

ELEMENTIS

A global specialty chemicals company

Application Leaflet

Dispersing agents for pigment dispersions & colorants

Key Benefits

- ❖ Achieving the best performance using Elementis additives
- ❖ Ability to manufacture colorants for various aqueous and non-aqueous systems by provided guide formulations

Enhanced Performance Through Applied Innovation

Introduction

Color dispersions are highly concentrated dispersions of pigments in a liquid medium, comprising a mixture of dispersing agents, solvent and probably vehicles; colorants are a kind of dispensable pigment dispersions, applicable to a colorant system.

Modern paint manufacturers are using color dispersions to rationalize their production process. Production and labor costs can be reduced, production flexibility, services to the customers and profits are improved. For economic reasons color dispersions and colorants are not formulated for just one coating system but for a segment of the coating industry (e.g. waterborne industrial systems).

The color dispersions and colorants are added to a base paint or a binder solution. No grinding process is required; the desired color is obtained by simple mixing.

Elementis has vast experience in supplying additives for a wide range of color dispersions.

The aim of this report is to enhance awareness of Elementis knowledge and to help the potential formulator in the selection of suitable additives to be used in color dispersions and colorants. Furthermore the indicated recipes are considered as a starting point for the development of colorants and tinters.

Definitions

Various expressions for all kinds of pigment preparations are being used in the industry. To avoid any misunderstanding with this we have summarized the meaning of the various expressions as used in this publication.

Pigment dispersion

Most generic description, meaning pigments dispersed in a liquid medium. The term includes color dispersions, colorants, stainers, tinters, pigment pastes and pigment concentrates.

Color dispersion

Pigment dispersion in a medium to a maximum color strength; also known as pigment concentrates.

Colorant

Pigment dispersion in a liquid medium to a well-controlled strength and viscosity volumetric or gravimetric addition by dispenser is possible.

Tinters

Synonym for color dispersions

Explanations for the tinting procedure

Intermix : synonym for in-plant tinting

Shop-tinting : synonym for point-of-sale tinting

WB : waterborne coatings

SB : solventborne coatings

Selection guide

Color dispersions are highly concentrated dispersions of pigments in a liquid medium, comprising a mixture of dispersing agents, solvent and probably vehicles; colorants are kind of dispensable pigment dispersions, applicable to a colorant system.

A selection of the dispersant system depends largely on the requirements and use of the colorants and tinters. Important criteria for this include:

- Area of use : waterborne, solventborne or universal
- Market segment : decorative, industrial or both
- Economics : cost price sensitivity and quality
- Environment : organic solvent-free or not

The selection guide, table 1, can be used as a first indication for the selection of the dispersing agents and starting formulations. Please keep in mind that the borderline between one recommendation and another may be vague, depending on the applied selection criteria. Some overlap is possible.

In this report typical compositions of six different types of colorants will be presented:

| | Pigment dispersion | Typical use |
|----|-----------------------------------|-----------------------|
| 1. | Waterborne color dispersions | WB decorative |
| 2. | Waterborne solvent free colorants | WB decorative |
| 3. | Waterborne colorants | WB industrial |
| 4. | Universal colorants (UC) | Shop-tinting |
| 5. | Universal NO-VOC colorants | Universal decorative |
| 6. | Solventborne industrial colorants | SB general industrial |

Table 1: Selection guide - Elementis additives for tinters and color dispersions

| Application | Main dispersant | Co-dispersant | Formulations (see page) |
|-------------------------------------|--|--------------------------------------|-------------------------|
| WB-solvent free color dispersions | NUOSPERSE® FN 260 (NUOSPERSE® FN 265) | NUOSPERSE® FX 610 | Page 5 |
| WB-Industrial colorants | NUOSPERSE® FX 7500W | | Page 6 |
| | NUOSPERSE® FX 365 | NUOSPERSE® FX 600 | Page 7 |
| | NUOSPERSE® W-33 NUOSPERSE® W-39 | | Page 8 |
| Universal NO-VOC deco, shop-tinting | NUOSPERSE® FN 260 (NUOSPERSE® FN 265) | NUOSPERSE® FX 610 NUOSPERSE® 2008 | Page 9 |
| Universal NO-VOC colorants | NUOSPERSE® 2000 | | Page 10 |
| SB-industrial | NUOSPERSE® 9850 | | Page 11 |



General recommendations for formulating and manufacturing

The starting formulations as indicated in the next paragraphs, are made to the best of our knowledge, however a certain optimization and adsorption to the individual requirements may be necessary. The pigments have partly been selected because of specific needs from a source for which the starting formulation originally has been designed. It does not give any guarantee that these will be the best designed for your application. Therefore we advise to select the range of pigments YOU need in YOUR system. Contact your pigment supplier for the best choice.

