



E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

PIGMENTS DEPARTMENT

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BT-476-D. COWLES DISPERSIBLE TONER
INCREASE SALE OF CPC PIGMENTS
(REF: LAS-CFR 8/15/75)

YOUR LETTER DISCUSSED HOW A TRUE COWLES DISPERSIBLE PRODUCT COULD RESULT IN LARGE-SCALE NEW BUSINESS FOR US RELATIVELY QUICKLY. I AGREE WITH YOUR REASONING. ALTHOUGH WE NEED NEW BUSINESS RIGHT NOW, IT IS NOW FORECAST THAT BY 1977 THERE WILL BE INADEQUATE NEWARK FINISHING CAPACITY, WITH THIS SITUATION AROUND THE CORNER, THERE IS LITTLE INCENTIVE TO PUT ON AN INTENSIVE DRIVE TO DEVELOP SUCH A PRODUCT. FOR NOW, IT WOULD BE BETTER TO ATTACK THIS BETA FLUSH MARKET WITH OUR HIGH-SOLIDS PRESSCAKE.

I BELIEVE R&D SHOULD CONTINUE WORK ON THIS PRODUCT, BUT ON A LOWER-PRIORITY BASIS, BECAUSE:

AS DISCUSSED ABOVE, THERE IS NO NEED FOR SUCH A PRODUCT OVER THE NEXT FEW YEARS TO FILL CAPACITY, NOR IS IT EXPECTED THIS PRODUCT WOULD BE PROFITABLE, ENOUGH TO REPLACE OTHER DRY TONERS. (SINCE THE PRODUCT WOULD COMPETE AGAINST FLUSHES, PRICING WOULD EQUAL REGULAR TONERS DURING STRONG ECONOMIC PERIODS, BUT FALL DRAMATICALLY DURING WEAK PERIODS.

WE MAY BE ABLE TO GET AT THIS MARKET ANYWAY WITH DEWATERED PRESSCAKES, AND WHILE R&D EFFORT SHOULD CONTINUE ON BT-476-D, IT SHOULD DO SO SLOWLY UNTIL WE SEE HOW DEWATERED PRESSCAKES PERFORM.

HOWEVER, DUE TO UNCERTAINTIES IN OUR SALES FORECASTING AND THE POSSIBILITY THAT WITHIN FIVE YEARS WE COULD HAVE EXPANDED CPC FINISHING CAPACITY, IT SHOULD BE CLEAR THAT THERE STILL IS HIGH INTEREST IN THIS PRODUCT.

C. F. Rolle
C. F. ROLLE

CFR/ksc

N35389

Irgalite® Blue LGLD

Beta-phthalocyanine
Pigment
Easily dispersible

Irgalite Blue LGLD (offset ink)

50% screen

mass tone

Irgalite Blue LGLD is a new type of easily dispersible beta-phthalocyanine pigment, designed for superior lithographic and letterpress inks. And is in powder form only.

Compared to conventional beta-phthalocyanine blues, Irgalite Blue LGLD offers the advantages of:

**better wettability,
faster dispersion,
superior flow properties,
brighter shades,
greater color strength,
higher gloss.**

Special manufacturing treatment enables the pigment to retain these excellent properties in any practical oil-based binder system for printing inks.

Use of Irgalite Blue LGLD reduces the cost of printing ink production by reducing milling time 30-50% over conventional beta-phthalocyanine pigments. In particular, it reduces the roll milling operation from three or four passes to just one.

Compared to flushed phthalocyanine blues, Irgalite Blue LGLD offers greater versatility, better inventory control and better money value. Fastness properties of Irgalite Blue LGLD are fully up to the standards of the equivalent conventional phthalocyanine blue pigments.

CIBA—GEIGY

Processing Operations

As with most pigment operations, use of proper equipment and attention to the usual processing regimen will achieve the full, manifold advantages of Irgalite Blue LGLD. In particular:

(a) High speed mixing equipment should be used, such as the Cowles Dissolver¹, the Molteni mixer², or similar alternates (Diaf, Drais, Lehmanh, Torrance, etc.) in which the impellers rotate at 1200 to 1500 rpm. Impellers operating at less than 1200 rpm cannot provide the shear force required to effectively disperse the pigment.

