

General Properties

Chemical Structure	Co/Al-oxide
Colour Index Part I	P.B. 28
Colour Index Part II	77346
CAS Number	1345-16-0
Physical Form	Powder
Colour Shade	Blue

Preparations

(Other) preparations can be made on special request.

Colouristical Properties Org.

Hue Grade in PVC 1/9 SD	258
Chroma in PVC 1/9 SD	40.1
Red. Ratio in PVC 1/9 SD	1.01
Hue Grade in PVC 1/25 SD	251
Chroma in PVC 1/25 SD	27.1
Red. Ratio in PVC 1/25 SD	3.45
Hue Grade in PE-LD 1/9 SD	259
Chroma in PE-LD 1/9 SD	40.6
Red. Ratio in PE-LD 1/9 SD	0.95

Ease of Dispersion <10

Physical Properties

Density	4.5	g/cm ³
Bulk Density	0.4	g/cm ³
Index of pH	8	
Conductivity	185	µS/cm
Specific Surface	20	m ² /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.	2	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 - SICOPAL® BLUE K 6310

PROPERTIES

Pigment type:	Co/Al oxide
Colour Index:	Pigment Blue 28
Application:	Colourant for plastics
Physical form:	Powder
Storage:	practically unlimited shelf life
Food packaging:	approved according to "Empfehlung IX des BgVV".

SPECIFICATION

Colour tolerances:	$dH^* \pm 0.7$; $dC^* \pm 0.7$; $dL^* \pm 0.7$; $dE^* \leq 1.0$; $da^* \pm 0.7$; $db^* \pm 0.7$
Strength equivalence:	100 ± 8 %
Test method:	BASF test method 11.3.1

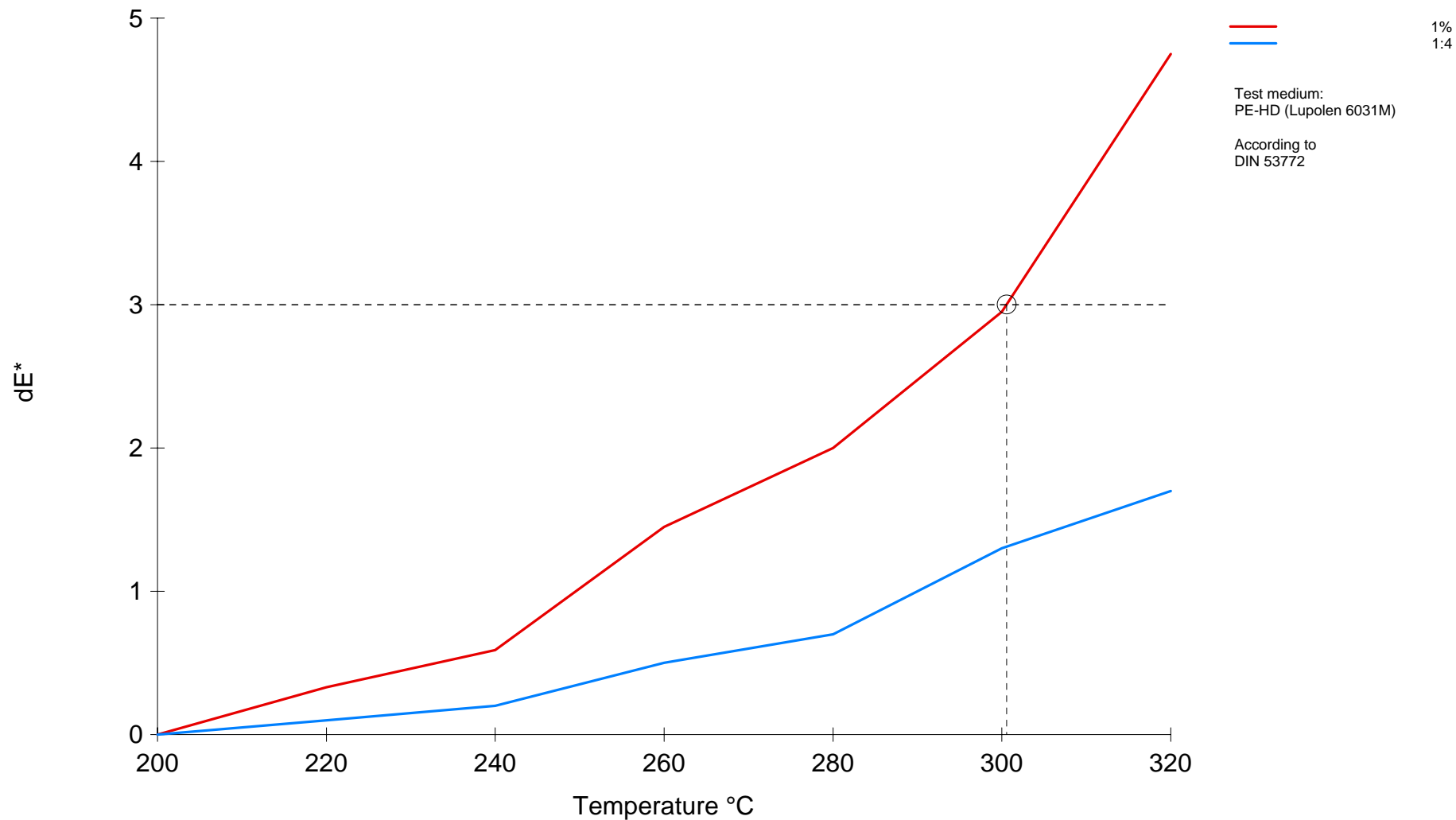
Please note:

