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FOREWORD

Few salesmen employed by industrial companies handle as widely diversified a line of products as do the Pigment, Chemical, and Color Division representatives of The Sherwin-Williams Company. The latter are expected to be walking encyclopedias of information about such fundamentally different materials as complex azo pigments, tin cans, and castor oil. When they step into the door of a customer, they cannot be sure whether to anticipate a question on the relative bleeding of inorganic and organic yellows, or the relative hiding power of lithopone and titanium dioxide.

This manual is an attempt to help the PC&C salesmen do a better job by serving as a reference to which they can turn when in doubt about a product, a use, a property, or a competitive material. During its preparation there has been only one thought in mind - to present the most information in the briefest possible form and in the way that is the easiest to get at the information and use it when it is needed.

This reference book is far from perfect - partly because it is a first attempt, and partly because it was written without direct, first hand information as to the requirements of each and every PC&C representative. However, if it helps - even in a small way - to enable the salesmen to do a better job, the many technical men who have contributed to it will feel well repaid.

H. F. SCHWARZ
PC&C SALES SERVICE LAB.
July 11, 1949.

PLTC Personnel (July '49)

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I. PRODUCTS FOR THE PAINT INDUSTRY

A. COLOR PIGMENTS

YELLOWS AND ORANGES

I. CHROME YELLOWS AND ORANGES:

Chrome Yellows and Chrome Oranges are lead salts, generally lead chromate or combinations of lead chromate and lead sulfate in varying proportions. In many cases they contain small amounts of other insoluble lead salts which are incorporated to increase cleanliness, light fastness, or tinting strength.

These pigments range in shade from a light primrose to a deep orange. The lighter shades are lead sulfo chromates, containing co-precipitated lead sulfate; the medium shades are normal lead chromate, while the oranges are basic lead chromates.

The strength and light fastness of Chrome Yellows increases with increased redness of shade. Chrome Oranges decrease in strength with increase in redness of shade.

Resistance to light of primrose Chrome Yellows is fair, resistance to heat and acid good, while resistance to alkali is fair. On light yellows and medium yellows resistance to light, heat, and acid is good, alkali fair. Resistance of the Oranges to light and heat is excellent, to acid poor, to alkali good. All are non-bleeding in varnish, water, paraffin, coal tar thinners, and alcohol.

Chrome Yellows and Oranges bake satisfactorily for 1½ hrs. at 320°F., except for the primrose shade which will stand 230° F. for 4 hrs.

Principal Standards

Special Standards

CP PRIMROSE YELLOW

12074: Lightest and cleanest shade Chrome Yellow.

CP CHROME YELLOW LIGHT (LEMON YELLOW)

12307: Standard lemon yellow shade. Lower tinting strength than 12147.

D-2652: Considerably redder than 12074. Slightly lighter and weaker than 12147.

12147: Best lemon yellow standard.

12121: Considerably deeper than 12147 and lighter than 12096.

D-2645: Dirtier than regular lemon yellow standards. Much better light fastness in both full shade and pastels than regular chrome yellow. Recommended for water and emulsion paints.

PAINT INDUSTRY - COLORS - YELLOWS AND ORANGES

CP CHROME YELLOW MEDIUM

- 12096: Lightest medium yellow. Better permanence than 12310. Does not meet Fed. Spec. TT-C-290.
- 12135: Shade dirtier than 12150. Strength 15% better than 12150. Recommended for tinting.
- 12310: Trifle deeper than 12096. Lower tinting strength than 12150. Meets Fed. Spec. TT-C-290.
- D-2649: Dirtier than regular medium yellow. Much better light fastness in both full shade and tints than regular chrome yellow. Recommended for water and emulsion paints.
- 12150: ~~Best Quality medium yellow.~~ Slightly deeper, stronger, and better permanence than 12310. Low reactivity in high acid value vehicles. Meets Fed. Spec. TT-C-290.
- 12152: ~~Considerably~~ brighter in shade *(more than 12150. Deeper & deeper than 12096. at 4000SS 12096.)*

CP CHROME ORANGE

- 12311: CP Chrome Orange Light - Standard light orange shade.
- 12082: CP Chrome Orange Medium - Somewhat deeper than 12311.
- 12084: CP Chrome Orange Dark - Considerably deeper than 12082.
- 12093: CP Chrome Orange Extra Dark - Meets "International Orange" shade for oil and oleoresinous vehicles. Slightly deeper than 12084.
- 12097: CP Chrome Orange Extra Dark - Meets "International Orange" shade for lacquers and synthetics.
- 12051: American Vermilion - Considerably deeper than 12093. Low tinting strength. Shade unstable to prolonged milling.