Manufacturing procedure

In preparation of the pigment dispersion, it is recommended to add first water or solvent (or part of it, depending on the dispersion characteristics) and dissolve the dispersing agent. After this, the pigments and extenders are added and mixed. Mix this thoroughly on a dissolver at low speed. The next step is the grinding procedure. Take care for air entrapment. After the dispersion process the pigment dispersion can be vacuumed to remove the entrapped air and adjusted to strength and further items of the specification.

Evaluation of pigment dispersions

The sole uniform recommendation for the evaluation of the color dispersions and colorants that can be given is: evaluate the dispersion under circumstances that come as close as possible to the practical usage! This means for instance, that the compatibility has to be tested carefully in the final paint systems. A practical way is to carry out the test with at least two ratios of the pigment dispersions: about the lowest and the highest use concentrations. Characteristic properties such as color development, influence on the viscosity and stability are to be part of the evaluation program.

Color development can be followed in a simple way, by carrying out a “rub-out” test. After incorporating the pigment dispersion into the final system, part of the paint sample is simply mixed with a spatula (or 2 minutes on a shaker) and the remaining part is thoroughly mixed on a dissolver (or e.g. 10 minutes on a paint shaker, depending on the practical usage conditions). For both paints a draw-down is made and after the flash-off most of the solvent, a rub-out is made. No color differences between both paint samples, nor between the rubbed and not rubbed areas in the paint layer, indicate optimal color development.

To adjust the color development, additives are being added to the “base-paint” or vehicle system, to which the pigment dispersion is added.

From practical experiences it has been seen that the following products are extremely suitable to improve the color development and the acceptance of pigment dispersions in various media:

- NUOSPERSE® 2006
- NUOSPERSE® FA 115
- NUOSPERSE® 2008
- NUOSPERSE® FN 265
- NUOSPERSE® FA 196

The NUOSPERSE® grades presented here in sequence with declining hydrophility. However, other Elementis additives may also be considered.

For further detailed information on the principles of color acceptance improvers please refer to our separate technical leaflet.

Guideline formulations

Waterborne solvent free color dispersions

Main application field: architectural coatings

These pigment dispersions are used for the shading of various water-based coatings such as dispersion paints, wall plasters, paper coatings, inks, textile and leather finishes. A further simplification of the indicated starting formulations is possible by use of the co-dispersing agents NUOSPERSE® FX 610.

Table 2: Guideline formulations based on NUOSPERSE® FN 260 and NUOSPERSE® FX 610

| Pigment | C.I. | [%] | NUOSPERSE® FX 610 [%] | NUOSPERSE® FN 260 [%] | Water [%] | Humectant * [%] | RHEOLATE® FX 1070 ** [%] | KOH solution w(KOH)= 0.25 | Defoamer [%] |
|-------------------------------|----------|------|-----------------------------|-----------------------------|--------------|--------------------|--------------------------------|------------------------------------|-----------------|
| Hansa® Brilliant Yellow 2GX70 | P.Y. 74 | 45 | 2.0 | 7.3 | 35.1 | 10.0 | — | 0.2 | 0.4 |
| MONARCH® 120 | P.Bk. 7 | 44 | 2.1 | 7.2 | 36.1 | 10.0 | — | 0.2 | 0.4 |
| SILO® 3048 | P.Y. 42 | 65 | 6.5 | 1.5 | 15.7 | 10.0 | 0.3 | 0.7 | 0.3 |
| Hostaperm® Green GNX | P.G. 7 | 50 | 1.2 | 9.8 | 28.5 | 10.0 | — | 0.1 | 0.4 |
| Heliogen® Blue L6875F | PB.15:2 | 43 | 1.0 | 7.0 | 36.2 | 12.0 | — | 0.4 | 0.4 |
| Heliogen® Blue L7087 | PB.15:3 | 45 | 1.0 | 7.0 | 34.2 | 12.0 | — | 0.4 | 0.4 |
| Bayferrox® 130M | P.R. 101 | 70 | 3.0 | 4.0 | 11.6 | 10.0 | 0.3 | 0.8 | 0.3 |
| Permanent® Red FGR | P.R. 112 | 40 | 5.0 | 6.0 | 36.2 | 12.0 | — | 0.4 | 0.4 |
| Hostaperm® Violet RL Spec. | P.V. 23 | 35 | 7.5 | 4.5 | 42.5 | 10.0 | — | 0.1 | 0.4 |
| Hostaperm® Red Violet ER02 | P.V. 19 | 40 | 10.0 | 5.0 | 34.5 | 10.0 | — | 0.1 | 0.4 |
| TRONOX® CR-826 | P.W. 6 | 72.5 | 5.0 | 3.0 | 10.0 | 8.2 | 0.5 | 0.5 | 0.3 |
| Hostaperm® Rosa E WD | P.R. 122 | 35 | 6.5 | 8.0 | 38.0 | 12.0 | — | 0.1 | 0.4 |
| Irgazin® Red 3670 HD | P.R. 254 | 40 | 3.0 | 6.0 | 40.4 | 10.0 | — | 0.2 | 0.4 |

