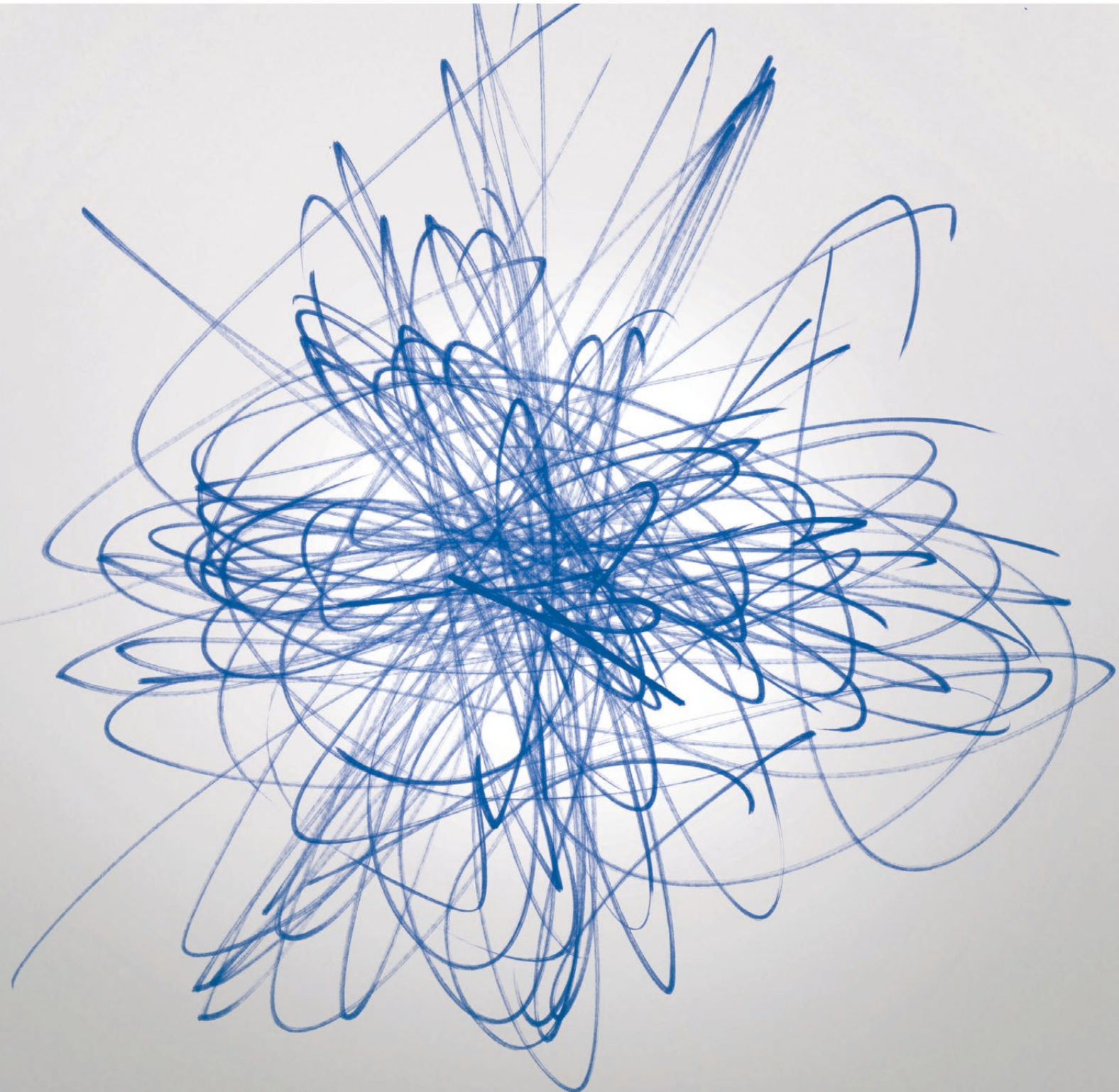


# CREATIVE COLORS SOLUTIONS FOR COLORING YOUR WORK ENVIRONMENT



# CREATIVE COLORS SOLUTIONS FOR COLORING YOUR WORK ENVIRONMENT

Heubach is a global leader in the field of specialty chemicals. Strong business relationships, commitment to outstanding service and wide-ranging application know-how make Heubach a preferred partner for its customers.



Heubach headquartered in Vienna, Austria, is represented on five continents with over 100 group companies. Heubach's world-class products and services play a key role in its customers' manufacturing processes and add value to their end products. The company's success is based on the know-how of its people and their ability to identify new customer needs at an early stage and to work together with customers to develop innovative, efficient solutions.

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Pigments and Pigment Preparations	4
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## HEUBACH'S COLOR COMPETENCE

Heubach offers a broad portfolio of colorants to enhance the appearance and performance of:

- Art and creative paints
- Pencils, crayons and chalks
- Writing inks
- Marker inks

Choose a colorant which covers most of the current regulations relevant for these articles. Our broad range of colorants includes:

### PIGMENTS

#### Powders

- Selected Cosmetic, Graphtol®, Hansa®, Hostaperm®<sup>1)</sup>, Novoperm®, Permanent and PV Fast®

### DYES

#### Water soluble powders and liquids

- Duasyn®
- Sanolin®

#### Super washable water soluble polymeric dyes

- Sanolin® Lave liq.

#### Solvent soluble powders

- Savinyl®

### PIGMENT PREPARATIONS

#### Aqueous dispersions

- Colanyl®
- Cosmenyl®
- Hostafine®<sup>1)</sup>
- Flexonyl®
- Viscofil®

#### Solvent soluble Granules

- Hostanol®<sup>1)</sup> HW 30

Heubach utilizes its global network of production and service facilities to satisfy customers' requirements.

Our technical competence centers in Europe (Germany), the Americas (Brazil, United States), Africa (South Africa), and Asia (China, India, Malaysia) respond to your technical requests. As a supplier for the consumer goods industry, we provide comprehensive support in the areas of product safety, toxicology and regulations.

## COLOR SELECTION

The following tables contain a selection of colorants successfully used in writing inks and art, creative and school materials. Included in Heubach's extensive portfolio is a multitude of other colorants which may match your specific application performance requirements perfectly. Please do not hesitate to contact our experts for additional product and application recommendations.

This brochure depicts the colorant in four-color printing. Slight differences might occur in your application.

Additionally, the final formulation could have an impact on the color appearance and stability. Please conduct preliminary tests to confirm suitability in your formulation. Our product portfolio is continuously being improved to keep pace with the dynamic needs of the market.