2. MOLYBDATE ORANGES

Molybdate Oranges are mixed crystal pigments consisting essentially of lead chromate and lead sulfate, similar in composition to a light shade chrome yellow, but containing 5 to 10% of lead molybdate. The purpose of the lead molybdate is to effect a re-crystallization, resulting in a change of shade from light yellow to bright reddish-orange. Molybdate Oranges are the brightest orange pigments; not even the organic oranges being as bright.

Molybdate Oranges have fair resistance to light and alkali, and good resistance to heat and acid. They are non-bleeding in varnish, water, paraffin, coal tar thinner, and alcohol. They bake satisfactorily at 320°F. for 1½ hr.

Molybdate Oranges are characterized by brilliance of tone, high tinting strength (4.5 times higher than chrome orange), and excellent covering power (2.4 times higher than chrome orange). They have excellent film durability, but, except for D-2834, they darken appreciably on outdoor exposure.

PAINT INDUSTRY - COLORS - YELLOWS AND ORANGES

Molybdate Oranges are frequently blended with organic toners such as Graphic Reds, Rubanox Reds, and Solfast Reds, using up to 60% Molybdate Orange. Combinations of this type produce good hiding, low cost red enamels which bake well and retain their brilliance during baking better than lithol red used straight.

12095: Molybdate Orange Light - Standard light shade. High tinting strength.

12145: Molybdate Orange Dark - Best standard for blending with organic red toners. Low tinting strength. Considerably weaker and bluer in tint than 12095.

12155 D-2834: Molybdate Orange Dark - Considerably dirtier in shade, but very much better light fastness than 12145. Recommended for low cost, fast to light enamels for outside exposure. *16369. A. C. good photo. and 2. as per 12145. 12145. 12145.*

3. ZINC YELLOW:

Zinc Yellow is a complex addition product of potassium dichromate and zinc oxide, corresponding to the empirical formula $4\text{ZnO} \cdot 4\text{CrO}_3 \cdot \text{K}_2\text{O} \cdot 3\text{H}_2\text{O}$. Because it combines most of the factors essential to prevent corrosion, Zinc Yellow is widely used as a rust inhibitor in metal primers for steel, aluminum alloys, and magnesium alloys. Although this pigment is only slightly soluble, it is sufficiently so to yield an adequate concentration of inhibiting ions to metal surfaces, thus retarding corrosion.

Zinc Yellow is greener and dirtier than primrose chrome yellow. It possesses extremely good light resistance, does not darken, and is not affected by sulphide fumes. It bleeds badly in water and has low tinting strength and opacity. Resistance to heat, alkali, and acid is poor. It bakes satisfactorily for 5 hrs. at 165F.

Zinc Yellow is an economical pigment which is particularly well adapted to the formulation of metal primers. Trim paints with excellent light fastness may likewise be formulated by blending Zinc Yellow with Iron Blue or Phthalocyanine Blue.

12054: Zinc Yellow - Regular Zinc Yellow Standard. Does not meet Federal Spec. TT-Z-415-Type I. Meets Federal Spec. TT-Z-415-Type II.

4. PERMANSA YELLOWS (HANSA YELLOWS):

Permansa Yellows are organic toners produced from nitro aromatic amines and aceto acetic arylides. They have extremely high tinctorial strength and excellent light fastness when used in high concentration. They possess good resistance to alkali and are widely used where this property is desired. They also replace chrome-yellows in many formulations in which the presence of lead cannot be tolerated.

Resistance to light of the 10G type is excellent, alkali and acid good, and heat fair. For the Gand M type, resistance to light and heat is excellent, alkali and acid good. All are non-bleeding in varnish, water, and coal tar thinners but bleed slightly in alcohol and paraffin. Permansa Yellows bronze when baked at temperatures over 180°F.

Permansa Yellows are recommended for water and emulsion paints because of their good alkali resistance.