* Humectants are used to avoid drying out effects of the concentrated dispersions. To prevent bacterial decomposition a biocide might be necessary.

** The mentioned NiSAT grade RHEOLATE® FX 1070 is used to adjust the rheological character of the colorant.

NUOSPERSE® FN 265 can be used as a 1:1 alternative nonionic wetting agent for NUOSPERSE® FN 260.

NUOSPERSE® FN 265 is additionally part of many paint and coating formulations.

Waterborne industrial colorants

Main application field: protective and marine coatings, general industrial coatings and inks

These colorants are used for the shading of various waterborne coatings such as industrial coatings, dispersion paints, paper coatings and inks. They are also used as part of gravimetric and volumetric tinting systems and have excellent mutual mixing properties; Essential for computerized tinting.

The formulations, show good wet-edge properties, that is to say, are quite resistant against drying out effects during storage. Nevertheless, for extreme application conditions (high pigment loading, long storage time in a dispenser canister) it may be necessary to increase the wet-edge time. This can be obtained by increasing the percentage of humectant in the formulation.

To prevent bacterial decomposition a biocide can be necessary.

These below colorant formulations are used for the shading of various waterborne industrial coatings such as one and two-pack industrial coatings and inks. NUOSPERSE® FX 7500W is a polymeric dispersant grade dedicated to be used as a stand-alone dispersant for most effective processing especially for formulations with organic pigments and carbon black.

Table 3: Guideline formulations based on NUOSPERSE® FX 7500W

| Pigment | Conc. [%] | NUOSPERSE® FX 7500W [%] | Defoamer [%] | Preservative [%] | DMAE [%] | Propylene glycol [%] | Water [%] |
|-----------------------|-----------|-------------------------|--------------|------------------|----------|----------------------|-----------|
| Carbon Black MA 100 | 35.0 | 17.5 | 0.1 | 0.1 | 0.3 | 4.0 | 43.0 |
| Evonik® FW 200 | 15.0 | 22.5 | 0.3 | 0.1 | 1.0 | — | 61.1 |
| MONARCH® 1300 | 15.0 | 16.5 | 0.3 | 0.1 | 1.0 | — | 67.1 |
| MONARCH® 1400 | 18.0 | 22.5 | 0.3 | 0.1 | 1.0 | — | 58.1 |
| EMPEROR® 2000 | 18.0 | 21.6 | 0.3 | 0.1 | 1.0 | — | 59.0 |
| Raven® 5000 | 20.0 | 30.0 | 0.3 | 0.1 | 1.0 | — | 48.6 |
| Heliogen® Blue D 7079 | 37.0 | 24.0 | 0.3 | 0.1 | — | — | 38.6 |
| Ti-Pure™ R-706 | 72.0 | 10.8 | 0.1 | 0.2 | — | — | 16.9 |
| Bayferrox® 3920 | 55.0 | 19.3 | — | 0.2 | — | — | 25.4 |