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#### DATA EXPLANATION:

- |                   |   |
|-------------------|---|
| ● Recommended     | Technically recommended for the application according to internal test methods and market information |
| ○ Suitable        | Technically suitable for the application, but some restrictions may apply                             |
| – Not recommended | Technically not suitable according to internal test methods and market information                    |

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#### REGULATION PROFILE:

- |   |
|---|
| ■ In compliance with the regulation, i. e. the colorant fulfills special requirements   |
| □ In compliance with the regulation, i. e. the colorant fulfills the requirements, however, there are specific limitations with regard to concentration and/or application (for detailed information please see separate data sheets) |
| / Not in compliance with the regulation   |
| / <sup>1)</sup> Under evaluation  |

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#### EN 71-3

- |  |
|--|
| ◆ The product fulfills the heavy metal limits as described on page 18  |
| ◇ 1. The product is based on a heavy metal complex or an inorganic pigment. In such cases, the extractable content (0.1n HCL) has to be considered for the heavy metal which is contained according to the chemical structure. |
| 2. The product is based on an organic pigment or dye. However, for certain heavy metals, the extractable content has to be considered due to the manufacturing process.  |



























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#### ASTM D-4236

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| ▲ Product has been evaluated by Duke University and qualifies for an ACMI certificate. |
|--|

For detailed information about the regulations profile, see page 14.

# PIGMENTS AND PIGMENT PREPARATIONS

FULL SHADE	C.I. NAME	PIGMENT	PIGMENT PREPARATION	
			Water based	Solvent based
	Pigment Yellow 3	<b>HANSA YELLOW 10G</b>		
			<b>COLANYL YELLOW 10G 132</b>	
	Pigment Yellow 74	<b>HANSA BRILLIANT YELLOW 5GX</b>		
		<b>HANSA BRILLIANT YELLOW 2GX 70</b>		
			<b>COLANYL YELLOW 5GX 131</b>	
	Pigment Yellow 12	<b>PERMANENT YELLOW DHG</b>		
	Pigment Yellow 155	<b>GRAPHTOL YELLOW 3GP</b>		
			<b>VISCOFIL YELLOW 2GLL</b>	
	Pigment Yellow 126	<b>PERMANENT YELLOW DGR</b>		
	Pigment Yellow 1	<b>HANSA YELLOW G 02</b>		
			<b>COSMENYL YELLOW 100</b>	
	Pigment Yellow 14	<b>PERMANENT YELLOW P-G</b>		
	Pigment Yellow 17	<b>GRAPHTOL YELLOW GG</b>		
	Pigment Yellow 13	<b>GRAPHTOL YELLOW GR</b>		
		<b>PERMANENT YELLOW GR 01</b>		
			<b>HOSTAFINE YELLOW SP-GR 30</b>	
	Pigment Yellow 83	<b>NOVOPERM YELLOW HR 02</b>		
		<b>NOVOPERM YELLOW HR 70</b>		
			<b>HOSTAFINE YELLOW SP-HR 30</b>	
			<b>COLANYL YELLOW HR 131</b>	
				<b>HOSTANOL HW 30 YELLOW HR</b>
	Pigment Orange 13	<b>GRAPHTOL ORANGE GPS</b>		
	Pigment Orange 36	<b>NOVOPERM ORANGE HL 70</b>		
	Pigment Orange 5	<b>HANSA RED GG</b>		
	Pigment Orange 34	<b>GRAPHTOL ORANGE RL</b>		
			<b>PERMANENT ORANGE RL 70</b>	































ART, CREATIVE AND SCHOOL MATERIALS						WRITING INKS				MARKER INKS				REGULATIONS*				
Oil paints	Aquarelle and gouache paints	Acrylic paints	Pencil	Wax crayon	Chalk	Fountain pen ink	Gel pen ink	Felt tip pen ink (roller ball, fine liner, needle ball)	Pigmented felt tip pen ink (fine liner, durable drawing)	Permanent marker ink	White board marker ink	Highlighter ink	Stamping ink	EN 71/3	EN 71/7	EN 71/9 incl. 2015/2117/EC	AP (89) I	ASTM D-4236
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● Recommended  
○ Suitable  
○ Not recommended  
\* Details see page 14-17

■ In compliance with the regulation  
□ In compliance with the regulation, but with restrictions  
/ Not in compliance with the regulation  
/<sup>1)</sup> Under evaluation

◆ The product fulfills the heavy metal limits (page 18)  
◇ The product fulfills the heavy metal limits when the extractable content is considered (page 18)  
▲ Product has been evaluated by Duke University and qualifies for an ACMI certificate.

# PIGMENTS AND PIGMENT PREPARATIONS

FULL SHADE	C.I. NAME	PIGMENT	PIGMENT PREPARATION	
			Water based	Solvent based
	Pigment Red 188	<b>NOVOPERM RED HF3S</b>		
			<b>HOSTAFINE RED SP-HF3S</b>	
	Pigment Red 3	<b>HANSA SCARLET RNC</b>		
	Pigment Red 53:1	<b>GRAPHTOL RED LG</b>		
		<b>GRAPHTOL RED LC</b>		
	Pigment Red 9	<b>PERMANENT RED FRLLO1</b>		
			<b>COLANYL RED FRLL 131</b>	
	Pigment Red 2	<b>PERMANENT RED FRR</b>		
			<b>VISCOFIL RED AGN</b>	
	Pigment Red 112	<b>PERMANENT RED FGR</b>		
			<b>FLEXONYL RED SP-FGR</b>	
			<b>HOSTAFINE RED SP-FGR</b>	
			<b>COLANYL RED FGR 131</b>	
			<b>COLANYL RED FGRG 130</b>	
			<b>HOSTAFINE RED SP-P2GL</b>	
	Pigment Red 179			
	Pigment Red 254	<b>HOSTAPERM RED D3G 70-CN</b>		
			<b>COLANYL RED D3GD 500</b>	
	Pigment Red 170	<b>NOVOPERM RED F3RK 70</b>		
		<b>GRAPHTOL RED F5RK</b>		
				<b>HOSTANOL HW 30 RED F5RK</b>
	Pigment Red 5	<b>PERMANENT CARMINE FB 01</b>		
			<b>COSMENYL CARMINE OC 100</b>	
	Pigment Red 146	<b>PERMANENT CARMINE FBB 02</b>		
			<b>FLEXONYL CARMINE SP-FBB</b>	
	Pigment Red 181	<b>COSMETIC PINK RC 01</b>		
	Pigment Violet 19	<b>HOSTAPERM RED E3B</b>		
		<b>HOSTAPERM RED E5B 02</b>		
		<b>HOSTAPERM RED VIOLET ER 02</b>		
			<b>COLANYL RED E3B 130</b>	































