



Effect of Synergist on Pigment Violet 23

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ABSTRACT

There is a need in the area of solvent dispersion of organic pigments for products of lower viscosity (i.e. fluidity) and improved transparency and gloss. This is especially a need in the area of solvent inks for packaging applications. The solvents in these inks are typically oxygenated types and alcohols (ethanol, propanols), esters (ethyl acetate, isopropyl acetate) and ethers (mono methyl ether of propylene glycol), or mixtures of it. The typical resins dissolved in these solvents for formulating packaging inks are nitrocellulose, polyamide, polyurethane and polyvinyl butyrate.

Preparation of Mono sulphonation of Dioxazine compound is carried out with controlled Degree of Sulphonation like 0.9. After that this mono sulphonated mass is coupled with long chain Amine (C₁₀.C₁₈) and prepared new additive.

Effect of this sulphonated mass and additive is measured by addition into pigments. This effect is measured in solvent base ink application and found that due to effect of this sulphonated mass and additive gives excellent flow with improved gloss and transparency.

Keywords: Pigmentary Properties, Viscosity, Gloss, Solvent base ink

INTRODUCTION

Pigment Violet 23¹⁻³, also referred to as Carbazole Violet, is a universally useful product. Its color, a bluish violet shade, is not accessible with other pigments. Pigment Violet 23 is used in almost all media which are typically colored with pigments. The list of suitable systems ranges from coatings and paints to plastics, printing inks, and other special-purpose media. Pigment Violet 23 is entirely fast to many organic solvents. At standardized conditions it is fast to alcohols, esters, and aliphatic hydrocarbons as well as to plasticizers such as dibutyl and dioctyl phthalate. Other solvents, such as ketones are colored slightly.

Tinctorially, Pigment Violet 23 is an uncommonly strong pigment⁴⁻⁶ in almost all media, which qualifies it, even in very small amounts, for use as a shading pigment. Used to a considerable extent as shading component for paints, Pigment Violet 23 adds a reddish tinge to the shade of copper phthalocyanine blue pigments. Although Pigment Violet 23 is not quite as lightfast and weather fast as phthalocyanine blue pigments, it does satisfy most requirements, even very stringent ones. Moreover, Pigment Violet 23 is also a useful toning pigment for white enamels.

EXPERIMENTAL

Sulphonation of Dioxine Pigments

100 parts of sulphuric acid of 98% strength has been taken in RBF and then mass has been cooled it to 25-27° c. 10 parts of violet 23 crude has been slowly charged in the reaction mixture keeping temperature 25-27° c. Then reaction mixture has been heated to 50-52°C. and maintained this temperature for 6 hours. Then the degree of

sulphonation has been checked. (Degree of Sulphonation has been checked by Titration method with Amine). The reaction mixture has been cooled to 30° c and then dumped in ice and water. Dumping temperature has been maintained to 10-12° c. The reaction mixture has been stirred for one hour and then filtered it. The Material has been washed till pH comes to 2.0.

For getting Deferent Values of Sulphonation, reaction Temperature and Time has been changed. From Above experiments coloristic data for different type of degree of Sulphonation has been checked and it founds that 0.9 degree of sulphonation has been given better results in Polyamide Ink Application and as well as Nitro cellulose base Ink Application.

Preparation of Additive

Wet cake of above sulphonation mass (Degree of sulphonation 0.9) has been reslurried in water with vigours agitation. 10% dilute Caustic lye has been added in the mixture keeping ph 9. The Mixture has been heated to 80°c and maintained the temperature for 1hour. The solution of Different Type of Amine (Mentioned in Table) as per its Molecular weight ratio has been prepared and added to reaction mixture.

The mixture has been isolated keeping pH 9 by addition dilute caustic lye and maintained temperature 80°c 2 hour. The isolated product has been filtered and washed till it become free of alkali and sulfate ions and then wet cake has been dried.

Composition of Pigments

Resultant product of above experiments is blended with Untreated Pigment Violet 23 In following manner. This Blanding is carried out in form of dry pigment.