PAINT INDUSTRY - COLORS - YELLOWS AND ORANGES

Principal Standards

Special Standards

PCONA
+
CCAA
12105: Permanas Yellow 10G - Standard
Hanaa 10G shade. Considerably
lighter than G shade. Corres-
ponds to primrose chrome
yellows. (PCY)

12101: Permanas Yellow G - Standard
Hanaa G shade for paint use.
Three times as strong as chrome
yellow light. (PCY)

12112: Permanas Yellow M - Consider-
ably redder than 12101 or 12107.
Shade comparable to medium chrome
yellow. Good strength. (PCY)

D-2648: Permanas Yellow 3G. Not to be
recommended when G shade is
available because light fastness
is not as good. Masstone somewhat
lighter and not as clean as 12101.

12111: Lime-Fast Yellow - Reduced (10%)
Permanas Yellow G on China Clay.
Recommend for water and emulsion
paints.

5. BENZIDINE YELLOWS:

Benzidine Yellows are organic toners made from 3,3' dichlor benzidine and aceto
acetic arylides.

Compared to Permanas Yellows, regular Benzidine Yellows have higher tinting strength,
but less permanence. For paints and enamels the light fast types listed below are
recommended. Resistance to heat is excellent, alkali and acid good, and light
fair to poor. They are non-bleeding in varnish, water, and coal tar thinner. The
baking is satisfactory for 1½ hours at 320°F.

D-2840: Benzidine Yellow - Light fast type. Very transparent. Shade similar to
12190, 12191, and 12192.

D-2841: Benzidine Yellow - Light fast type. Very opaque. Medium shade, like
Medium Chrome Yellow. Strength equal to 12191.

12192: Benzidine Yellow - Substitute for Tartrazine Lake in tin decorating varnishes.
Better money value and considerably greater resistance to light.

6. PERMANSA ORANGE (DINITRANILINE ORANGE):

Permanas Orange is made by coupling 2:4 dinitraniline with beta naphthol. It
possesses excellent light fastness in both full shade and tints, and is non-bleeding
in water and paint and synthetic vehicles, but bleeds slightly in lacquer. Baking
is satisfactory for 4 hrs. at 230°F.

10369: Permanas Orange - Regular Dinitraniline Orange. Used for shading Permanas
Yellow to deeper tones for all types of enamels.

7. PERMANENT ORANGE (ORTHONITRANILINE ORANGE):

Permanent Orange is made by coupling ortho-nitraniline with beta naphthol. This
organic orange possesses excellent permanence to light in full shade and fair in
tints. It has good opacity, but bleeds slightly in water, oil, and coal tar
thinners. Bleeding properties are similar to those of the Para Toners. Baking is
satisfactory for 4 hrs. at 230°F.

PAINT INDUSTRY - COLORS - YELLOWS AND ORANGES

10330: Permanent Orange Toner - Regular Ortho-Nitraniline Orange standard.

10376: Permanent Orange Toner - The best standard. Trifle lighter, cleaner, and stronger than 10330.

8. BENZIDINE ORANGE:

9. SOLFAST ORANGE:

Neither are used by the paint industry.

PAINT INDUSTRY - COLORS

REDS AND MAROONS

I. GRAPHIC REDS AND BRITONE REDS (LITHOL REDS):

Graphic Reds are produced by diazotizing tobas acid (2-naphthylamine-1-sulfonic acid), coupling with beta-naphthol, and forming the sodium, barium, calcium, and strontium salts. Because they are metal salts, these pigments are more resistant to common organic solvents and water than the pigment dyestuffs.

Graphic Reds range in shade from light yellow shade reds (sodium salts) through medium reds (barium salts) to dark reds and maroons (calcium salts).

Resinated Graphic Reds are produced by incorporating metallic resins in the proper amount and under the proper conditions. The use of the resinate intensifies the masstone of the pigments, produces a cleaner tint, and rather than decreasing strength actually enhances it. All resinated lithol reds are more transparent than the corresponding non-resinated pigments. Resinated Graphic Reds are known by the name "Britone Red" or "Illini" Red".

Graphic Reds are clean in both full shades and tints, and have good strength and opacity in paint systems. They are not sufficiently durable for use in work requiring exterior exposure. They are the most economical organic reds available, and are widely used in toy enamels, dipping enamels, and general industrial applications where good durability is not needed.

Graphic Reds have fair light resistance in full shades and poor in tints. They have fair resistance to heat and good resistance to acid and alkali. They are non-bleeding in water and oil, and will not bleed from a lacquer or synthetic enamel into a white overstripe.