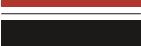

ART, CREATIVE AND SCHOOL MATERIALS						WRITING INKS				MARKER INKS				REGULATIONS*				
Oil paints	Aquarelle and gouache paints	Acrylic paints	Pencil	Wax crayon	Chalk	Fountain pen ink	Gel pen ink	Felt tip pen ink (roller ball, fine liner, needle ball)	Pigmented felt tip pen ink (fine liner, durable drawing)	Permanent marker ink	White board marker ink	Highlighter ink	Stamping ink	EN 71/3	EN 71/7	EN 71/9 incl. 2015/2117/EC	AP (89) I	ASTM D-4236
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● Recommended  
○ Suitable  
- Not recommended  
\* Details see page 14-17

■ In compliance with the regulation  
□ In compliance with the regulation, but with restrictions  
/ Not in compliance with the regulation  
/<sup>1)</sup> Under evaluation

◆ The product fulfills the heavy metal limits (page 18)  
◇ The product fulfills the heavy metal limits when the extractable content is considered (page 18)  
▲ Product has been evaluated by Duke University and qualifies for an ACMI certificate.

# PIGMENTS AND PIGMENT PREPARATIONS

FULL SHADE	C.I. NAME	PIGMENT	PIGMENT PREPARATION		
			Water based	Solvent based	
	Pigment Red 122	<b>HOSTAPERM PINK E</b>			
		<b>HOSTAPERM PINK P-EB</b>			
			<b>HOSTAJET MAGENTA E -PT</b>		
	Pigment Red 12	<b>PERMANENT BORDEAUX FRR</b>			
	Pigment Red 184		<b>HOSTAFINE RUBINE SP-F6B</b>		
	Pigment Red 57:1	<b>GRAPHTOL RUBINE L4B</b>			
	Pigment Violet 23	<b>PV FAST VIOLET RL</b>			
			<b>COSMENYL VIOLET 100</b>		
			<b>COLANYL VIOLET RL 132</b>		
	Pigment Blue 15	<b>GRAPHTOL BLUE AN 01</b>			
		<b>PV FAST BLUE A4R</b>			
	Pigment Blue 15:1		<b>COSMENYL BLUE BLS 30 GRAN.</b>		
			<b>COSMENYL BLUE OC 100</b>		
	Pigment Blue 15:3	<b>PV FAST BLUE BG</b>			
			<b>HOSTAFINE BLUE SP-B2G</b>		
			<b>COLANYL BLUE B2G 131</b>		
					<b>HOSTANOL HW 30 BLUE B2G</b>
					
	Pigment Green 7	<b>PV FAST GREEN GNX</b>			
			<b>COSMENYL GREEN OC 100</b>		
			<b>HOSTAFINE GREEN SP-GN</b>		
		<b>COLANYL GREEN GG 131</b>			
	Pigment Brown 25	<b>HOSTAPERM BROWN HFR 01</b>			
	Pigment Black 7		<b>COSMENYL BLACK 100</b>		
			<b>HOSTAFINE BLACK SP-T 30</b>		
			<b>HOSTAFINE BLACK TS 30</b>		
			<b>COLANYL BLACK N 131</b>		
					<b>HOSTANOL HW 30 BLACK R</b>
	Pigment White 6		<b>FLEXONYL WHITE RL 130</b>		
	Pigment Yellow 42		<b>COSMENYL OXIDE YELLOW 100</b>		
	Pigment Red 101		<b>COLANYL OXIDE RED B 131</b>		
	Pigment Black 11		<b>COLANYL OXIDE BLACK B 130</b>		






















ART, CREATIVE AND SCHOOL MATERIALS						WRITING INKS				MARKER INKS				REGULATIONS*				
Oil paints	Aquarelle and gouache paints	Acrylic paints	Pencil	Wax crayon	Chalk	Fountain pen ink	Gel pen ink	Felt tip pen ink (roller ball, fine liner, needle ball)	Pigmented felt tip pen ink (fine liner, durable drawing)	Permanent marker ink	White board marker ink	Highlighter ink	Stamping ink	EN 71/3	EN 71/7	EN 71/9 incl. 2015/2117/EC	AP (89) I	ASTM D-4236
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● Recommended  
○ Suitable  
- Not recommended  
\* Details see page 14-17

■ In compliance with the regulation  
□ In compliance with the regulation, but with restrictions  
/ Not in compliance with the regulation  
/<sup>1)</sup> Under evaluation

◆ The product fulfills the heavy metal limits (page 18)  
◇ The product fulfills the heavy metal limits when the extractable content is considered (page 18)  
▲ Product has been evaluated by Duke University and qualifies for an ACMI certificate.

# DYES

FULL SHADE	C.I. NAME	WATER SOLUBLE DYES	SOLVENT SOLUBLE DYES
	Direct Yellow 132	<b>DUASYN YELLOW 3GF-SF LIQ.</b>	
	Food Yellow 13	<b>SANOLIN QUINOLINE YELLOW 70</b>	
	Acid Yellow 3		
	Food Yellow 4	<b>SANOLIN TARTRAZINE X 90</b>	
	Acid Yellow 23	<b>DUASYN ACID YELLOW XX-SF LIQ.</b>	
	Food Yellow 3	<b>SANOLIN ORANGE RGL 90</b>	
	Food Red 7	<b>SANOLIN PONCEAU 4RC 82</b>	
	Acid Red 18		
	Reactive Red 180	<b>DUASYN BRILLIANT RED F3B-SF LIQ.</b>	
	Acid Red 249	<b>SANOLIN RED NBG</b>	
	Acid Red 52	<b>SANOLIN RHODAMINE B 02</b>	
	Acid Blue 182	<b>SANOLIN BLUE EHRL LIQ.</b>	
	Acid Blue 93	<b>DUASYN INK BLUE SLK</b>	
	Food Blue 5:2	<b>SANOLIN PATENT BLUE V 85 01</b>	
	Food Blue 2	<b>SANOLIN BLUE AE 90</b>	
	Acid Blue 9	<b>DUASYN ACID BLUE AE -SF 30 LIQ.</b>	
		<b>DUASYN ACID BLUE AE 03</b>	
	Direct Blue 199	<b>DUASYNJET CYAN FRL-SP LIQ.</b>	
		<b>SANOLIN TURQUOISE BLUE FBL</b>	