Table 4: Resin-free guideline formulations based on NUOSPERSE® FX 600 and NUOSPERSE® FX 365

| Pigment | C.I. | [%] | NUOSPERSE® FX 365 [%] | NUOSPERSE® FX 600 [%] | Humectant * [%] | Water [%] | RHEOLATE® FX 1070 ** [%] | Defoamer [%] |
|-------------------------|-----------|------|-----------------------------|-----------------------------|--------------------|--------------|--------------------------------|-----------------|
| Bayferrox® 130M | P.R. 101 | 60.0 | 9.0 | 5.8 | 3.0 | 21.5 | 0.2 | 0.5 |
| Bayferrox® 3910 | P.Y. 42 | 55.0 | 3.3 | 7.0 | 3.0 | 29.2 | 2.0 | 0.5 |
| Heliogen® Blue L 7080 F | P.B. 15:3 | 40.0 | 11.0 | 3.0 | 3.0 | 42.5 | — | 0.5 |
| Hostaperm® Green 8G | P.G. 36 | 45.0 | 11.0 | — | 3.0 | 36.5 | 4.0 | 0.5 |
| Hostaperm® Rosa E | P.R. 122 | 30.0 | 6.0 | 2.0 | 3.0 | 56.5 | 2.0 | 0.5 |
| Irgazin® DPP Orange RA | P.O. 73 | 45.0 | 7.0 | 2.0 | 3.0 | 42.5 | — | 0.5 |
| Irgazin® DPP Red BO | P.R. 254 | 45.0 | 7.5 | — | 3.0 | 41.0 | 3.0 | 0.5 |
| Kronos® 2310 | P.W. 6 | 70.0 | 3.2 | 2.0 | 3.0 | 19.5 | 2.0 | 0.5 |
| Novoperm® Yellow FGL | P.Y. 97 | 45.0 | 1.1 | 5.0 | 3.0 | 45.1 | 0.3 | 0.5 |
| Paliotol™ Yellow L 0962 | P.Y. 138 | 55.0 | 2.0 | 6.0 | 3.0 | 33.0 | 0.5 | 0.5 |
| Sico® Red L 3855 | P.R. 112 | 45.0 | 7.5 | 1.0 | 3.0 | 41.5 | 1.5 | 0.5 |
| Sicotan® Yellow L 1010 | P.Y. 53 | 70.0 | 3.2 | 2.0 | 3.0 | 19.5 | 2.0 | 0.3 |
| Special Black | P.Bk. 7 | 35.0 | 5.0 | 5.0 | 3.0 | 51.0 | 0.5 | 0.5 |
| Special Black 250 | P.Bk. 7 | 40.0 | 6.6 | 2.0 | 3.0 | 46.9 | 1.0 | 0.5 |

* Humectants are used to avoid drying out effects of the concentrated dispersions. To prevent bacterial decomposition a biocide might be necessary.

** The mentioned NiSAT grade RHEOLATE® FX 1070 is used to adjust the rheological character of the colorant.

NUOSPERSE® FX 600, a polymeric dispersant, is an effective millbase viscosity reducer. For optimum stability NUOSPERSE® FX 365, a non-ionic, polymeric grade, has to be formulated in addition.

Table 5: Resin-based guideline formulations based on NUOSPERSE® FX 600 and NUOSPERSE® FX 365

| Pigment | C.I. | Conc. [%] | NUOSPERSE® FX 365 [%] | NUOSPERSE® 2008 [%] | NUOSPERSE® FX 600 [%] | Water [%] | Synthetic Resin emulsion |
|-------------------------|-----------|--------------|-----------------------------|---------------------------|-----------------------------|--------------|--------------------------------|
| Bayferrox® 130M | P.R. 101 | 55.0 | 1.0 | 2.5 | — | 7.5 | 34.0 |
| Bayferrox® 3910 | P.Y. 42 | 52.5 | 2.7 | — | 7.5 | 14.0 | 23.3 |
| Heliogen® Blue L 6975 F | P.B. 15:2 | 25.0 | 7.7 | 2.0 | — | 25.3 | 40.0 |
| Heliogen® Blue L 7080 F | P.B. 15:3 | 25.0 | 12.0 | — | — | 23.0 | 40.0 |
| Hostaperm® Green 8G | P.G. 36 | 35.0 | 11.0 | — | — | 18.0 | 36.0 |
| Irgazin® Red 3670 HD | P.R. 254 | 37.0 | 9.0 | — | 1.0 | 23.0 | 30.0 |
| Kronos® 2310 | P.W. 6 | 70.0 | 1.0 | 2.0 | 1.5 | 6.5 | 19.0 |
| Novoperm® Red F3RK 70 | P.R. 170 | 30.0 | 6.5 | 1.5 | — | 32.0 | 30.0 |
| Novoperm® Yellow FGL | P.Y. 97 | 40.0 | 4.5 | 1.0 | 1.0 | 33.5 | 20.0 |