(b) The ratio of rotating disc to container, measured at a diameter, should be between 2/3 and 1/2. A smaller ratio, such as 1/3, would decrease the dispersion because of the formation of "idle points" in the rotating mass. The Molteni impeller is an exception to this rule. Here, a relatively small disc is mounted on an eccentric shaft. The working principle, based on a fixed scraper blade and rotating mixing vessel, gives excellent dispersion results.

(c) To the above standard equipment should be added a triple roll mill. Its important functions in deaeration, homogenizing, and providing a finishing polish to the printing ink are described on page 4.

Binders

Since the pigment is the most expensive ingredient in printing inks, it is not necessary to stress any further the commercial significance of easily dispersible Irgalite Blue LGLD. It may be used with a wide choice of resins to satisfy the differences in paper quality, the type and speed of the printing machine, the drying equipment, etc.

Although ink makers rarely reveal the exact formulations they adopt, it may be said generally, that phenolic and maleic resins are bodied together with linseed oil and mineral oils to make an oil-based binder system. Quite usual variations include the use of alkyd resins, waxes, gelled varnishes, dehydrated castor oil, and soy bean oil.

The recommended processing technique consists in making a pigment concentrate in the binder system, which after dispersion, is reduced to the required pigment concentration, e.g., 15%, by adding more binder and solvents.

Two important factors to consider when choosing the vehicle of a binder system are the vehicle's capacity for wetting the pigment powder, and the vehicle's viscosity. Poor wetting properties in the vehicle result in a longer dispersing time and inferior dispersion quality. The recommended viscosity for the vehicle is 100-350 poises. Higher viscosities, e.g., more than 400 poises, might cause problems due to the temperature rising too fast on mixing. At the other extreme, low viscosity binders may impair or slow down dispersion because of the reduced shearing action. The viscosity of the binder should be in the 60-150 poises range.

¹ Morehouse International, Los Angeles, California
² Molteni, Senago, Italy

Processing Techniques

Phase 1 - Wetting-Out of the Pigment

The normal procedure for incorporating Irgalite Blue LGLD in a binder system is to add the pigment in two equal portions, because the volume of the charge grows considerably at the beginning of the wetting process and then decreases towards the end.

For a batch of 200-1,000 pounds of ink, in the first stage, half of the pigment is added to the initial fraction of low viscosity varnish or gel. (The other components, such as waxes, mineral oils, petroleum derivatives, driers, will be added at a later stage. The pigment concentration in the initial varnish fraction should not exceed 30%, since at higher concentrations the dispersibility is adversely affected. This initial mixture is stirred for 2-4 minutes at about 700 rpm. Then, the rest of the pigment is added and the mixture is again stirred for 2-4 minutes at 700 rpm to complete the two-stage wetting-out phase.

Phase 2 - Dispersion

After the pigment has been wetted, the actual dispersion is conducted in a high speed mixer for 30 minutes at 1300-1500 rpm. During this time the temperature usually rises to 160° F in the first 10 minutes, to 180° F in the next 10 minutes, and in the final 10 minutes, it might go as high as 230° F. This temperature increase is inevitable due to the attrition forces generated in the rotating mass. It has no negative effects, however, provided that the evaporation of petroleum derivatives does not induce a substantial change of viscosity in the system.

During the 30 minute mixing interval, it is possible to follow the progress of dispersion by means of a grindometer or by microscopic examination. A fineness of dispersion of less than 5 microns is obtained.

Phase 3 - Dispersion Quality Test

After the dispersion step is completed and before the other components are added, a small sample of the dispersion is given a finishing and deaeration pass on the triple roll mill. Then the quality of dispersion is controlled so that a grindometer test reading is not greater than 5 microns.

