

PRODUCTS FOR DIGITAL INKS

Pigments, Pigment Preparations and Charge Control Agents for Electrophotographic Toners. Pigments, Pigment Preparations and Dyes for Inkjet Inks.



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HEUBACH PRODUCTS FOR THE NIP MARKET

HEUBACH OFFERS KEY INGREDIENTS FOR TONERS AND INKJET INKS

Electrophotography and inkjet are the two most successful technologies in Non-Impact Printing (NIP).

This brochure, called »Products for Digital Inks« covers products for toner & inkjet applications. Our range of innovative toner products comprises Charge Control Agents (CCAs) and Pigments for Electrophotographic Toners.

The toner-specific products are named as Copy (CCAs) and Toner (pigments).

For inkjet we offer dyes, pigments and pigment preparations named as Duasyn®, Duasynjet, Savinyl®, Ink Jet and Hostajet®.

Heubach has decades of experience in the development and manufacture of pigments and dyes for digital printing. This includes R&D and production as well as worldwide technical service and supply. Over the past decades Heubach has continued to introduce innovative products for the toner and inkjet markets.

For more general information on Heubach, further product and regulatory information, please contact your nearest Heubach representative or Heubach location listed under »Contacts«.

For more information visit our websites at

www.Heubach.com

In addition Heubach offers Wacker's pyrogenic silicas HDK® for toner applications in Japan and Korea.

www.wacker.com/hdk



PRODUCTS FOR TONERS

SALES RANGE



CHARGE CONTROL AGENT

Negative Charge Control Agent (CCA), responsible for polarity and magnitude of the electrostatic toner charge (Copy).



PIGMENTS

Specially developed range of pigments for toner applications with specified triboelectric properties (Toner). Additional recommended pigments for toner applications (Permanent, Graphtol®, Hansa®, Novoperm®, PV Fast®, Hostaperm®, Ink Jet).



PIGMENTS PREPARATIONS

Non-dusting, easy-to-disperse concentrates solid (Hostacopy®) and liquid dispersions are available on request.

CHARGE CONTROL AGENT PRODUCT RANGE, DESCRIPTIONS AND PROPERTIES

HEUBACH SELLS CHARGE CONTROL AGENT (CCA) FOR TONER APPLICATIONS UNDER THE NAME COPY.

Heubach's Charge Control Agents (CCA) are characterized by high efficiency, quick charge-up and long-term charge stability. In addition, their charging effect is unaltered by a change in environmental conditions such as humidity, temperature, etc. They also exhibit good thermal stability and are easy to disperse.

The colorless CCA are designed for multi-purpose applications, i. e., for color toners as well as for black toners. Copy Charge N4P are compatible with common toner resins like styrene-acrylic, polyester, epoxy, etc.

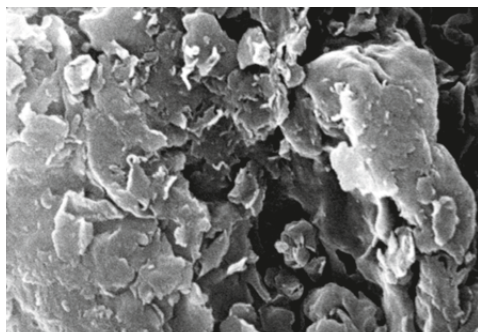
ADVANTAGES

- Good dispersibility
 - Quick charge-up
 - Adjusted tribo level
 - Long term chargeability
 - Multi-purpose CCAs for colored and black toner
-

CHARGE CONTROL AGENT FOR TONERS

PRODUCT	POLARITY	COLOR	CHEMICAL CLASS
COPY CHARGE N4P	Negative	Colorless	Modified inorganic polymeric compound

SEM (Scanning Electron Microscopy) image



10000 x — 1µm Copy Charge N4P



Thermal stability checked by Differential Scanning Calorimetry (DSC)