NUOSPERSE® W-33 and W-39 are polymeric dispersant which have been designed to be used as standalone dispersants to prepare of binder free colorants of organic and inorganic pigments. NUOSPERSE® W-33 and NUOSPERSE® W-39 are based on slightly different compositions of anionic and nonionic surfactants.

Table 6: Resin-free guideline formulations based on NUOSPERSE® W-33 and NUOSPERSE® W-39

| Pigment | C.I. | Conc. [%] | NUOSPERSE® W-33 [%] | NUOSPERSE® W-39 [%] | Water [%] | Humectant * [%] | pH adjust. [%] |
|--------------|----------|-----------|---------------------|---------------------|-----------|-----------------|----------------|
| White | P.W. 6 | 65.0 | 11.0 | — | 17.8 | 5.9 | 0.3 |
| Carbon black | P.Bk. 7 | 35.0 | 10.0 | — | 49.5 | 5.0 | 0.5 |
| Hansa Yellow | P.Y. 74 | 35.0 | 12.0 | — | 46.9 | 6.0 | 0.1 |
| Red oxide | P.R.101 | 60.0 | — | 11.0 | 24.7 | 4.0 | 0.3 |
| Phtalo blue | P.B.15:2 | 30.0 | — | 11.0 | 52.7 | 6.0 | 0.3 |
| Yellow oxide | P.B.15:3 | 45.0 | — | 9.0 | 25.7 | 5.0 | 0.3 |
| Naphtol red | P.R.170 | 30.0 | — | 11.0 | 51.5 | 7.0 | 0.5 |

* Humectants are used to avoid drying out effects of the concentrated dispersions. To prevent bacterial decomposition a biocide might be necessary.

If a combination of technologies is preferred, NUOSPERSE® W-30 is further suitable option.

Universal NO-VOC deco and shop-tinting

The selection of the dispersing agents for these colorants is quite complex. These colorants are used for the shading of various waterborne and solventborne architectural coatings such as dispersion paints and alkyd paints. The color strength, viscosity and rheology can be controlled carefully to warrant a perfect reproducibility. These colorants show a long stability, narrow viscosity range and wide compatibility range. The dispersing agents mentioned do not contain alkyl phenol-derivatives.

The pigment content in the colorant starting formulations below is maximized; for practical purpose it may be useful to include an extender in the formulation, at the cost of lower pigment content.

NUOSPERSE® FN 265 is an alternative nonionic wetting agent for NUOSPERSE® FN 260. Replacement is 1:1.

Table 7: Guideline formulations based on NUOSPERSE® FN 260, NUOSPERSE® FX 610 and NUOSPERSE® 2008