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 - SICOPAL® BLUE K 6310

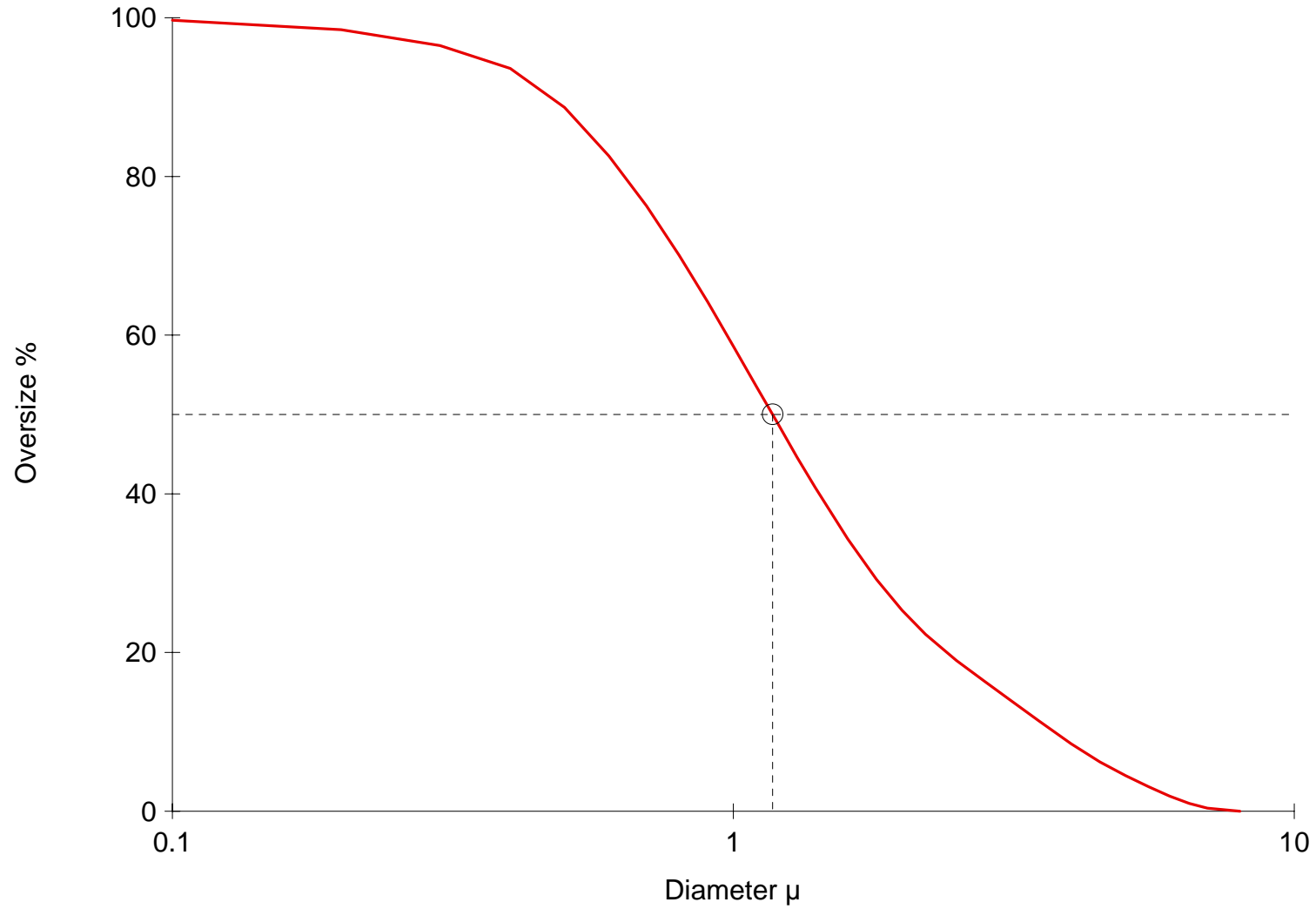


Heat Stability SICOPAL® BLUE K 6310