PIGMENTS

PRODUCT DESCRIPTIONS AND PROPERTIES

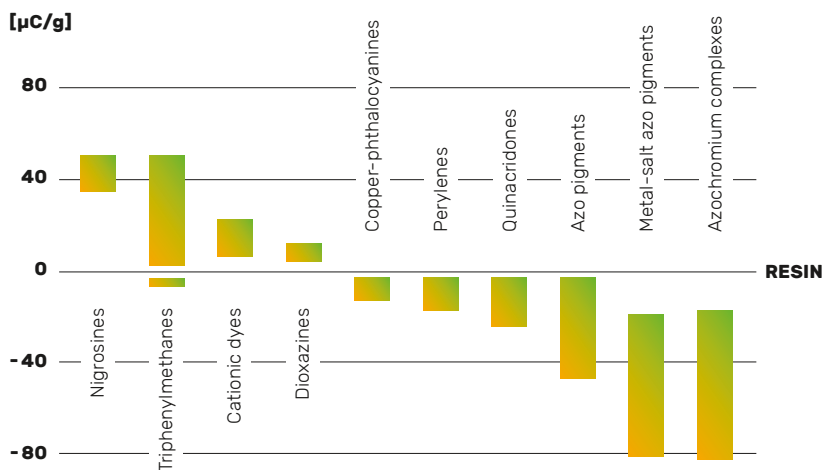
HEUBACH SELLS ORGANIC PIGMENTS FOR TONER APPLICATIONS UNDER THE NAME TONER.

Toner pigments must satisfy coloristic requirements such as hue, tinctorial strength, and transparency; also, they must possess good heat resistance and light fastness. In addition, pigments for toner application should meet triboelectric requirements. Chemically identical pigments can show very different properties depending on their chemical processes.

Heubach has developed a special range of toner pigments. These products offer additional advantages to the toner industry, e.g. good dispersibility and compatibility in toner resins, and high transparency. In addition, the triboelectric properties are specified and monitored.

The pigments listed for the process colors of yellow, magenta, and cyan are a general recommendation. Special combinations may be necessary, depending on the particular toner resin, the respective toner process (e.g. chemical or conventional toner) and intended use (color copying, color printing, color proofing, etc.). Our experts can advise you for your individual needs.

TRIBOELECTRIC SPECTRUM OF PIGMENT CLASSES



Each pigment class has its typical range within the triboelectric spectrum and influences polarity and magnitude of the toner charge.
 [Ref. H.-T. Macholdt, A. Sieber; *Dyes and Pigments* 9, pp. 119-127 (1988)]

ADVANTAGES

- Good dispersibility
- Compatibility in toner resins
- High transparency
- Specified and monitored triboelectric properties

PIGMENTS

PRODUCT RANGE

- Toner pigments (Toner grades for process colors)
- Additionally recommended pigments for toner applications (for shading, spot colors, etc.)

TONER PIGMENTS FOR PROCESS COLORS

PRODUCT	COLOR	COLOUR INDEX	CHEMICAL CLASS	LIGHT FASTNESS ¹ (1/1 SD)
TONER YELLOW 5GXT	Yellow	P. Y. 74	Monoazo	5
TONER YELLOW 3GP	Yellow	P. Y. 155	Bisacetoacetarylide	7-8
TONER YELLOW HG	Yellow	P. Y. 180	Benzimidazolone	6-7
TONER MAGENTA E 02	Magenta	P. R. 122	Quinacridone	7
TONER MAGENTA E	Magenta	P. R. 122	Quinacridone	7-8

1 - Light fastness was determined in a draw down in a typical polyester toner resin.



