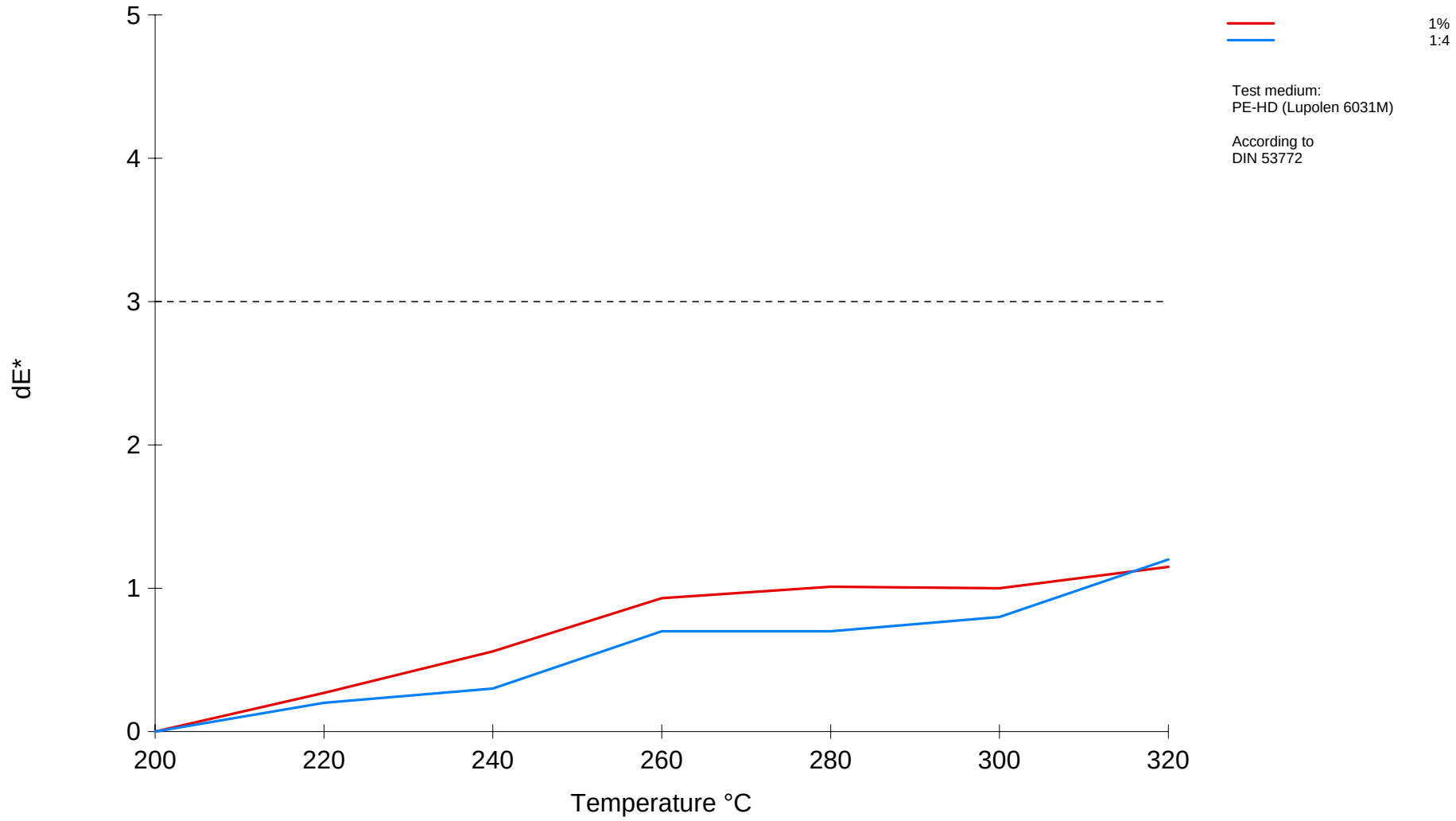


Susp. Fluid: H2O
Disp. Agent: Na4P2O7
Mixer Time: 60 s
Median Size: 1.95 u

CILAS