SODIUM GRAPHIC REDS - REGULAR TYPE

CP 272: Graphic Red Y - Standard sodium Graphic Red type. Sold as CP ~~272~~ ¹¹⁰² for use in rubber.

BARIUM GRAPHIC REDS - REGULAR TYPE

CP 233: Graphic Red M - A medium red having a clean undertone and fair strength.

CP 918: Graphic Red M - Very light masstone. Considerably lighter and cleaner than CP 233 and about 10% stronger.

CALCIUM GRAPHIC REDS - REGULAR TYPE

CP 234: Graphic Red R - Normal calcium Graphic Red. Good strength.

CP 564: Graphic Red R - Slightly lighter and considerably brighter masstone and cleaner undertone than CP 234. 5 to 8% stronger than CP 234.

CP 837: Graphic Red R RG - Moderately darker and about 20% stronger than CP 564. Very easy grinding.

PAINT INDUSTRY - COLORS - REDS AND MAROONS

CALCIUM GRAPHIC REDS - RESINATED TYPE

CP 808: Britone Red R - Considerably darker masstone and slightly stronger than CP 234.

CP 565: Britone Red R RG - Slightly darker and brighter masstone, slightly yellower and brighter tint than CP 808. Trifler stronger than CP 808.

2. BRITONE MAROONS (LITHOL MAROONS):

Britone Maroons are similar in composition to the Calcium Graphic Reds, being a darker shade of this type color. They have properties similar to the Graphic Reds, and in general are used in the same way.

CP 377: Britone Maroon - Typical Lithol Maroon. Fairly deep masstone, blue undertone and tint. Fairly good covering.

CP 838: Britone Maroon RG - Considerably darker and brighter masstone and 40% stronger than CP 377.

3. LAKE RED C:

Not widely used by paint industry.

4. RUBANOX REDS (LITHOL RUBINES):

Rubanox Reds are calcium salts of the azo pigment 4-aminotoluene-3-sulfonic acid coupled with beta-oxy naphthoic acid. Rubanox Reds are bright blue shade reds, brilliant in masstone, clean and strong in tint. They are made in two principal forms: A medium shade having high bronze and a darker (resinated) shade which is considerably brighter and has low bronze.

Rubanox Reds have good resistance to light in full shade and tints. They are non-bleeding in oil, water, alcohol, paraffin, and will not bleed through enamels or lacquers. Resistance to acid and alkali is good. Baking is satisfactory for 4 hrs. at 320°F.

Rubanox Reds have the unusual property of blending with light reds without the dulling of shade usually associated with such blends. When Rubanox Red are blended with Molybdate Orange, a non-bleeding substitute for Toluidine Red is produced. This blend is used considerably in baking enamels. Rubanox Reds are also used straight in enamels.

CP 543: Rubanox Red - Non-resinated type. Typical medium red Rubanox. Considerably lighter masstone, appreciable bluer undertone, and 10% stronger than CP 368. More opaque than CP 368.

CP 762: Rubanox Red - Resinated type. Slightly lighter and about 8% stronger than CP 368.

CP 368: Rubanox Red - Resinated type. Typical dark shade Rubanox Red. Deep, brilliant masstone. Clean blue undertone in tint. Good strength.

PAINT INDUSTRY - COLORS - REDS AND MAROONS

5. SOLFAST REDS:

Solfast Reds are precipitated azo pigments derived from beta oxy naphthoic acid. They are produced in two types: the light shade, having a yellow undertone; and the dark shade, having a blue undertone. Both types have high tinting strength and properties similar to those of the Rubanox Reds, with the exception that they have better resistance to bleeding and a softer texture. The light shade does not bleed in grease and bacon fat.

The Solfast Reds have good resistance to light in full shade, fair in tints. They do not bleed in oil, water, alcohol, paraffin, and do not bleed through enamel or lacquer. Their resistance to acid and alkali is good. Baking is satisfactory for 4 hrs. at 320°F.

For use in enamels, the outstanding characteristics of the Solfast Reds are their resistance to baking and freedom from bleeding in paint vehicles and solvents.

LIGHT SHADE - YELLOW UNDERTONE

CP 663: Solfast Red - Corresponds to "Watchung" Red. Outstanding in resistance to bleeding. Best resistance to grease and bacon fat.