Light exposure for determination of light fastness



ADDITIONALLY RECOMMENDED PIGMENTS* FOR TONER APPLICATIONS

PRODUCT	COLOR	COLOUR INDEX	CHEMICAL CLASS	LIGHT FASTNESS ¹ (1/1, SD)
PV FAST YELLOW H9G	Yellow	P. Y. 214	Disazo	7
HOSTAPERM YELLOW H6G	Yellow	P. Y. 175	Benzimidazolone	7
INK JET YELLOW HG 01 VP 6252	Yellow	P. Y. 180	Benzimidazolone	7
PV FAST YELLOW HG 01	Yellow	P. Y. 180	Benzimidazolone	7
NOVOPERM YELLOW P-HG	Yellow	P. Y. 180	Benzimidazolone	7
NOVOPERM YELLOW FGL	Yellow	P. Y. 97	Monoazo	7
GRAPHTOL YELLOW GG	Yellow	P. Y. 17	Diarylide	4
INK JET YELLOW 5GX-W	Yellow	P. Y. 74	Monoazo	6
INK JET YELLOW 5GS	Yellow	P. Y. 74	Monoazo	6
HANSA YELLOW 5GX 01	Yellow	P. Y. 74	Monoazo	6
HANSA YELLOW 5GX 02	Yellow	P. Y. 74	Monoazo	6
NOVOPERM YELLOW P-M3R	Yellow	P. Y. 139	Isoindoline	8
GRAPHTOL ORANGE RL	Orange	P. O. 34	Disazo	6-7
PV FAST RED D3G	Red	P. R. 254	DPP	8
GRAPHTOL CARMINE HF4C	Red	P. R. 185	Benzimidazolone	6-7
PERMANENT CARMINE FBB 02	Blue-shade red	P. R. 146	Monoazo	6
PERMANENT RUBINE F6B	Blue-shade red	P. R. 184	Monoazo	5
INK JET MAGENTA E5B 02	Magenta	P. V. 19	Quinacridones	7
PV FAST PINK E 01	Magenta	P. R. 122	Quinacridones	7-8
HOSTAPERM VIOLET P-RL	Violet	P. V. 23	Dioxazine	8
HOSTAPERM BLUE B2G 03	Cyan	P. B. 15:3	Phthalocyanine	8
PV FAST BLUE BG-NIP	Cyan	P. B. 15:3	Phthalocyanine	8
HOSTAPERM GREEN GNX-C	Green	P. G. 7	Phthalocyanine	8

* Please note that these products are standardized in different applications like paints, etc.
 1 = The light fastness was determined in a draw down in a typical polyester toner resin.

Further pigments for toner applications can be recommended on request.

PIGMENT PREPARATIONS PRODUCT DESCRIPTIONS AND PROPERTIES

HEUBACH SELLS SPECIALLY DEVELOPED PIGMENT PREPARATIONS FOR TONER APPLICATIONS.

A factor of utmost importance for the efficiency of pigments is their optimum degree of dispersion. Therefore, a pigment must be homogeneously incorporated into a toner resin by a physical process with high shear forces. In the case of chemical toner pigments need to be dispersed into various media, depending on the type of chemical toner process.

In all cases predispersed pigments in the form of pigment preparations help to reduce processing time and cost. Heubach offers solid (Hostacopy®) and liquid tailor-made pigment preparations on request.

ADVANTAGES

- Non-dusting micro-granules
 - Excellent dispersion quality due to optimized processing
 - Compatibility with common polyester toner resins
 - Easier dosing and mixing reduce toner process costs
-



PRODUCTS FOR INKJET INKS SALES RANGE

Within the Non-Impact Printing technology, inkjet printing enjoys high popularity due to its flexibility to print a large variety of substrates.

Inkjet applications include monochromatic, color office and industrial printers for marking, wide-format, packaging and publication printing.



SPECIAL REQUIREMENTS OF COLORANTS FOR INKJET INKS

- Good jetability
 - High surface tension
 - High light and water fastness
 - Low viscosity
 - Very good quality consistency
-

PIGMENTS FOR WATER-BASED, SOLVENT-BASED AND UV CURING INKJET INKS

PIGMENTS:

Specially developed range of inkjet pigments. Additional pigments recommended for inkjet applications (Graphtol, Novoperm, PV Fast, Hostaperm, Permanent, Hansa).