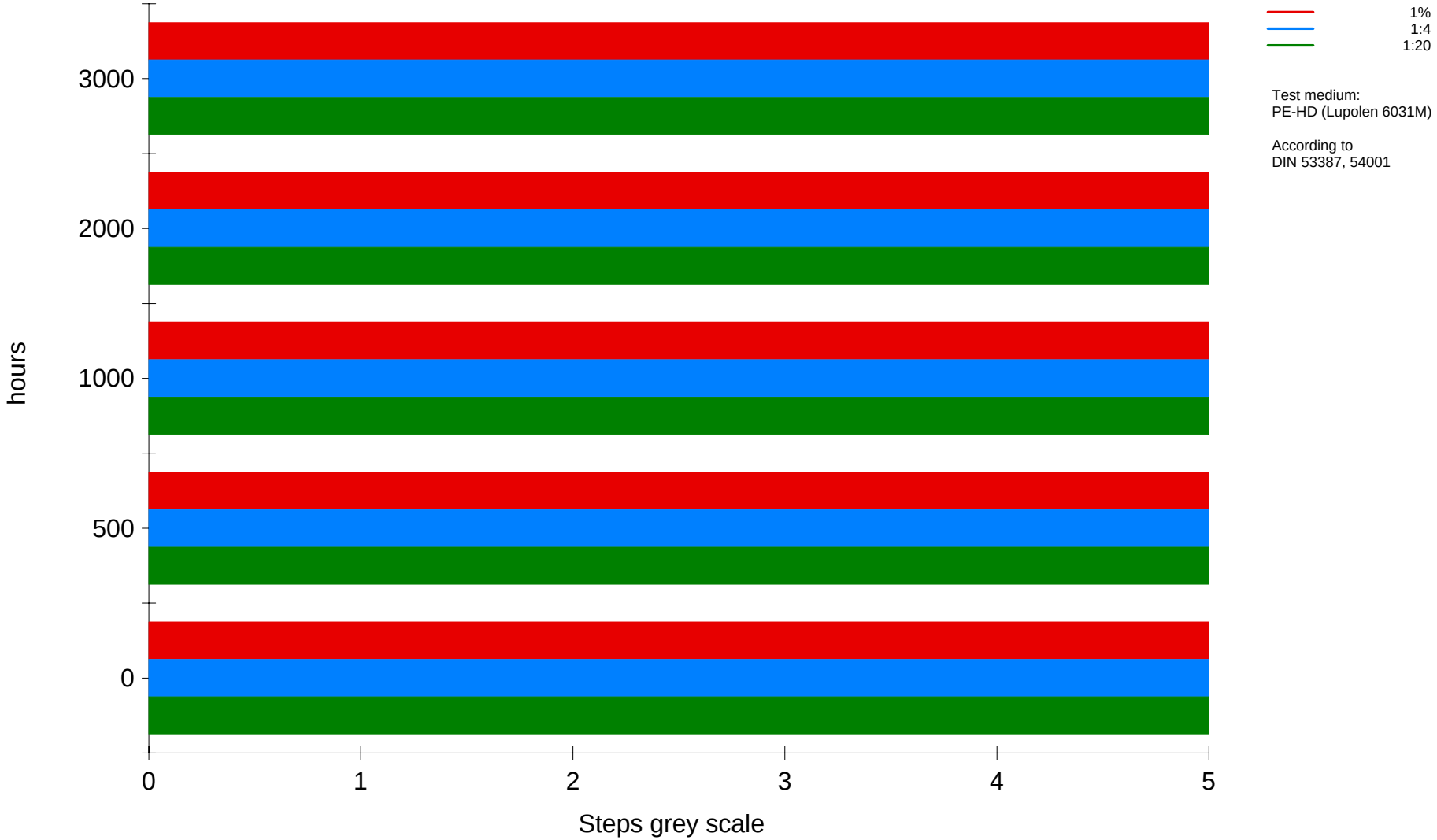
Note: The program stores curve points (see table). The diagram shows approximations.