CP 967: Solfast Red - Considerably darker in masstone, but same shade in tint as CP 663. Same strength as CP 663. Better resistance to bleeding than all other Solfast Reds except CP 663.

DARK SHADE - BLUE UNDERTONE

CP 787: Solfast Red - Standard dark shade Solfast Red. Shade similar to Rubanox Reds.

CP 1028: Solfast Red - Slightly darker, 15% stronger, and better light fastness than CP 787.

6. PIGMENT RUBINES:

Pigment Rubines are precipitated azo pigments derived from beta oxy naphthoic acid. They are made in two types - the strontium salt, which is a light, yellow shade red; and the calcium salt, which is a medium red, bluer and deeper than the strontium salt.

The light Pigment Rubine has good resistance to light in full shade and fair in tints. The medium shade Pigment Rubine has very good resistance to light in full shade and good in tints. Both types have fair resistance to alkali and acid and do not bleed in oil, water, alcohol, paraffin, nor through enamels and lacquers. Baking is satisfactory for 4 hrs. at 320°F.

CP 1030: Pigment Rubine Y - Light, yellow shade.

CP 1031: Pigment Rubine B - Medium shade.

PAINT INDUSTRY - COLORS - RED AND MAROONS

7. PARA REDS:

These colors are azo pigments produced by coupling paranitraniline with beta naphthol. Two distinct types, light and dark, are made. The light shade is the straight coupling, while the dark is made by replacing approximately 10% of the beta naphthol with mono acid.

Para Reds have relatively bright masstones, but the reduced shades and tints are much yellower and not as clean as the Graphic Reds. They have better permanence than Graphic Reds.

Resistance to light is good in full shades, but only fair in tints. They bleed in varnish, water, paraffin, alcohol, and coal tar thinners. Resistance to alkali and acids is good. Maximum baking temperature without bronzing is 180°F.

Para Reds have excellent covering and are economical pigments where a moderate degree of durability is sufficient and freedom from bleed is not required. They are widely used for industrial enamels, implement enamels, and store front enamels.

10355: Para Red Light - Considerably lighter in shade and stronger than 10333.

10333: Para Red Light - Standard light Para for paint and enamel uses. Deeper in shade and weaker than 10355.

10109: Para Red Dark - Dark masstone, blue undertone. Standard dark Para for paint and enamel. Low tinting strength. Maximum opacity. Very easy grinding.

8. TOLUIDINE REDS:

Toluidine Reds are azo pigments made by coupling meta nitro para toluidine with beta naphthol. They are made in a wide range of shades. They have excellent brightness, good covering power, and outstanding durability, especially in full shade.

Light resistance of the Toluidine Reds is excellent in full shade and fair in tints. Resistance to acid and alkali is good. They are non-bleeding in the usual oil and oleo-resinous paint systems and in air dried synthetics, but bleed in lacquer solvents, alcohol, aromatic solvents, and paraffin. The standard Toluidine Reds will bronze when baked at a temperature higher than 180°F. See below for special non-bronzing types.

Toluidine Reds combine extreme brilliance in masstone with excellent light fastness, and for this reason are the most widely used of all the red toners for coloring exterior surface coatings. They likewise lend themselves to the formulation of industrial enamels, and are extensively used for this purpose.

Principal Standards

10450: Toluidine Red Light - Slightly lighter, considerably cleaner, and, considerably stronger than 10189.

Special Standards

10385: Toluidine Red Light - Similar in shade to 10189, but considerably stronger. Not as bright as 10450.

PAINT INDUSTRY - COLORS - REDS AND MAROONS

10189: Toluidine Red Light - Standard Toluidine Red Shade. Bright masstone with blue tint.

10801: Toluidine Red Light - Resinated type. Not as clean as 10189. Better gloss and more resistant to bronzing and hazing in baked finishes than regular type. Rapid grinding.

10451: Toluidine Red Light - Non-bronzing type. Better gloss and more resistant to bronzing and hazing than 10189 and 10450. Equal to 10801 in resistance to bronzing and hazing but considerably brighter in shade.

10395: Toluidine Red Dark - Regular dark toluidine red standard.

D-2904: Toluidine Red Medium - Slightly deeper than 10189 and considerably lighter than 10395.

D-2914: Toluidine Red Extra Dark - Slightly deeper than 10395.

10386: Toluidine Red Lake - 25% 10298 on whiting. Recommended for water paints and kalsomines.