If the dispersion is satisfactory, all other ingredients are poured into the mixing vessel and the whole milling charge is homogenized.

Phase 4 - Finishing Pass

At this stage, the product is given one pass over a triple roll mill to de-aerate the ink after the mixing process and to give a final polish. The working conditions here may be chosen by the ink maker. An output of 130-175 lbs./hr., for a roll width of 20 inches, is possible.

The roll pressure, which can be as low as 175 lbs/in.² or as high as 875 lbs/in.², depending on the type, is obviously important for the smoothness of the finished ink. For Irgalite Blue LGLD, an average roll pressure of 175/in.² is required. A roll pressure of 110 lbs/in.² is considered light; 300 lbs/in.² as strong.

Review

The advantages of Irgalite Blue LGLD are clearly identified in superior physical properties of the finished ink, in a 30-50% reduction in milling time and therefore in a higher production rate for printing inks. Conventional pigment powders are usually dispersed on the triple roll mill, where 3 or 4 passes are required. Irgalite Blue LGLD requires only 1 pass over the triple roll mill since dispersion takes place in the high speed disperser.

If, however, the ink maker is not equipped with a high speed disperser, Irgalite Blue LGLD can be perfectly dispersed and homogenized on the triple roll mill, like conventional pigment powders, using 2-3 passes. The time saving, therefore, is still quite appreciable; and the other advantages over conventional phthalocyanine toners, such as better gloss, more homogeneous print lay, better flow properties, etc., are retained. Irgalite Blue LGLD also offers greater versatility, better inventory control, and better money value than flushed phthalocyanine blue.



Important Note:

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CIBA-GEIGY

Pigments
Department



Price Schedule

August 1, 1974

Easily Dispersible Pigments

<u>IRGALITE®L</u>	Price per pound
IRGALITE Yellow LBAW	\$4.90
IRGALITE Blue LGLD	5.50

Standard container
44 pounds
No repack available

Terms
Net 30 days

Delivery
F.O.B., shipping point
Minimum transportation allowed to destination

All prices subject to change without notice

Pigments Department
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Ardsley, New York 10502
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September 1972

Stir-In Pigments for Paints

IRGALITE® Yellow PDS1

Pigment Yellow 1:arylamide yellow G

IRGALITE Yellow PDS2

Pigment Yellow 3:arylamide yellow 10G

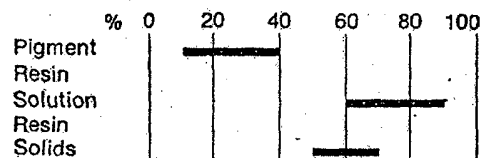
IRGALITE Yellow PDS1 and IRGALITE Yellow PDS2 are easily dispersible pigments. They are supplied in granule form for ease of handling and reduced dusting.

Both of these pigments disperse rapidly and efficiently in high-speed mixing equipment to give improved strength, cleaner shade and higher gloss in paint than can be obtained with conventional arylamide yellow pigments. IRGALITE Yellow PDS1 and IRGALITE Yellow PDS2 both retain shade and strength when dispersed at elevated temperatures.

Although particularly recommended for use with high-speed dispersion equipment, these IRGALITE PDS pigments readily disperse on roll mills and on the wide range of milling equipment available today.

Dispersion with Cavitation Mixers

High-speed mixer formulations vary appreciably, and a fixed recommendation is not possible. The diagram shows the areas of maximum efficiency in mixers of the Cowles dissolver or Torrance mixer type with IRGALITE Yellow PDS1 or IRGALITE Yellow PDS2 in a long oil soya alkyd.



Fastness Properties

Baking	300 F maximum
Solvent resistance	poor
Overpainting	poor
Chemical resistance	good

Light Fastness

Full strength	excellent
Color: TiO ₂	
1:1	excellent
1:25	medium
1:200	fair

Technical Information

	IRGALITE Yellow PDS1	IRGALITE Yellow PDS2
Oil absorption	56	43
Specific gravity	1.45	1.67

Pigments Department
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Ardsley, New York 10502

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