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

Particle Size Distribution
SICOPAL® BLUE K 6310

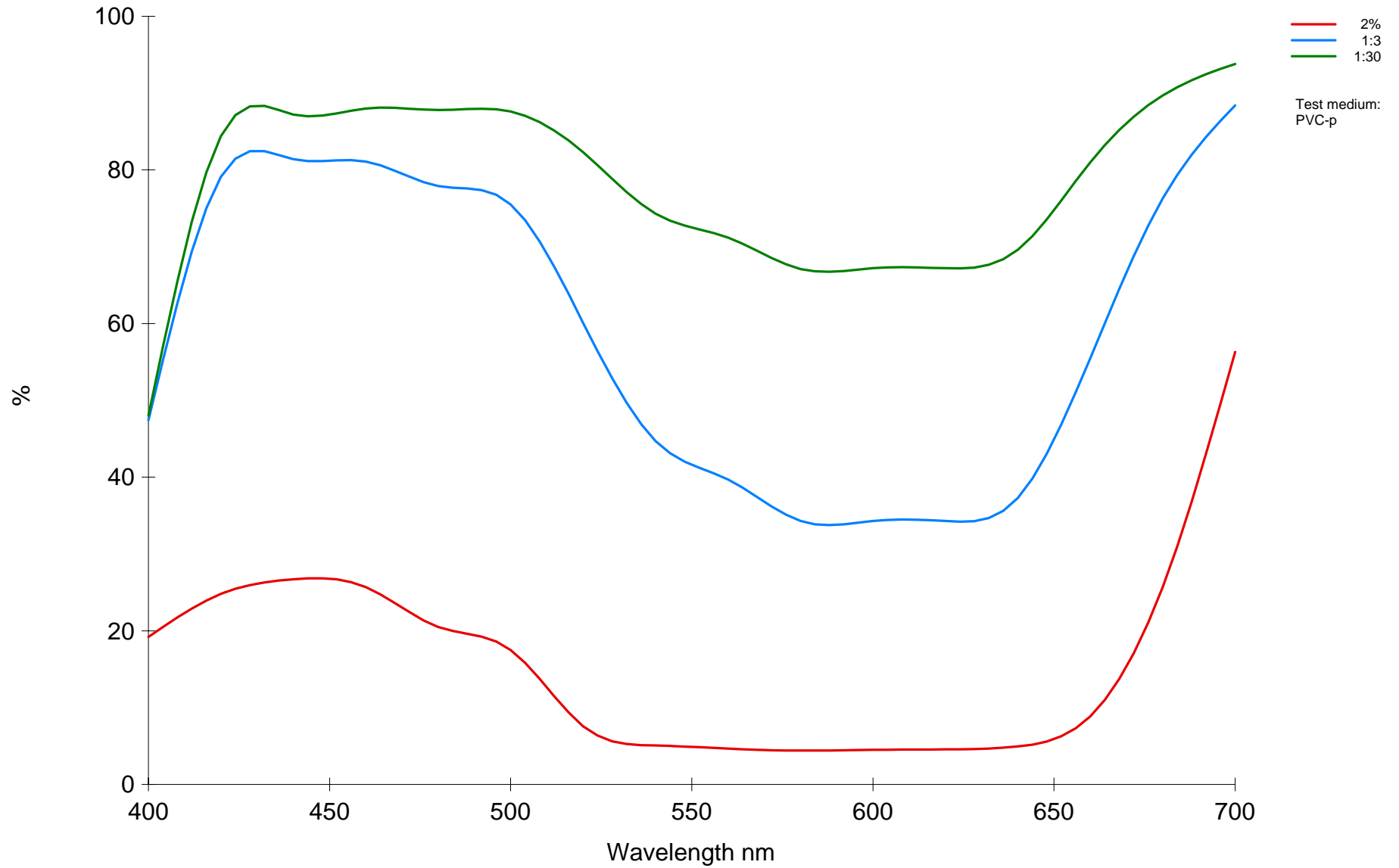


Susp. Fluid: H2O
Disp. Agent: Na4P2O7