ART, CREATIVE AND SCHOOL MATERIALS						WRITING INKS				MARKER INKS				REGULATIONS*				
Oil paints	Aquarelle and gouache paints	Acrylic paints	Pencil	Wax crayon	Chalk	Fountain pen ink	Gel pen ink	Felt tip pen ink (roller ball, fine liner, needle ball)	Pigmented felt tip pen ink (fine liner, durable drawing)	Permanent marker ink	White board marker ink	Highlighter ink	Stamping ink	EN 71/3	EN 71/7	EN 71/9 incl. 2015/2117/EC	AP (89) I	ASTM D-4236
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● Recommended  
○ Suitable  
- Not recommended  
\* Details see page 14-17

■ In compliance with the regulation  
□ In compliance with the regulation, but with restrictions  
/ Not in compliance with the regulation  
/<sup>1)</sup> Under evaluation

◆ The product fulfills the heavy metal limits (page 18)  
◇ The product fulfills the heavy metal limits when the extractable content is considered (page 18)  
▲ Product has been evaluated by Duke University and qualifies for an ACMI certificate.

# DYES

FULL SHADE	C.I. NAME	WATER SOLUBLE DYES	SOLVENT SOLUBLE DYES
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	Solvent Yellow 79		<b>SAVINYL YELLOW 2GLS 01</b>
	Solvent Yellow 83:1		<b>SAVINYL YELLOW RLS</b>
	Solvent Yellow 83		<b>SAVINYL YELLOW RLSN</b>
	Solvent Yellow 62		<b>SAVINYL YELLOW 2RLS</b>
	Solvent Orange 41		<b>SAVINYL ORANGE RLS</b>
	Solvent Orange 62		<b>SAVINYL ORANGE RLSE</b>
	Solvent Red 124		<b>SAVINYL FIRE RED 3GLS</b>
	Solvent Red 91		<b>SAVINYL RED 3BLS</b>
	Solvent Red 127		<b>SAVINYL PINK 6BLS</b>
	Acid Violet 66		<b>SAVINYL DARK VIOLET R</b>
	Solvent Blue 45		<b>SAVINYL BLUE RS</b>
	Solvent Blue 44		<b>SAVINYL BLUE GLS</b>
	Mix		<b>SAVINYL GREEN 2GLS 01</b>
	Mix		<b>SAVINYL BROWN GLS</b>
	Solvent Black 27		<b>SAVINYL BLACK RLSN 01</b>
			<b>DUASYN BLACK A-RG</b>

	-	<b>SANOLIN LAVE YELLOW A01 VP 6273</b>	
	-	<b>SANOLIN LAVE YELLOW GX LIQ. VP 5220</b>	
	-	<b>SANOLIN LAVE ORANGE R LIQ. VP 5221</b>	
	-	<b>SANOLIN LAVE RED B LIQ. VP 5222</b>	
	-	<b>SANOLIN LAVE PINK B LIQ. VP 5454</b>	
	-	<b>SANOLIN LAVE VIOLET B LIQ. VP 5223</b>	
	-	<b>SANOLIN LAVE BLUE A LIQ. VP 5453</b>	
	-	<b>SANOLIN LAVE BLUE R LIQ. VP 5224</b>	
	-	<b>SANOLIN LAVE BLUE T LIQ. VP 5240</b>	
	-	<b>SANOLIN LAVE GREEN G LIQ. VP 5225</b>	

ART, CREATIVE AND SCHOOL MATERIALS						WRITING INKS				MARKER INKS				REGULATIONS*				
Oil paints	Aquarelle and gouache paints	Acrylic paints	Pencil	Wax crayon	Chalk	Fountain pen ink	Gel pen ink	Felt tip pen ink (roller ball, fine liner, needle ball)	Pigmented felt tip pen ink (fine liner, durable drawing)	Permanent marker ink	White board marker ink	Highlighter ink	Stamping ink	EN 71/3	EN 71/7	EN 71/9 incl. 2015/2117/EC	AP (89) I	ASTM D-4236
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■ In compliance with the regulation  
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/ Not in compliance with the regulation  
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◆ The product fulfills the heavy metal limits (page 18)  
◇ The product fulfills the heavy metal limits when the extractable content is considered (page 18)  
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# REGULATIONS

In general, the manufacturer of the formulation is responsible for using ingredients that meet the local legislative requirements. We at Heubach provide our customers with comprehensive technical support and maintain up-to-date information about the legal requirements applying to our products.

## EUROPEAN UNION

### EN 71/3 - Migration of certain elements: Heavy metals

This part of the European norm specifies the requirements and test methods for the migration of certain heavy metal elements.

The EN 71/3 classifies the toys and components of toys into 3 groups:

- Dry, brittle, powder-like or pliable toy material
- Liquid or sticky toy material
- Scraped-off material

All heavy metal limits defined by the EN 71/3 refer to the end article and not to the single components (ingredients/raw materials) of the article.

Test procedures for CrIII/CrVI migration have not yet been defined by The European Committee for Standardization (CEN).

### DEFINED MIGRATION LIMITS OF CERTAIN HEAVY METALS IN THE FINISHED ARTICLE IN MG/KG (PPM)

Chemical Elements	In dry, brittle, powder-like toy material	In liquid or sticky toy material	In scraped-off toy material
Aluminum	5 625.0	1 406.0	70 000.0
Antimony	45.0	11.3	560.0
Arsenic	3.8	0.9	47.0
Barium	1500.0	375.0	18 750.0
Boron	1 200.0	300.0	15 000.0
Cadmium	1.9	0.5	23.0
Chromium (III)	37.5	9.4	460.0
Chromium (VI)	0.020	0.005	0.053
Cobalt	10.5	2.6	130.0
Copper	622.5	158.0	7 700.0
Lead	2.0	0.5	23.0
Manganese	1 200.0	300.0	15 000.0
Mercury	7.5	1.9	94.0
Nickel	75.0	18.8	930.0
Selenium	37.5	9.4	460.0
Strontium	4 500.0	1 125.0	56 000.0
Tin	15 000.0	3 750.0	180 000.0
Organic Tin	0.9	0.2	12.0
Zinc	3 750.0	938.0	46 000.0



**Directive 2009/48/EC on the safety of toys  
(New Toys Directive),  
2<sup>nd</sup> Amendment 2015/2117/EC and EN 71-9**

EN 71/9 defines requirements for selected organic compounds in certain toys and toy materials. The considered organic compounds are:

- Solvents
- Preservatives
- Plasticizers
- Flame retardants
- Monomers
- Biocides
- Processing aids
- Coloring agents

The regulation EN 71/9 lists the specific toy and toy components with the respective limit requirements for the chemical compounds in table 1.