9. PERMANSA REDS (FIRE RED):

Permansa Red is an azo pigment made by coupling ortho chlor paranitraniline with beta naphthol. Lighter, cleaner, and more brilliant than the Toluidine Reds. Permansa Red is otherwise similar to the Toluidines in general physical characteristics.

Resistance to light is excellent in full shade and fair in tints. Resistance to acid and alkali is good. Permansa Red does not bleed in water or oil, but bleeds in lacquers and synthetic vehicles. The maximum temperature of baking to prevent bronzing is 180°F.

Specific uses for Permansa Red include bulletin enamels, gasoline pump enamels, filling station enamels, show-card colors, and any finish where a light bright red is desired.

10361: Permansa Red - Standard pigment for paint uses. Very light, bright shade. Low tinting strength and good opacity.

10363: Permansa Red - Slightly lighter shade and better strength than 10361. Most popular standard.

10. SOLFAST RHODAMINE REDS:

The Solfast Rhodamines are made by the precipitation of rhodamine dyestuffs with phospho tungstic and molybdic acid. They are characterized by outstanding brilliance of shade, and good resistance to light. They are used in industrial enamels where a bright, striking decorative effect is required and no severe durability demand need be met.

PAINT INDUSTRY - COLORS - REDS AND MAROONS

Resistance to alkali is poor and to acid is good. They are non-bleeding in varnish and coal tar thinner, but bleed slightly in water and paraffin.

10371: Solfast Rhodamine Y - Typical rose shade Rhodamine Red, Good permanence.

10373: Solfast Rhodamine B - Bluer shade than 10371. Same general properties except permanence of tints not quite as good.

11. SCARLET LAKE:

Scarlet Lake is produced by the precipitation of Scarlet 2R dyestuff on a mixed base of alumina and blanc fixe. It is sometimes known as Turkey Red. This pigment has only fair permanence. Resistance to heat is excellent, and to alkali and acid poor. It is non-bleeding in paint vehicles, water, paraffin, and alcohol. It is especially suitable for inexpensive enamels. Baking is satisfactory at 230°F.

10180: Scarlet Lake Dark - Standard deep bright shade.

12. SOLFAST SCARLETS, TOLUIDINE MAROONS, SOLFAST MAROONS (ARYLIDE REDS AND MAROONS):

Included in this class of colors are three types, all of which are azo pigments derived from the arylide group of intermediates. They are classed together because their compositions and characteristics are somewhat similar, although there is some difference in the properties of each type of pigment.

The Toluidine Maroons have excellent resistance to light in full shades and fair resistance in tints. Solfast Scarlets and Solfast Maroons have excellent resistance to light in both full shades and tints. Resistance to heat, alkali, and acid is good for all three types. The Toluidine Maroons bleed slightly in nitro cellulose lacquers and synthetic enamels. The Solfast Scarlets and Solfast Maroons also bleed slightly in both nitro cellulose and synthetic finishes except 10399 which does not bleed in synthetics.

D-2799: Solfast Scarlet Light - Somewhat darker in shade than Permanse Red, 10361. Excellent resistance to light in full shades and tints. Recommended for durable lacquers and enamels.

10397: Solfast Scarlet Light - Slightly darker than D-2799. Shade similar to Toluidine Red Light. Tint cleaner and much stronger than Toluidine Red and much better permanence in tints. More transparent than Toluidine Reds.

10396: Toluidine Maroon Light - Standard Light shade Toluidine Maroon. Considerably deeper in shade than Toluidine Red Dark, 10395. Recommended for high quality fast-to-light lacquers and enamels.

10393: Toluidine Maroon Dark - Standard dark Toluidine Maroon. Darker in shade and yellower in tint than 10396. Recommended for high quality fast-to-light lacquers and enamels.

PAINT INDUSTRY - COLORS - RED AND MAROONS

D-2830: Solfast Maroon - Same depth, but considerably cleaner in shade than 10393. Excellent permanence in full shade and tints. Recommended for top quality regular maroon and opalescent maroon enamels, especially automotive enamels.

D-2831: Solfast Maroon Dark - Considerably deeper in shade than D-2830 or 10393. Properties and uses similar to D-2830.