Mixer Time: 60 s
Median Size: 1.18 u

CILAS

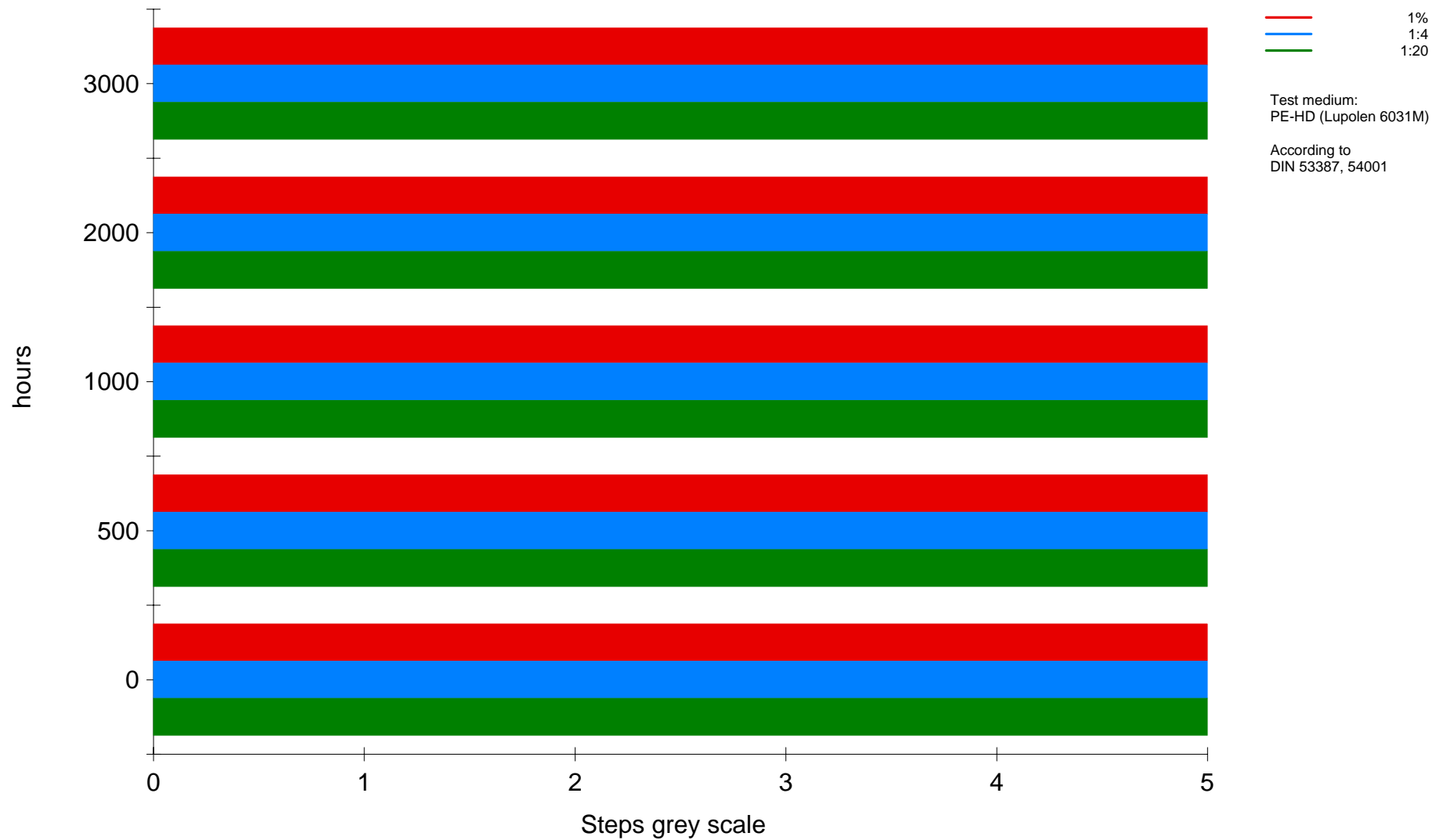
Note: The program stores curve points (see table). The diagram shows approximations.