Table 1

Experiment	Details of Experiment
1	Untreated Pigment (Pigment Violet 23)
2	Untreated Pigment +Dioxazine Sulphonic Acid
3	Untreated Pigment + Additive1 (Dioxazine Sulphonic Acid + Arquad 2HT-75)
4	Untreated Pigment + Additive 2 (Dioxazine Sulphonic Acid + Arquad 2C-75)
5	Untreated Pigment + Additive 3 (Dioxazine Sulphonic Acid + Steryl Amine)
6	Untreated Pigment + Additive 4 (Dioxazine Sulphonic Acid + Armeen 12 D)

RESULTS AND DISCUSSION

- **NC Base Application/Polyamide Ink** : The resulting product has been tested against untreated Pigments in 20 % Pigment Loading and pigmentory properties like Viscosity has been checked by Zahn Cup No 3, Gloss has been checked By Gloss meter at 60° and coloristic data by Macbeth Color Matching Machine, and Transparency by visual observation on transparent paper. All results has been attached here.

Table 1: NC Base Application

Experiment	Tinting Strength (%)	Gloss 60 ⁰ (%)	Viscosity (Sec.)	Transparency
1	100	18.5	42	+
2	97.83	19.2	22	++
3	100	25	18	+++++
4	98.23	22	20	++++
5	98.52	19.8	24	+++
6	104.35	21.4	20	++

Table 2: Polyamide Ink Application

Experiment	Tinting Strength (%)	Gloss 60 ⁰ (%)	Viscosity (Sec.)	Transparency
1	100	26.5	60	+
2	111.57	28.6	28	+++++
3	110	33	22	++++
4	109.11	32.1	25	++
5	106.59	30.5	26	++++
6	109.38	32.3	25	+++

Effect of Sulpho derivatives

- It founds that in presence of only sulpho derivatives (Exp: 2) with Pigment Violet 23, It gives very good results in Polyamide Ink but not get similar results in NC Base Ink Application.
- Due to presence of sulpho derivatives along with Pigment Violet 23 gives lower viscosity in NC base ink application but simultaneously not improved it gloss, transparency and color strength. Its shows that effect of sulpho derivatives is not compatible with alcohol system. Because in more case NC base ink is prepared in alcohol system.
- In Polyamide ink application we found that sulpho derivatives gives lower viscosity, improved gloss, better transparency and higher color strength. It indicates that sulpho derivatives gives better effect in non-polar solvent system.

Effect of Additives

- It used different additives along with Pigment Violet 23 and observed it pigmentary properties in NC base application and Polyamide ink application and in this both application additives improved rheological properties of pigments.

- In Additive 1 (exp-3) it used Arquad 2HT-75 (Di (hydrogenated tallow alkyl) dimethyl ammonium chloride) along with sulpho derivatives and observed that this additive gives excellent results in both applications in terms of Viscosity, gloss, transparency and color strength. Arquad 2HT-75 is C₁₈ group quaternary long chain amine. From the above table its shows that additive 1 has been giving its suitability in both applications.
- In additive 2 (exp-4) It used Arquad 2C 75 (dicocoalkyl dimethyl ammonium chloride) along with sulpho derivatives and observed that this additives gives also good results in both Application. But comparison with Additive 1 its gives slightly inferior results. In term of transparency, additive 2 gives more opaque than additive 1. Arquad 2C-75 is C₁₂ group of long chain amine.
- In additive 3 (exp-5) It used streyl amine along with sulpho derivatives and observed that effect of this additives in viscosity, gloss, and transparency. But this effect is not comparable with additive 1 & 2.
In additive 4 (exp-6) It used Armeen 12D along with sulpho derivatives gives good results in both applications.
But it's not advisable to use these derivatives because it's not gives effect like additive 1&2.

CONCLUSION

Above experiments and results found that only sulpho derivative has been given better results in Polyamide ink application. Looking to cost effectiveness if Pigment used only in Polyamide Ink application than it's suitable to used only sulpho derivatives along with Pigment to get better results. If Pigment works in multipurpose application and not previously defines that suitability of additive 1 is preferred. This gives us lower viscosity, improved gloss and better transparency in all ink application.

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