13. MAROON TONERS (LAKE BORDEAUX MAROONS):

These pigments are the manganese or calcium salts of tobias acid coupled with beta oxy naphthoic acid. Either the manganese or calcium salt can be made in the light or dark forms. We have classified these colors according to the metal constituent since the properties are consistent within each group whether the shade is light or dark.

The manganese salt has excellent light resistance and is recommended for all types of exterior enamels and lacquers. The calcium salt does not have the light resistance of the manganese salt, but is generally rated good.

CALCIUM TYPE

CP 1034: Maroon Toner - Dark maroon type. Brighter and yellower than CP779. Recommended for enamels and lacquers. Light stability not quite as good as CP 779.

MANGANESE TYPE

CP 429: Maroon Toner - Light maroon type. A reduced pigment on barytes. Recommended for its soft grinding.

CP 1032: Maroon Toner - Light maroon type. 50% stronger than CP 429. Otherwise similar to CP 429. Soft grinding.

CP 779: Maroon Toner - Dark maroon type. Darker and brighter than CP 429. Good hiding power. Hard grinding.

CP 1033: Maroon Toner - Dark maroon type. Considerably darker and brighter than CP 779. Hard grinding.

14. ALIZARINE LAKES:

These pigments are made by the precipitation of alizarine dyestuffs on a mixed base. They possess fair covering power, excellent light and alkali resistance, and good heat and acid resistance. They are non-bleeding in varnish, water, and paraffin, coal tar thinner, and alcohol (except 10132, which bleeds in alcohol), and are therefore suitable for lacquer as well as for paint and enamel purposes. Baking is satisfactory at 230°F.

10132: Alizarine Red Lake - Typical light shade maroon. Not suited for lacquers.

10322: Alizarine Red Lake - Same shade as 10132, but is non-bleeding in lacquers.

10352: Alizarine Maroon Dark - Considerably deeper than 10322. Non-bleeding in lacquers.

PAINT INDUSTRY - COLORS - REDS AND MAROONS

15. BORDEAUX LAKES:

These colors are produced by the precipitation of amaranth or bordeaux dyestuffs on a mixed base. They possess fair permanence at a reasonable price. They are non-bleeding in varnish, water, paraffin, alcohol, and coal tar thinner. They have good resistance to heat and fair to poor resistance to light, alkali, and acid. Baking is satisfactory at 230°F.

10182: Amaranth Maroon Lake - A very bright shade. Deeper than 10132.

10340: Bordeaux Maroon Lake - Slightly deeper shade than 10182.

PAINT INDUSTRY - COLORS

GREENS

1. CHROME GREENS:

Chrome Greens are intimate mixtures of Chrome Yellow and Iron Blue. The shade of a Chrome Green is controlled by two factors: the proportion of blue to yellow, and the greenness or redness of the yellow or blue used in its manufacture. The depth of the green is a function of the amount of blue it contains. Brightness or olive-ness is determined by the shade of the constituent pigments; the redder the yellow or blue, the more olive the tone of the green.

Chrome Greens exist in both blue undertone and yellow undertone types, sometimes called "Nitrate" and "Acetate" greens from the fact that nitric and acetic acids were once used to make the respective types. The blue undertone types are brighter and cleaner than the yellow undertone greens, and tend to have better light resistance. Yellow undertone greens, on the other hand, are stronger for a given depth of shade. Our Chrome Greens are of the "Nitrate" type.

Chrome Greens exhibit very high hiding power in paint systems. They are excellent in exterior durability. Like Chrome Yellows, they undergo darkening on exposure to light. This trait has been corrected to a large degree in modern Chrome Greens, which are regarded as having adequate light fastness when used in full shades. They show significant fading in tints; for pale shades of green subjected to exterior exposure, Solfast Green or Solfast Sky Blue shaded with Zinc Yellow should be used. Chrome Greens, because of their Iron Blue content, are sensitive to alkalis. When alkali-resistant green products are required, recourse must be had to Shamrock Green, Solfast Green, or Permanse Green.

Listed below are the principal Chrome Green standards. By using two of these standards, either alone or mixing them together, a full range of green shades can be obtained. Because of convenience to the Dry Color Department and to the customer, it is preferable to sell only the standards listed. However, numerous other standards are available to match special shades for special customers.

11825: CP Chrome Green Extra Light - Contains 2.0% Iron Blue.

11834: CP Chrome Green Light - Contains 7.5% Iron Blue.