| Pigment | C.I. | [%] | NUOSPERSE® FX 610 [%] | NUOSPERSE® FN 260 [%] | NUOSPERSE® 2008 [%] | Water [%] | Humectant * [%] | RHEOLATE® FX 1070 ** [%] | KOH solution w (KOH) = 0.1 | Defoamer [%] |
|----------------------------------|-----------|------|-----------------------------|-----------------------------|---------------------------|--------------|--------------------|--------------------------------|-------------------------------------|-----------------|
| Hansa® Brilliant Yellow 2GX70 | P.Y. 74 | 45.0 | 2.0 | 6.0 | 2.0 | 34.4 | 10.0 | — | 0.2 | 0.4 |
| MONARCH® 120 | P.Bk. 7 | 40.0 | 2.5 | 7.2 | 3.0 | 36.7 | 10.0 | — | 0.2 | 0.4 |
| SILO® 3048 | P.Y.42 | 60.0 | 6.5 | 1.5 | 2.5 | 18.2 | 10.0 | 0.3 | 0.7 | 0.3 |
| Hostaperm® Green GNX | P.G. 7 | 45.0 | 1.0 | 9.5 | 2.0 | 32.0 | 10.0 | — | 0.1 | 0.4 |
| Heliogen® Blue L 6875 F | P.B. 15:2 | 40.0 | 1.0 | 6.0 | 3.0 | 37.2 | 12.0 | — | 0.4 | 0.4 |
| Heliogen® Blue L7087 | P.B. 15:3 | 45.0 | 1.0 | 5.5 | 3.0 | 32.7 | 12.0 | — | 0.4 | 0.4 |
| Bayferrox® 130M | P.R.101 | 65.0 | 3.0 | 3.0 | 2.0 | 16.0 | 10.0 | 0.3 | 0.4 | 0.3 |
| Permanent® Red FGR | P.R.112 | 40.0 | 5.0 | 5.0 | 2.0 | 35.3 | 12.0 | — | 0.3 | 0.4 |
| Hostaperm® Violet RL Spec. | P.V. 23 | 35.0 | 6.0 | 4.0 | 3.0 | 41.5 | 10.0 | — | 0.1 | 0.4 |
| TRONOX® CR-826 | P.W. 6 | 70.0 | 5.0 | 1.5 | 2.5 | 11.5 | 8.2 | 0.5 | 0.5 | 0.3 |
| Hostaperm® Rosa E WD | P.R. 122 | 35.0 | 6.5 | 5.5 | 2.5 | 38.0 | 12.0 | — | 0.1 | 0.4 |
| Irgazin® Red 3670 HD | P.R. 254 | 40.0 | 3.0 | 4.0 | 3.0 | 39.4 | 10.0 | — | 0.2 | 0.4 |
| Paliotol® Yellow L 0962 HD | P.Y. 138 | 45.0 | 3.5 | 6.0 | 2.0 | 32.9 | 10.0 | — | 0.2 | 0.4 |

* Humectants are used to avoid drying out effects of the concentrated dispersions. To prevent bacterial decomposition a biocide might be necessary.

** The mentioned NiSAT grade RHEOLATE® FX 1070 is used to adjust the rheological character of the colorant.

Universal NO-VOC colorants

These colorants are formulated with the carrier/humectant NUOSPERSE® 2000. NUOSPERSE® 2000 enables to formulate colorants showing excellent stability and compatibility properties. Due to the humectant properties of the additive it is no longer necessary to use organic solvents. The colorants will show excellent dry-out resistance and "wet-edge". Colorants based on NUOSPERSE® 2000 may be added by dispensing machines, volumetrically or gravimetrically.

Table 8: Guideline formulations based on NUOSPERSE® 2000

| Pigment | C.I. | [%] | NUOSPERSE® 2000 [%] | Defoamer [%] | Water [%] | RHEOLATE® FX 1070 * [%] | ASP 170 [%] |
|------------------------|-----------|------|---------------------------|-----------------|--------------|-------------------------------|----------------|
| Bayferrox® 130M | P.R. 101 | 60.0 | 15.0 | 0.5 | 24.5 | — | — |
| Bayferrox® 3910 | P.Y. 42 | 60.0 | 15.0 | 0.5 | 24.5 | — | — |
| Hostaperm® Rosa E | P.R. 122 | 32.0 | 15.0 | 0.5 | 52.5 | — | — |
| Heliogen® Blue L 7101F | P.B. 15:4 | 40.0 | 15.0 | 0.5 | 44.5 | — | — |
| Hostaperm® Green 8 G | P.G. 36 | 55.0 | 15.0 | 0.5 | 23.5 | — | 6.0 |
| Irgazin® DPP Red BO | P.R. 254 | 50.0 | 15.0 | 0.5 | 33.5 | 1.0 | — |
| Kronos® 2310 | P.W. 6 | 60.0 | 15.0 | 0.5 | 21.5 | 3.0 | — |
| Novoperm® Yellow FGL | P.Y. 97 | 40.0 | 13.0 | 0.5 | 45.8 | 0.7 | — |
| Special Black 250 | P.Bk. 7 | 40.0 | 15.0 | 0.5 | 41.5 | 3.0 | — |

* The mentioned NiSAT grade RHEOLATE® FX 1070 is used to adjust the rheological character of the colorant.

If needed it is recommended to use NUOSPERSE® FX 610 as mill base viscosity reducer in case of hydrophilic pigment or Carbon Blacks.