COLORANTS FOR WATER-BASED INKJET INKS

PIGMENT PREPARATIONS:

Aqueous pigment dispersions available under the trademark Hostajet PT.

DYES:

Duasyn SF and Duasynjet SF grades are aqueous solutions of dyes specially designed for water-based inkjet inks.

COLORANTS FOR SOLVENT-BASED INKJET INKS

DYES:

Powder grade dyes with very good solubility in alcohols, ketones and glycol esters (Savinyl).

PIGMENTS FOR WATER-BASED, SOLVENT-BASED AND UV CURING INKJET INKS

Heubach offers a comprehensive range of high quality organic pigments for inkjet applications.

The range consists of:

- Ink Jet Grade Pigments
- Selected Toner, Permanent, Novoperm, Hostaperm and PV Fast pigments

Heubach recommends using Ink Jet grade pigments for the most technologically advanced inks. These recommendations are based on tests performed in our Non-Impact Printing application laboratory.

PRODUCT PROPERTIES

- High chemical purity
 - Good dispersibility
 - Good long-term ink stability performance
-



PIGMENTS FOR WATER-BASED, SOLVENT-BASED AND UV CURING INKJET INKS

INK JET PIGMENTS

PRODUCT	COLOUR INDEX	CHEMICAL CLASS	MAIN APPLICATION		
			Aqueous	UV	Solvent
INK JET YELLOW H2G	P.Y. 120	Benzimidazolone		■	■
INK JET YELLOW 4G	P.Y. 155	Bisacetoacetarylide	■	■	■
INK JET YELLOW 4GC	P.Y. 155	Bisacetoacetarylide	■	■	■
INK JET YELLOW HG 01 VP 6252	P.Y. 180	Benzimidazolone	■	■	■
INK JET YELLOW 5GX-W	P.Y. 74	Monoazo	■		
INK JET YELLOW 5GS	P.Y. 74	Monoazo	■		
INK JET MAGENTA E5B 02	P.V. 19	Quinacridone	■	■	■
INK JET MAGENTA E7B	-	Quinacridone	■	■	■
INK JET MAGENTA E 02	P.R. 122	Quinacridone	■	■	■
INK JET MAGENTA E-S VP 6057	P.R. 122	Quinacridone	■	■	■



ADDITIONALLY RECOMMENDED PIGMENTS FOR INKJET APPLICATIONS

PRODUCT	COLOUR INDEX	CHEMICAL CLASS	MAIN APPLICATION		
			Aqueous	UV	Solvent
PV FAST YELLOW HG 01	P.Y. 180	Benzimidazolone		■	■
TONER YELLOW HG	P.Y. 180	Benzimidazolone		■	■
NOVOPERM YELLOW P-HG	P.Y. 180	Benzimidazolone		■	■
TONER YELLOW 5GXT	P.Y. 74	Monoazo	○		
HANSA YELLOW 5GX 01	P.Y. 74	Monoazo	○		
HANSA YELLOW 5GX 02	P.Y. 74	Monoazo	○		
HANSA BRILLIANT YELLOW 5GX 03	P.Y. 74	Monoazo	○		
NOVOPERM YELLOW P-M3R	P.Y. 139	Isoindoline		■	■
GRAPHTOL ORANGE RL	P.O. 34	Diazo	■		
PV FAST ORANGE 0RL	P.O. 43	Perione	■	■	■
PV FAST ORANGE H2GL	P.O. 64	Benzimidazolone		■	■
PV FAST RED D3G	P.R. 254	DPP	■	■	■
PERMANENT CARMINE FBB 02	P.R. 146	Monoazo	○		■
PERMANENT RUBINE F6B	P.R. 184	Monoazo	○		■
TONER MAGENTA E 02	P.R. 122	Quinacridone	○	○	○
TONER MAGENTA E	P.R. 122	Quinacridone	○	○	○
PV FAST PINK E 01	P.R. 122	Quinacridone		■	■
HOSTAPERM VIOLET BL 01	P.V. 23	Dioxazine	■	■	■
PV FAST VIOLET RL	P.V. 23	Dioxazine	■	○	■
HOSTAPERM VIOLET RL 02	P.V. 23	Dioxazine	■	■	
HOSTAPERM VIOLET P-RL	P.V. 23	Dioxazine		■	■
PV FAST BLUE BG-NIP	P.B. 15:3	Phthalocyanine	■	■	■
HOSTAPERM BLUE BT-617-D	P.B. 15:4	Phthalocyanine	■	■	■
HOSTAPERM GREEN GNX-C	P.G. 7	Phthalocyanine	○	■	■