Reflection Curve SICOPAL® BLUE K 6310

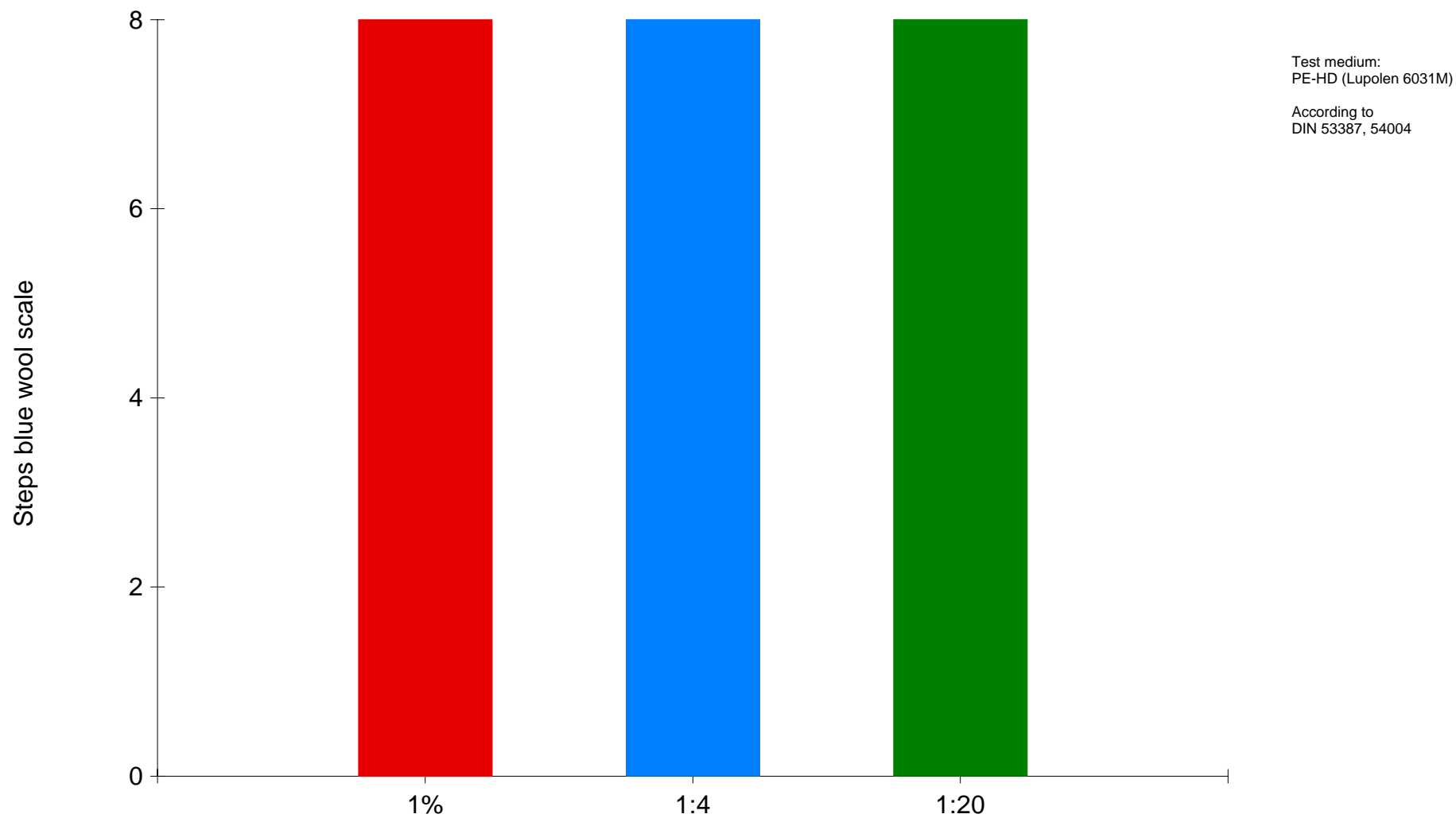


Note: The program stores curve points (see table). The diagram shows approximations.

Weather fastness SICOPAL® BLUE K 6310



Light fastness
SICOPAL® BLUE K 6310





Product Safety Datasheet **BASF**

Name of product	SICOPAL® Blue K 6310
C.I. No. / Name	77 346 / C.I. Pigment Blue 28, Cobalt Blue, CoAl_2O_4
CAS No.	1345-16-0
EINECS No.	310-193-6
Name of product	SICOPAL® Blue K 6710 / 7210 / 7310
C.I. No. / Name	77 343 / C.I. Pigment Blue 36, Cobalt Blue, $\text{Co}(\text{Al,Cr})_2\text{O}_4$
CAS No.	68187-11-1
EINECS No.	269-072-0
Chemical nature	Practically insoluble spinel pigments based on cobalt(II)/aluminium oxide or cobalt(II)/chromium(III)-/aluminium oxide. The heavy metal oxides are absorbed by the spinel lattice and thus lose their chemical, physical, and physiological properties.
Toxicology	In experiments on animals, cobalt blue pigments did not display acute toxicity. No acute irritant effect was shown in tests to determine the acute irritation of the skin and mucous membranes. Feeding tests on rats to determine carcinogenic effects revealed no statistically significant finding whatever. Due to their insolubility the pigments can be regarded as not bio-available. Soluble cobalt compounds and cobalt metal may have sensitizing effects. No sensitizing effects have been reported, even after handling cobalt blue pigments for many years.
Ecology	The SICOPAL® Blue 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 these pigments are incinerated, they are recovered in the original form in the residual ash.
Labelling	SICOPAL® Blue 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.
Heavy metal content	SICOPAL® Blue pigments 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	< 3 mg/kg	Copper	< 20 mg/kg