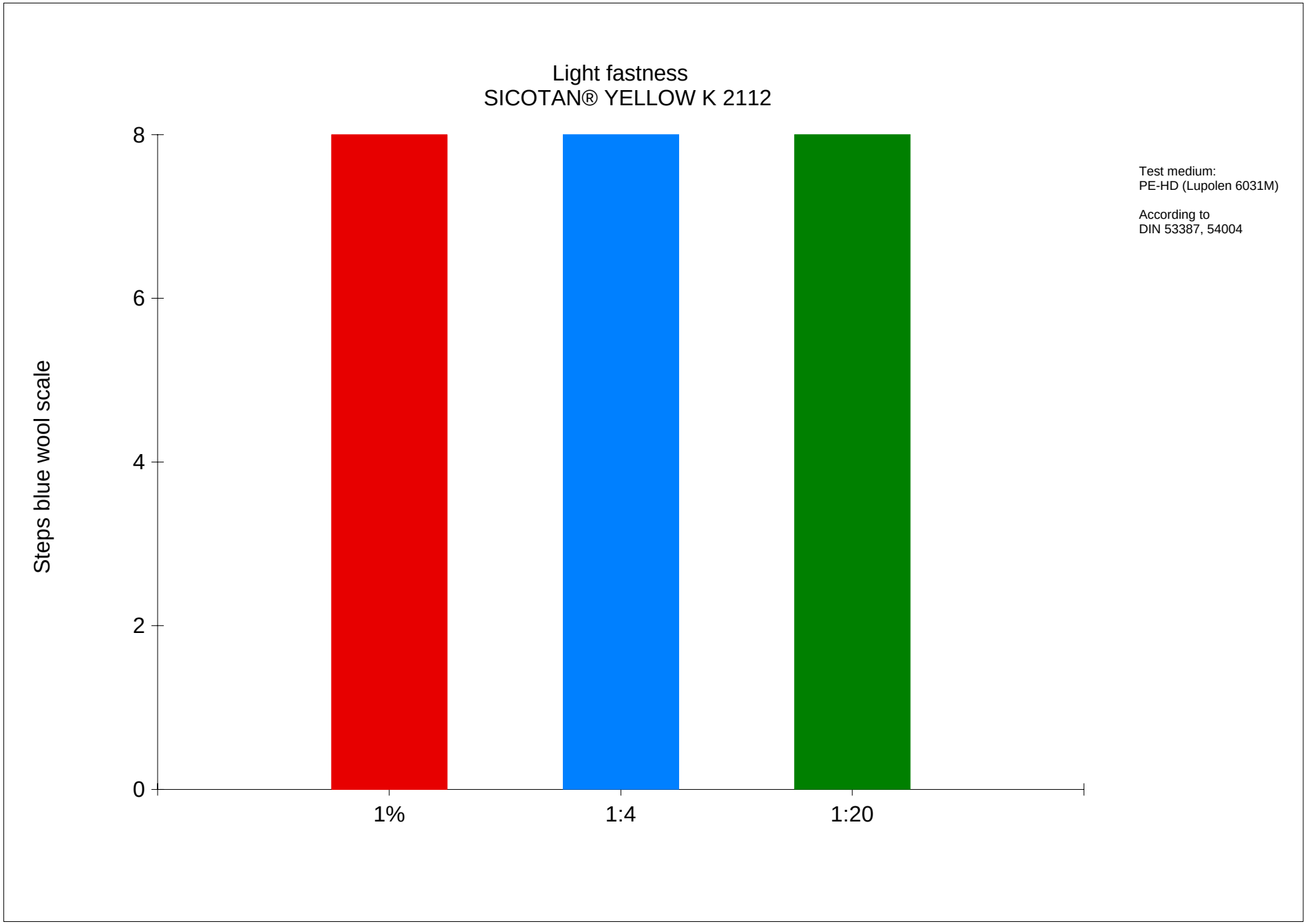
Heat Stability
SICOTAN® YELLOW K 2112



Note: The program stores curve points (see table). The diagram shows approximations.