COLORANTS FOR WATER-BASED INKJET INKS PIGMENT PREPARATIONS

Hostajet grades are fully dispersed pigments with no additional dispersing equipment needed. They allow manufacturing of state-of-the-art inkjet inks.



HOSTAJET

Hostajet PT grades are aqueous pigment preparations based on polymeric dispersants and inkjet quality pigments. They are especially developed for inkjet applications.

ADVANTAGES

- High color strength
 - High transparency and brightness
 - Excellent light fastness
(may be used for outdoor applications)
 - Excellent water fastness
 - Good compatibility with acrylic resins
and with a wide range of solvents
 - Very narrow particle size distribution
 - Excellent jetability
 - No sedimentation
 - Very low viscosity
-

COLORANTS FOR WATER-BASED INKJET INKS PRODUCT RANGE

HOSTAJET PIGMENT PREPARATIONS FOR INKJET INKS

PRODUCT	COLOUR INDEX	CHEMICAL CLASS	PIGMENT CONTENT [approx. %]	PARTICLE SIZE (typical d ₅₀) [nm]	LIGHT FASTNESS ¹	CHARACTERISTICS
HOSTAJET YELLOW 4G-PT	P. Y. 155	Bisacetoacetarylide	20	100	6-7	High performance green shade yellow
HOSTAJET RED D3G-PT VP 5121	P. R. 254	DPP	20	170	6-7	Mid shade red
HOSTAJET MAGENTA E5B-PT	P. V. 19	Quinacridone	20	80	7-8	High performance red shade magenta
HOSTAJET MAGENTA E-PT	P. R. 122	Quinacridone	20	70	7-8	High performance standard magenta
HOSTAJET CYAN BG-PT	P. B. 15:3	Phthalocyanine	20	80	8	High performance standard cyan
HOSTAJET BLACK O-PT	P. Bl. 7	Carbon Black	15	70	8	High performance standard black

¹ = Fastness properties were tested according to DIN ISO 12040 with an aqueous based inkjet ink containing 5% pigment applied onto plain paper.

DUASYN-SF/DUASYNJET-SF

Duasyn/Duasynjet grades are specially designed for water-based inkjet inks.

The following properties are typical for all Duasyn SF/Duasynjet SF grades used mainly for high performance inkjet inks:

ADVANTAGES

- Low salt content
- High purity
- High surface tension
- High tinctorial strength and brightness

DUASYN SPECIAL INKJET GRADE SF DYES

PRODUCT	COLOUR INDEX	CHEMICAL CLASS	DYE CONTENT [approx. %]	LIGHT FASTNESS ¹
DUASYN ACID YELLOW XX-SF LIQ.	A. Y. 23	Azo	8	4-5
DUASYN YELLOW 3GF-SF LIQ.	D. Y. 132	Azo	8	4-5
DUASYN BRILLIANT RED F3B-SF LIQ.	R. R. 180	Azo	15	4
DUASYN MAGENTA CR-SF LIQ.	-	Azo	15	4
DUASYNJET CYAN FRL-SF LIQ.	D. B. 199	Phthalocyanine	10	7
DUASYN ACID BLUE AE-SF 30 LIQ.	A. B. 9	Triarylmethane	30	2-3

¹ = Fastness properties were tested according to DIN ISO 12040 with an aqueous based inkjet ink containing 4% Duasyn black dye or 2.5% Duasyn/Duasynjet color dye applied onto plain paper.