Antimony	< 5 mg/kg	Nickel	500 mg/kg
Lead	< 20 mg/kg	Selenium	< 1 mg/kg
Cadmium	< 10 mg/kg	Mercury	< 1 mg/kg

The constitutional contents of cobalt, chromium(III) and zinc are listed in the following Table:

SICOPAL® Blue	K 6310	K 6710	K 7210	K 7310
Cobalt	28 %	18 %	20 %	18 %
Chromium	0,15 %	10 %	17 %	24 %
Zinc	0,04 %	2 %	4 %	4 %

Halogen content The **SICOPAL®** pigments do not contain any halogens in their formulations.

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

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: **SICOPAL®** Blue K 6310 is listed on the FDA List (21.CFR, § 178.3297). Use of the other **SICOPAL®** Blue pigments only on evidence of "non migration".

They feature absolute fastness to migration in the coloration of plastics in contact with food. Extraction tests with cobalt blue pigments as 1 % colorant in 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. No detectable migration of cobalt, chromium and zinc was determined in the extraction experiments.

Toys According to tests on standard samples (Type 8082), the **SICOPAL®** Blue 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. 611500, 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).

Water hazard class WGK 0 (generally non water hazardous according to German legislation - self-classification)

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)

TA Luft Para 3.1.4, Class II (cobalt) (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". The Product Safety Department in our Inorganic Pigments Division will gladly reply to your queries and can be reached under

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The information submitted in this publication is based on our current knowledge and experience. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.