This regulation applies to colorants regarding:

- 1.) A negative list of colorants (regulation table 2B) which should NOT be included in the concerned toy or toy component.

These colorants are:

- Disperse dyes (Blue 1, Blue 3, Blue 106, Blue 124, Yellow 3, Orange 3, Orange 37/76, Red 1)
- Solvent dyes (Yellow 1, Yellow 2, Yellow 3)
- Basic dyes (Red 9, Violet 1, Violet 3)
- Acid dyes (Red 26, Violet 49)

- 2.) The limits for selected primary aromatic amines (regulation table 2C) defined for the concerned toy or toy components

**PRIMARY AROMATIC AMINES OF TABLE 2C:**

Compound	CAS-No.	Limit in end article
Benzidine	92-87-5	<5 mg/kg
2-Naphthylamine	91-59-8	<5 mg/kg
4-Chloraniline	106-47-8	<5 mg/kg
3,3'-Dichlorobenzidine	91-94-1	<5 mg/kg
3,3'-Dimethoxybenzidine	119-90-4	<5 mg/kg
3,3'-Dimethylbenzidine	119-93-7	<5 mg/kg
o-Toluidine	95-53-4	<5 mg/kg
2-Methoxyaniline	90-04-0	<5 mg/kg
Aniline	62-53-3	<5 mg/kg

- 3.) The limits for selected preservatives (regulation table 2H) for the concerned toy or toy components

**PRESERVATIVES OF TABLE 2H:**

Compound	Abbr.	CAS-No.	Limit in end article
Phenol		108-95-2	<10 mg/kg
1,2-Benzyliso-thiazolin-3-one	BIT	2634-33-5	<5 mg/kg
2-Methyl-4-iso-thiazolin-3-one	MIT	2682-20-4	<10 mg/kg
5-Chloro-2-methyl-4-isothiazolin-3-one	CMIT	26172-55-4	<10 mg/kg
5-Chloro-2-methyl-4-isothiazolin-3-one + 2-methyl-4-iso-thiazolin-3-one	Kathon (CMIT/MIT)		<15 mg/kg
Formaldehyde (free)		50-00-0	0.05 %

- 4.) The Directive (EU) 2015/2117 limits the use of Kathon (Reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-2H -isothiazol-3-one / 3:1) in toys for children below 3 years.

**PRESERVATIVES FOR USE IN AQUEOUS TOY MATERIAL FOR CHILDREN < 3 YEARS:**

Compound	Abbr.	CAS-No.	Limit in end article
2-Methyl-4-iso-thiazolin-3-one	MIT	2682-20-4	<0.25 mg/kg
5-Chloro-2-methyl-4-isothiazolin-3-one	CMIT	26172-55-4	<0.75 mg/kg
5-Chloro-2-methyl-4-isothiazolin-3-one + 2-methyl-4-iso-thiazolin-3-one	Kathon (CMIT/MIT)	55965-84-9	<1 mg/kg

# REGULATIONS

## EN 71/7- Finger paints - Requirements and test methods

EN 71 part 7 specifies requirements for the substances and materials used in finger paints and applies to finger paints only.

Finger paints shall not contain dangerous substances or preparations in amounts which can harm the health of children using them.

The following criteria are regulated in EN 71/7 :

- Colorants
- Preservatives
- Limits for the migration of certain elements (heavy metals)
- Limits for primary aromatic amines
- Limits for other impurities
- Taste and smell
- pH-value
- Binding agents, extenders, humectants and surfactants
- N-Nitrosamines

EN 71/7 defines limits for certain heavy metals and for primary aromatic amines in the finished article.

### DEFINED MIGRATION LIMITS OF CERTAIN HEAVY METALS IN THE FINISHED ARTICLE IN MG/KG (PPM)

Chemical Elements	In dry, brittle, powder-like toy material	In liquid or sticky toy material	In scraped-off toy material
Aluminum	5 625.0	1 406.0	70 000.0
Antimony	45.0	11.3	560.0
Arsenic	3.8	0.9	47.0
Barium	1500.0	375.0	18 750.0
Boron	1 200.0	300.0	15 000.0
Cadmium	1.9	0.5	23.0
Chromium (III)	37.5	9.4	460.0
Chromium (VI)	0.020	0.005	0.053
Cobalt	10.5	2.6	130.0
Copper	622.5	158.0	7 700.0
Lead	2.0	0.5	23.0
Manganese	1 200.0	300.0	15 000.0
Mercury	7.5	1.9	94.0
Nickel	75.0	18.8	930.0
Selenium	37.5	9.4	460.0
Strontium	4 500.0	1 125.0	56 000.0
Tin	15 000.0	3 750.0	180 000.0
Organic Tin	0.9	0.2	12.0
Zinc	3 750.0	938.0	46 000.0

Furthermore, the EN 71/7 contains a list of 61 colorants which are allowed in finger paints. It also lists 38 types of preservatives and their limits allowed for finger paints. Finger paints shall not be sweetened, flavored or fragranced. An embittering agent (sucrose octaacetate, naringin or denatonium benzoate) shall be added to the finger paint. The pH-value of the final product shall be between 4 and 10. Additionally, the EN 71/7 norm contains an informative list with different acceptable compounds for binding agents, extenders, humectants and surfactants.

EN 71/7 also regulates the primary aromatic amines. The following 4 aromatic amines are not allowed in finger paints:

- Benzidine
- 2-Naphthylamine
- 4-Chloro-2-methyl-aniline
- 4-Aminobiphenyl

With the exception of those 4 amines, aromatic amines contained in finger paints shall not exceed a total amount of 20 mg/kg. No individual primary aromatic amine shall exceed 10 mg/kg. Additional EN 71/7 also lists 23 examples of primary aromatic amines of concern.

Limits for other impurities are:

Polychlorinated biphenyls	< 2.00 ppm
Hexachlorobenzene	< 5.00 ppm
Benzo (a) pyrene	< 0.05 ppm

Furthermore, the concentration of N-Nitrosamines shall not exceed the limit values as defined in EN 71/12.