COLORANTS FOR SOLVENT-BASED INKJET INKS DYES

SAVINYL DYES FOR INKJET INKS

PRODUCT	COLOUR INDEX	CHEMICAL CLASS	LIGHT FASTNESS ¹	CHARACTERISTICS
SAVINYL YELLOW RLS	S. Y. 83:1	Azo 1:2 Cr-complex	7-8	Standard yellow with good solubility in ketones
SAVINYL RED 3BLS	S. R. 91	Azo 1:2 Co-complex	6	Magenta with good solubility in ketones
SAVINYL PINK 6BLS	S. R. 127	Azo 1:2 Cr-complex	4	Standard magenta with good solubility in appropriate ketones
SAVINYL BLUE GLS	S. B. 44	Phthalocyanine	6	Standard cyan with good solubility in alcohols and ketones
SAVINYL BLACK RLSN 01	S. Bl. 27	Azo 1:2 Cr-complex	7	Standard black with good solubility in ketones

¹ = Fastness properties were tested according to DIN ISO 12040 on a print containing 5% Savinyl dye in vinyl copolymer, applied at 2-3g/m² on aluminum foil.

DUASYN DYE FOR INKJET INKS

PRODUCT	COLOUR INDEX	CHEMICAL CLASS	LIGHT FASTNESS ¹	CHARACTERISTICS
DUASYN BLACK A-RG	S. Bl. 27	Azo 1:2 Cr-complex	7	Standard black with good solubility in MEK

¹ = Fastness properties were tested according to DIN ISO 12040 on a print containing 5% dye in vinyl copolymer, applied at 2-3g/m² on aluminum foil.



ADVANTAGES

- Very good solubility in alcohols, ketones and glycol esters

NON-IMPACT PRINTING QUALITY CONTROL

Great care is taken to ensure a consistent quality of CCA, dyes, pigments and pigment preparations.

For CCA the charging efficiency is controlled by measuring the q/m -value (charge-to-mass ratio). The q/m -value quantifies the triboelectric properties of a toner ingredient dispersed in the toner matrix, both in sign and magnitude. In addition, relevant solid-state parameters are specified.

For each pigment, properties such as shade, transparency and tinctorial strength are specified. For Toner Pigments the triboelectric properties are also specified. For Inkjet pigments the purity is controlled.

For each pigment preparation, properties such as tinctorial strength, shade, purity of shade, transparency and viscosity are specified.

For each batch of water soluble salt-free (SF) dye, the cation content is specified, as well as the tinctorial strength, shade, purity of shade, surface tension, pH value and filterability.

For solvent soluble dyes, parameters like tinctorial strength, shade, purity of shade, solubility and filterability are specified.

PRODUCT INFORMATION

Product Data Sheets (PDSs) and Material Safety Data Sheets (MSDSs) are available upon request.



Viscosity measurement

PACKAGING

STANDARD PACKAGING FOR THE NIP GRADES

Depending on the product form (liquid/powder) and product group, different packaging is available:

COLORANTS AND ADDITIVES FOR ELECTROPHOTOGRAPHIC TONERS

CHARGE CONTROL AGENT
20 kg cardboard box (2x10 kg bags)

PIGMENTS
20 kg cardboard box (2x10 kg bags)



Packaging equipment

COLORANTS FOR INKJET INKS

DYES

For liquids:
25 kg or 30 kg plastic drum
200 kg plastic drum
1000 kg container, non-returnable

PIGMENT PREPARATIONS

30 kg plastic drum, 200 kg plastic drum

PIGMENTS FOR INKJET INKS

20 kg cardboard box (2x10 kg bags)

DYES FOR SOLVENT-BASED INKJET INKS

20 kg cardboard box (2x10 kg bags)



Further information about packaging may be obtained on request.