Solventborne industrial colorants

These colorants are used for the shading of various solventborne industrial coatings such as alkyd, alkyd melamine and epoxy polyamide coatings

In comparison to the universal pigment dispersions mentioned in the previous sections, these colorants may be used at higher dosages without remarkably influencing the final paint properties such as weather and corrosion fastness and also mechanical properties. The colorants can be designed for use as a part of a tinting system, both gravimetric as well as volumetric additions are possible.

Table 9: Guideline formulations based on NUOSPERSE® 9850

| Pigment | C.I. | [%] | NUOSPERSE® 9850 | MPA | BENTONE SD®- 2 * |
|------------------------|-----------|------|-----------------|------|------------------|
| Specialblack® 100 | P.Bk. 7 | 35.0 | 15.0 | 45.0 | — |
| Farbruss® FW 2V | P.Bk. 7 | 10.0 | 25.8 | 64.2 | — |
| Bayferrox® 3910 | P.Y. 42 | 65.0 | 15.0 | 44.5 | 0.5 |
| Hostaperm® Green 8G | P.G. 36 | 25.0 | 13.0 | 62.0 | — |
| Heliogen® Blue L7101 F | P.B. 15:4 | 25.0 | 16.3 | 58.7 | — |
| Bayferrox® 105 M | P.R. 101 | 70.0 | 22.8 | 7.2 | — |
| Novoperm® Red F3RK 70 | P.R. 170 | 45.0 | 17.0 | 38.0 | — |
| KRONOS® 2310 | P.W. 6 | 80.0 | 13.0 | 6.7 | 0.3 |
| Irgazin® Red L 3670 HD | P.R. 254 | 35.0 | 15.0 | 50.0 | — |

* The mentioned organoclay grade BENTONE SD®- 2 is used to adjust the rheological character of the colorant.

In table 10 you can find some formulations where a special binder is incorporated in the colorant to ensure minimum influence on paint film properties such as chemical resistance, water resistance etc. Although another binder may be used instead, an aldehyde or ketone resin is preferred for a wide range of compatibility and highest pigment loading in the colorant. The colorants may be used in a further optimized modification as colorants for tinting systems.

Table 10: Guideline formulations based on NUOSPERSE® 9850 with a Aldehyde Resin

| Pigment | C.I. | [%] | NUOSPERSE® 9850 [%] | Resin (65% solids) [%] | MPA [%] | BENTONE SD®- 2 * [%] |
|-------------------------------|-----------|------|---------------------------|------------------------------|------------|-------------------------|
| Hansa® Brilliant Yellow 2GX70 | P.Y. 74 | 30.0 | 3.4 | 49.0 | 17.6 | — |
| MONARCH® 120 | P.Bk. 7 | 25.0 | 3.0 | 53.5 | 18.5 | — |
| Bayferrox® 3920 | P.Y. 42 | 60.0 | 4.5 | 25.4 | 9.9 | 0.2 |
| Heliogen® Green L8735 | P.G. 7 | 22.5 | 2.6 | 37.5 | 22.4 | — |
| Heliogen® Blue L7101 F | P.B. 15:4 | 19.0 | 3.0 | 52.5 | 25.5 | — |
| Bayferrox® 130 BM | P.R. 101 | 60.0 | 2.8 | 26.0 | 10.2 | 1.0 |
| Novoperm® Red F3RK 70 | P.R. 170 | 27.0 | 2.6 | 53.4 | 17.0 | — |
| KRONOS® 2310 | P.W. 6 | 72.0 | 2.8 | 17.8 | 6.4 | 1.0 |
| Hostaperm® Rosa E | P.R. 122 | 15.0 | 5.0 | 60.0 | 20.0 | — |
| Lysopac® Orange 3620C | P.O. 36 | 30.0 | 3.4 | 42.8 | 23.8 | — |
| Lysopac® Yellow 6601B | P.Y.184 | 58.0 | 4.5 | 30.0 | 7.1 | 0.4 |

* The mentioned organoclay grade BENTONE SD®- 2 is used to adjust the rheological character of the colorant.



NOTE: The information herein is currently believed to be accurate. We do not guarantee its accuracy. Purchasers shall not rely on statements herein when purchasing any products. Purchasers should make their own investigations to determine if such products are suitable for a particular use. The products discussed are sold without warranty, express or implied, including a warranty of merchantability and fitness for use. Purchasers will be subject to a separate agreement which will not incorporate this document.

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