### **European Resolution AP (89) 1 - On the use of colorants in plastic materials coming into contact with food**

The European Resolution AP (89) 1 defines purity criteria for colorants and includes:

- Heavy metal limits
- Limits for primary aromatic amines
- Limits for polychlorinated biphenyls (PCB)

#### 1. Heavy metal

The content of metals and metalloids (extractables in 0.1 N HCl) shall not exceed the following specific limits:

Arsenic	< 100 ppm
Barium	< 100 ppm
Cadmium	< 100 ppm
Chromium	< 1000 ppm
Mercury	< 50 ppm
Lead	< 100 ppm
Antimony	< 500 ppm
Selenium	< 100 ppm

#### 2. Primary aromatic amines

The content of unsulphonated primary aromatic amines soluble in 1N HCl shall not exceed 500 ppm (calculated as aniline). The content of sulphonated aromatic amines shall not exceed 500 ppm (calculated as aniline sulphonic acid). The content of benzidine,  $\beta$ -naphthylamine and 4-amino-biphenyl, singly or in total, shall not exceed 10 ppm. The same limits apply to 2-methyl-4-chloroaniline.

#### 3. Polychlorinated biphenyls (PCB)

The content of polychlorinated biphenyls (PCB) shall not exceed 25 ppm.

### **USA**

#### **ASTM D-4236 - Standard practice for labeling art materials for chronic health hazards**

ASTM D-4236 defines the requirements for labeling of art and creative materials marketed in the U.S.

»Art and creative materials« must bear a conformance statement, e.g. »conforms to ASTM D-4236«, accompanied by chronic hazard statements and precautionary statements, if appropriate.

According to ASTM D-4236, those statements are to be defined by a toxicologist after evaluation of the chemical composition while considering scientific knowledge of the toxic potential (e.g. bio availability) of each component and the total formulation under the foreseeable use of the product.

#### **The ACMI (Art and Creative Materials Institute),**

an international manufacturers association, has established a global reputation in the toxicological evaluation of »art and creative materials« according to ASTM D-4236.



# IMPORTANT NOTES

**Concerning pigment preparations, the Colour Index data relate to the base pigments. If the chemical structure of the colorant was not published, no Colour Index number will appear.**

The dyes are illustrated by photographs in an aqueous dye solution with a commonly used concentration of writing inks (approx. 3%).

For the illustration of the pigment preparations, emulsion paints colored with the pigment preparations were used (light shade: 1% reduction in a white emulsion paint; dark shade: 3% in a full-shade emulsion paint). Pigments are also illustrated by matching the mass tone and the reduction shade.

Illustrations of the colorants were accomplished using four color printing and therefore do not contain the pigments or dyes concerned. Thus, shade deviations are possible. Additionally, final formulation has an impact on the color appearance. Please conduct preliminary tests to match the shade to your requirements.

## REGULATION IN GENERAL

The information refers to the colorants. However, the final confirmation of the observation of the limits can generally only be obtained by testing the final toys.

For detailed information, please see the paragraph »Regulations«.

Due to several local regulations, we can only give a guideline on the technical suitability of the product. We recommend the observation of local legislation before using the colorants.

## PURITY

All products meet specific strict purity requirements regarding heavy metal content, primary aromatic amines etc. Some products are also specified microbiologically or a microbiological specification can be provided upon request.

## Tests for EN 71/3 – Determination of the heavy metal trace impurities

We have determined the total contents of heavy metals (after acid digestion).

The observation of the heavy metal limits shown in the table below applies to products whose chemical structure does not contain a heavy metal molecule. Therefore – unless otherwise noted – the products mentioned in this brochure meet the following purity criteria on the basis of regular analytical tests:

The maximum total contents for the following elements are:

ELEMENT	PPM
Aluminum	1000
Antimony	100
Arsenic	10
Barium	100
Boron	250
Cadmium	5
Chromium (III and VI)	10
Cobalt	25
Copper	1000
Lead	10
Manganese	1000
Mercury	25
Nickel	100
Selenium	100
Strontium	1000
Tin	1000
Zinc	1000
Primary aromatic amines	500*
Aromatic amino sulfonic acids (if appropriate)	500**
4-aminobiphenyl, benzidine 2-naphthylamine, 2-methyl-4-chloroaniline	10

\* Calculated as aniline

\*\* Calculated as aniline sulfonic acid

Through observation of these stringent criteria (meaning total content criteria), the requirements specified in the BfR Recommendation IX and European Resolution AP (89)1 relating to the extractable heavy metal trace impurities and free primary aromatic amines in colorants are automatically met.

Colorants, which according to their chemical structure do contain a heavy metal, i. e.

- Copper phthalocyanine pigments
- Cr (III) complexes
- Cobalt complexes
- Nickel complexes

also meet the above heavy metal limits – except for the complexed heavy metal. For the complexed heavy metal, the extractable content has to be considered on a case by case basis. In certain cases, other heavy metals may be present as impurities in slightly increased amounts. For these heavy metals, the extractable content has to be considered as well.

The individual extractable content of the addressed heavy metals can be obtained upon request.

For selected products based on non complexed organic pigments or dyes however, the extractable content for certain heavy metals may have to be considered due to the manufacturing process.

#### **Tests for EN 71/9 – Determination of primary aromatic amines compliance**

Products which are in compliance with EN 71/9 fulfill the special requirements for the regulated primary aromatic amines and – if applicable – for the regulated preservatives within the scope of EN 71/9 and the Directive 2015/2117/EC. Heubach is aware that many of our customers will use the colorants in aqueous systems, which will impact the release of the water-soluble regulated primary aromatic amines. The release depends on:

- Intensity of contact with water
- Time of contact (of colorants) with water
- Level of solubility and/or dispersing of colorants in aqueous media
- The formulation of the customer's system in general

In order to cover the influence of an aqueous environment, we have tested our pigments in the most unfavorable way with a strong dispersion in water. These resulting pigment preparations have been tested for the regulated primary aromatic amines of EN 71/9 according to the method laid down in EN 71/10 and 11. However, HPLC (high performance liquid chromatography) has been used for determination of the regulated amines.

#### **Definitions:**

- »In compliance with the regulation« means that the colorants meet the actual limits for the regulated primary aromatic amines and – if applicable – the regulated preservatives.
- »In compliance with the regulation with limitations« means that the colorants meet the actual limits for the regulated primary aromatic amines and – if applicable – the regulated preservatives, if they are used up to a certain level of colorant concentration in the end article. The concentrations are laid down in corresponding data sheets.

#### **EN 71/3:**

- ◆ The product fulfills the heavy metal limits as laid down on page 18.
- ◇ 1. The product is based on a heavy metal complex or an inorganic pigment. In these cases, the extractable content (0.1 n HCL) has to be considered for the heavy metal which is contained according to the chemical structure.
- 2. The product is based on an organic pigment or dye. However, for certain heavy metal(s) the extractable content may have to be considered due to the manufacturing process.