HEUBACH WEBSITES FOR TONERS AND INKJET INKS

Information on the Heubach product range for toners and inkjet inks can be obtained via the internet.

Technical descriptions and examples of uses of Heubach pigments and charge control agents for toners and colorants for inkjet inks can be found at the following address:

HEUBACH.COM/***



GLOSSARY

OVERVIEW AND EXPLANATION

CHEMICAL CLASS

All products mentioned in this brochure are classified according to their chemical structure and application.

COLOUR INDEX

Colour Index provides all colorants (dyes and pigments) with two reference numbers on the basis of a) chemical classification and b) coloristic aspects, according to the widely accepted system of Colour Index Generic Names and Colour Index Constitution Numbers.

DYE CONTENT

The dye content stated in approximate percentage is the concentration of dye in the aqueous or solvent-based solution and should be regarded only as a guide. The decisive criterion when standardizing is the tinctorial strength.

DYES

Dyes are colorants chemically differentiated as Direct, Reactive, Solvent and Acid dyes, which are used for aqueous or solvent-based inkjet inks.

GENERAL TEST CONDITIONS

The values quoted are determined under Heubach test conditions. Any change in operating parameters, e. g., concentration in use, resin or substrate, can influence the test results.

INKJET SYSTEM

There are two basic forms of inkjet systems, continuous (CIJ) and drop-on-demand (DOD).

INKJET INKS

Inkjet inks can be generally divided into three main fields of application: water-based inks, solvent-based inks and UV curing inks.

LIGHT FASTNESS

The light fastness is determined with the Xenotest instrument from a drawdown in full shade in accordance with DIN ISO 12040 (eight-step Blue Wool scale). Rating 8 denotes outstanding light fastness and rating 1 very poor light fastness.

LV

Low-volume trial product without fixed specifications.

MEK

Methyl ethyl ketone, a volatile organic solvent used as the carrier for inkjet inks.

NIP

Non-Impact Printing.

PARTICLE SIZE (AVERAGE SIZE OF PRIMARY PARTICLES)

The median value of the primary particle is determined as follows: a series of photos is taken with the transmission electron microscope and evaluated using a graphic tablet. After analysis of about 1000 primary particles, a particle size distribution is calculated in parts by volume. The d_{50} -value of this distribution is the median value.

PIGMENTS

Pigments are colorants insoluble in the application medium.

PIGMENT CONTENT

The pigment content stated in approximate percentage is the concentration of pigment in the preparation and should be regarded only as a guideline. The decisive criterion when standardizing is the tinctorial strength.

PIGMENT DISPERSING

Distribution of a pigment, accompanied by a reduction of the agglomerate size to afford primary particles and aggregates. The dispersion steps are deagglomeration, wetting, distribution and stabilization.

PREPARATIONS

Preparations are based on pigments dispersed in water (Hostajet) or in resins (Hostacopy) to provide ready-to-use colorants for aqueous or solvent-based inkjet inks.

POLARITY

In electrophotographic printing the polarity of the toner could be either positive or negative. The sign of the polarity is controlled by Charge Control Agents. They also control magnitude, the charge-up behavior and long-term stability of the final toner charge characteristics.

SOLVENT-BASED INKS

Solvent-based inks contain colorants such as Savinyl dyes.

STANDARD DEPTH (SD)

An arbitrarily chosen depth of shade (color strength) for all hues, from which a uniform depth of shade may be determined for purposes of comparison. Depth of shade can then be described as a multiple or fraction of standard depth. The pigment content figure in percentage for the standard depth $\frac{1}{1}$ SD and $\frac{1}{3}$ SD was carried out according to DIN 53235.

VP

Trial product without fixed specifications.

WATER-BASED INKS

Water-based inks contain colorants such as Duasyn dyes and Hostajet aqueous ultra-fine pigment preparations.

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