Weather fastness
SICOTAN® YELLOW K 2112





Product Safety Datasheet BASF

Name of product	**SICOTAN®** Yellow K 2001/2010/2011/2107/2109/2111/2112 including the FG products
C.I. No. / Name	77 310 / C.I. Pigment Brown 24, Chrome Titanium Yellow (Ti,Sb,Cr)O2
CAS No.	68186-90-3
EINECS No.	269-052-1
Chemical nature	Practically insoluble rutile pigments based on chromium(III)/antimony(V)/titanium dioxide. Chromium-III-oxide, the chromatic component, and antimony pentoxide, for balancing the valency, are absorbed by the rutile lattice of these products. The heavy metal oxides thus lose their chemical, physical, and physiological properties. The toxicological and ecological properties therefore correspond largely to those of titanium dioxide rutile. The acid-soluble antimony content is less than 20 mg/kg. These doped rutile pigments must not be regarded as antimony compounds which must be labelled as dangerous substances.
Toxicology	In experiments on animals, chrome titanium yellow pigments did not display acute toxicity. Feeding tests on rats to determine the chronic toxicity revealed no toxicological finding whatever. No acute irritant effect was shown in tests to determine the acute irritation of the skin and mucous membranes. Extreme exposure to dust may lead to a brief irritation of the eyes by mechanical influence.
Ecology	The chrome titanium yellow pigments do not represent any hazard for the environment owing to their inert, practically insoluble character. They can be removed mechanically from effluents. If they are dumped on a controlled dumping site, dissolved heavy metals are not given off to the seepage water. If articles coloured with chrome titanium yellow pigments are incinerated, they are recovered in the original form in the residual ash.
Water hazard class	WGK 0 (generally non water hazardous according to German legislation - self-classification)
Labelling	Chrome titanium yellow pigments are not dangerous substances in the sense of the German Ordinance on Dangerous Substances or of corresponding EU regulations.
Classification as dangerous goods	The products are not classified as hazardous under transport regulations.
MAK value	The general threshold value for dust, i.e. 6 mg/m³, must be observed. (Proposal of the MAK commission for the alveolar passing dust fraction, i.e. 1.5 mg/m³, is not yet valid) (Germany)
Heavy metal content	The **SICOTAN®** pigments listed contain 3-4 % of chromium(III) and 1011 % of antimony. The products do not contain any lead, cadmium, chromium(VI) and mercury compounds in their formulations. The sum of the total contents of these elements, according to tests on standard samples, is less than 100 mg/kg. It is thus below the limit in the EU packaging directives and the American CONEG model. The hexavalent chromium content is below the

limit of detectability, i.e.
1 mg/kg. The average values for the total contents of technically unavoidable impurities are as follows:

Arsenic	30 mg/kg	Nickel	< 50 mg/kg
Lead	50 mg/kg	Selenium	< 1 mg/kg
Cadmium	< 10 mg/kg	Mercury	< 1 mg/kg
Cobalt	< 10 mg/kg	Zinc	< 100 mg/kg
Copper	< 10 mg/kg		

Halogen content

The **SICOTAN®** pigments do not contain any halogens in their formulations.

Food legislation

According to tests on standard samples (Type 8081) the **SICOTAN®** pigments listed conform to the demands on purity in the following food legislation (see also "Heavy metal content"):

Europe:	Resolution AP (89)
Germany:	BgVV Empfehlung IX., 190. Mitteilung vom 1.6.1994
France:	Brochure No. 1227
Italy:	Decreto Ministeriale dated 21.3.1973
Spain:	Resolución del 4.11.82 de la Subsecretaría de Sanidad
USA:	FDA approved to § 170.39 for each polymer up to 2%. In approval for 21.CFR, § 178.3297.

They feature absolute fastness to migration in the coloration of plastics in contact with food. Extraction tests with chrome titanium yellow as 1 % colorant in eight different plastics were carried out. The extraction conditions were 10 days at 40 °C with 4 food simulants, distilled water, 3 % acetic acid, 10 % alcohol, and Test Fat HB 307. Even when the limits of detectability were very low, i.e. 0.2 µg/l of chromium and 0.25 µg/l of antimony, no detectable migration was determined in the extraction experiments.

Toys

According to tests on standard samples (Type 8082), the **SICOTAN®** pigments listed conform to the demands on purity in the European standard on toys, i.e. EN 71, Part 3.

Registration status

The products are listed in the chemical inventories of the following countries: EU (EINECS), USA (TSCA), Canada (DSL), Japan (MITI), Australia (AICS), Korea (ECL), Philippines (PICCS, Final Version 1995), and Switzerland (BAGT No. 691990, Class free).

Other legislation on chemicals

The products do not fall under the provisions of the agreement on chemical weapons and do not contain any substances that are mentioned in the German Ordinance on the Prohibition of Certain Chemicals (ChemVerbotsV). They are produced without using substances that destroy ozone (Montreal Agreement - Ozone Depleting Substances).

TA Luft

Para 3.1.4, Class III (chromium, antimony) (Germany)

Further information can be found in our Material Safety Data Sheets, Technical Information Bulletins and in the Product Safety Info No. 4 "Discussion on heavy metals contained in pigments" and No. 5 "Toxicological and ecological data about nickel and chromium titanium yellow pigments (**SICOTAN**) and data for food contact application". The Product Safety Department in our Inorganic Pigments Division will gladly reply to your queries and can be reached under the

following address:

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