#### **Tests for AP (89)1 – Determination of unsulfonated primary aromatic amines (PAA)**

Testing of the colorants mentioned in this brochure for unsulfonated primary aromatic amines is done in accordance with DIN 55610 (also ETAD analytical method no. 212).

# TEST CONDITIONS

## PHYSICAL DATA

Parameters mentioned under »physical data« contain basic product characteristics. Not all parameters were tested on each batch.

### pH value

For water soluble dyes in powder or granular form, the pH value was determined on a 1% aqueous dye solution at 20 °C with a pH meter. The pH values of pigment preparations and liquid dyes were determined on the undiluted product.

### Surface tension

For water soluble dyes in powder or granular form, the surface tension was determined on a 1% aqueous dye solution at 20 °C.

### Solubility

The solubility figures represent the maximum amount of dry powder or granular dye in the respective solvent at 20 °C.

### Viscosity

The viscosity of pigment preparation pastes was determined at 23 °C with a rotation viscometer read off the flow curve at a shear rate of  $D = 60 \text{ s}^{-1}$  (+/- 10 %).

### Density

The density of the pigment preparations was determined on a DMA 38 (densitometer).

### Particle size

For pigment preparations, the particle size was determined by capillary hydrodynamic fractionation.  $D_{50}$  value in nm is the median value of this distribution.

For pigments, the average particle size was measured for the primary particles with the transmission electron microscope.

### Specific surface

The specific surface of the pigment powders was determined by the Haul and Duembgen single-point differential method with nitrogen as absorption gas at a temperature of -196 °C.

### Oil absorption

The oil absorption was determined on the basis of EN ISO 787-5 and given in g linseed oil per 100 g pigment

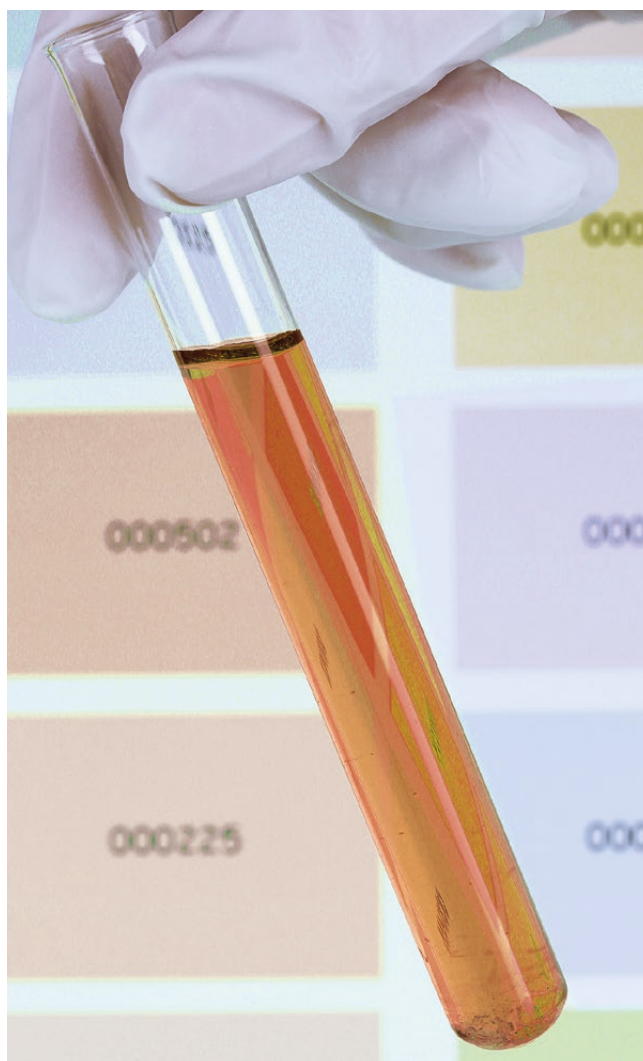
## PH STABILITY OF WATER SOLUBLE DYES

The behavior of water soluble dyes at different pH values was tested in 0.001% aqueous dye solutions buffered at the respective pH value 1-13. The respective samples are shown in photographs. (Please note that the shades of the illustrations can differ as mentioned above.)

## FASTNESS DATA OF WATER SOLUBLE DYES

### Light fastness of water soluble dyes

The light fastness properties were tested according to DIN ISO 12040 with an aqueous writing ink containing 4 % black dye or 2.5 % color dye applied onto plain paper. The assessment was carried out with reference to the 8-step wool scale, in accordance with DIN EN ISO 105-B01, the light fastness ratings ranging from 8 (excellent) to 1 (poor). The letter »d« was used for the reporting of a darkening effect after light exposure.



# FASTNESS DATA OF PIGMENTS, PIGMENT PREPARATIONS AND SOLVENT SOLUBLE DYES

## Acid and alkali fastness of pigment preparations

The fastness against acids and alkalis was tested on synthetic resin emulsion paint by a method resembling the standardized test procedure for the printing industry, as described in DIN 16524. The data were assessed against a 5-step gray scale »change in shade according to DIN EN 20105-A02/ ISO 105-A02.« with fastness ratings ranging from 5 (excellent) to 1 (poor).

## Acid and alkali fastness of pigments

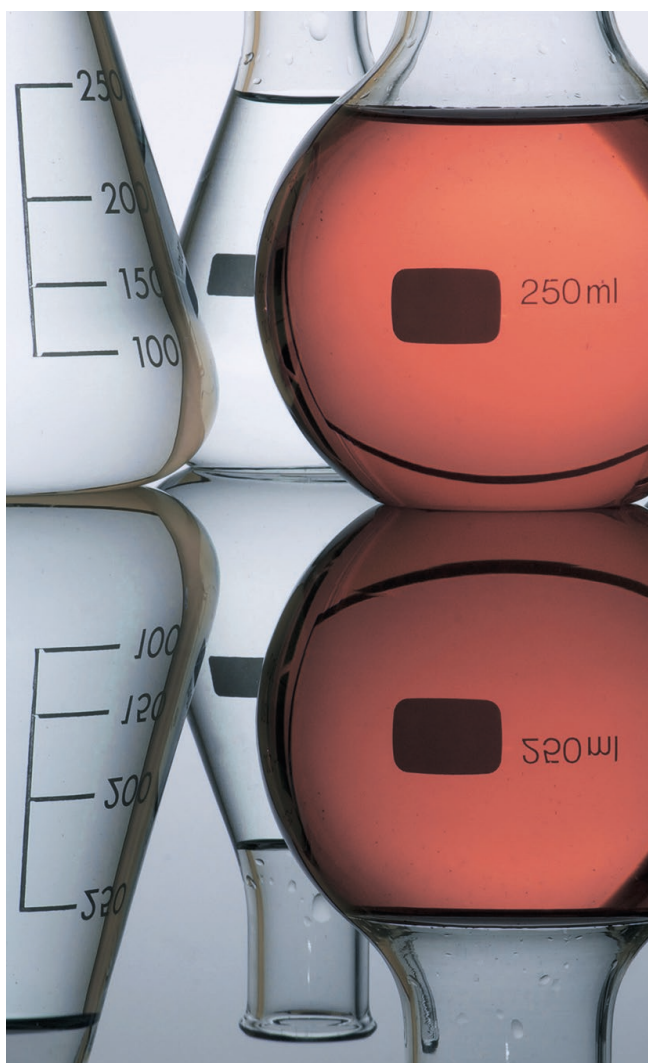
Metal sheets painted in full shade were spotted with 18% hydrochloric acid or 5% sodium hydroxide solution and precautions were taken to prevent evaporation. The solution was allowed to act for two hours at 40 °C. After removal of the acid or alkali solution, the change in color was assessed with the five-step gray scale

## Acid and alkali fastness of solvent soluble dyes

The fastness was tested on 1% shades for alkali and on 5% shades for acid in a nitrocellulose system applied on aluminum foils according to ISO 2837

## Light fastness of pigments, pigment preparations and solvent soluble dyes

The light fastness data of pigment preparations and solvent soluble dyes were determined using commercially obtainable equipment. The assessment was carried out with reference to the 8-step blue wool scale, in accordance with DIN EN ISO 105-B01, the light fastness ratings ranging from 8 (excellent) to 1 (poor). The letter »d« was used for the reporting of a darkening effect after light exposure.



## TEST MEDIA USED

### • Emulsion paint

Cosmenyl pastes were tested with 3% concentration in emulsion paint. Flexonyl grades were tested with 1% concentration in emulsion paint.

### • Resin paint

Pigments were tested in an air-drying synthetic resin paint (LOA) based on a long-oil alkyd resin.

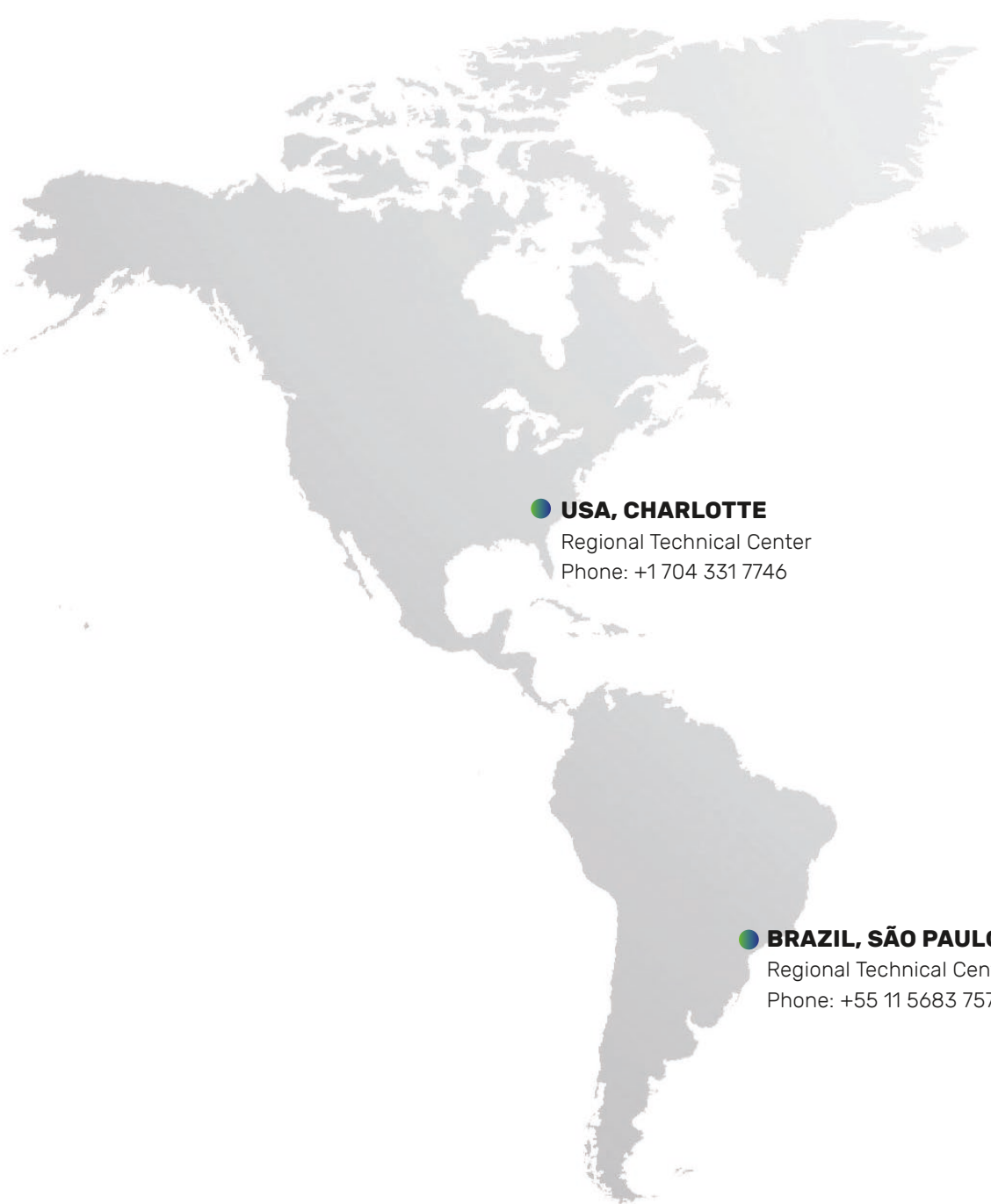
### • Prints

In a few cases, pigments have been tested in prints with 10% pigment content on special papers with a coating weight of 1.5g/m<sup>2</sup>.

# TECHNICAL SERVICE

Heubach's Technical Service Team will be happy to assist you if you require more information. Please contact our Technical Application Centre in your region.

You can also contact the Special Applications color team via **spa@Heubach.com**. Your request will be forwarded to the person responsible in your region.



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SPA 3012 EN | 03.2025