11837: CP Chrome Green Medium - Contains 20.0% Iron Blue.

11835: CP Chrome Green Dark - Contains 50.0% Iron Blue.

2. SOLFAST GREENS (PHTHALOCYANINE GREENS):

Solfast Green is chlorinated copper phthalocyanine. It is characterized by a bright, neutral green shade.

Solfast Green has excellent resistance to light, heat, acid, and alkali, and does not bleed in water, alcohol, lacquer, or petroleum solvents.

PAINT INDUSTRY - COLORS - GREENS

- CP 771: Solfast Green - Standard Phthalocyanine Green pigment.
- CP 983: Solfast Green - Masstone slightly darker than CP 771: Same strength.
- CP 707: Solfast Green - Water dispersible pigment of the CP 771 type. Recommended for water and emulsion paints.

3. SHAMROCK GREENS (HANSA YELLOW - PHTHALOCYANINE BLUE):

The Shamrock Greens are wet method mixtures of Permanse Yellow 10G and Solfast Sky Blue (CP 1037 type), and contain approximately 30% blanc fixe. Since they are produced by mixing the water pulps of the yellow and blue pigments, they are better quality pigments than the customer can obtain by mixing the corresponding yellow and blue pigments during his processing.

The Shamrock Greens have the excellent properties of Permanse Yellow 10G and Solfast Sky Blues. They have excellent resistance to light, heat, acid, and alkali. They are non-bleeding in varnish and water, but bleed slightly in paraffin, alcohol, and coal tar thinners.

Principal Standards

- 11184: Shamrock Green Light - Approximate depth of shade of Chrome Green Light, 11834. Much better permanence and brighter and cleaner than chrome greens.
- 11185: Shamrock Green Dark - Approximate depth of shade of Chrome Green 11837. Properties similar to 11184.

Special Standards

- D-2463: Lime-Fast Green Light - 10% of 11184 on blanc fixe. Recommended for water and emulsion paints.
- D-2464: Lime-Fast Green Dark - 10% of 11185 on blanc fixe. Recommended for water and emulsion paints.

4. PERMANSA GREENS (PIGMENT GREEN B):

Permansa Greens are iron salts of nitroso beta naphthol. They are made in two shades, the olive shade and yellow shade. Both shades are characterized by their excellent resistance to alkali. They are the only moderately priced organic green pigments with this property.

Permansa Greens have excellent resistance to light in full shade and good in tints. Resistance to acid and alkali is very good. They do not bleed in oil, water, alcohol, paraffin, greases, or fats, and they will not bleed through an enamel or lacquer over-stripe.

Permansa Greens are extensively used in water and emulsion paints where their alkali resistance in comparison to chrome greens and their economy and cleanness in comparison to chromium oxide is outstanding. In general they are used in any protective coating where excellent resistance to alkali is demanded and a moderate degree of light fastness will suffice.

PAINT INDUSTRY - COLORS - GREENS

Principal Standards

Special Standards

- CP 594: Permanaa Green - Standard Olive shade.
- CP 986: Permanaa Green - Standard yellow shade. Properties similar to CP 594, except considerably cleaner than CP 594.
- CP 997: Permanaa Green - Water dispersible pigment of CP 594 type. For water and emulsion paints.
- CP 765: Permanaa Green - Water pulp of CP 594 type. For water and emulsion paints.
- CP 903: Permanaa Green - Water pulp. Stronger and slightly yellower than CP 765. For water and emulsion paints.
- CP 987: Permanaa Green - Water pulp of CP 986. For water and emulsion paints.

5. SOLFAST GREENS (PHOSPHO TUNGSTIC GREENS):

These pigments are made by the precipitation of brilliant green dyestuff with phosphotungstic acid. They are distinguished by their brilliance, high tinctorial strength, and good permanence. They are recommended to produce brilliant greens where no severe durability is necessary.

They have good resistance to light and acid, excellent resistance to heat, and fair resistance to alkali. They do not bleed in varnish, water, or oil, and only slightly in paraffin and alcohol.

11174: Solfast Brilliant Green - Extremely bright yellow green shade.

11182: Solfast Marine Green - Considerably deeper and bluer than 11174.

6. SERENE GREENS (BENZIDINE YELLOW-PHTHALOCYANINE BLUE):

Serene Greens are wet process mixtures of Benzidine Yellow (12192 type) and Solfast Sky Blue. They are 50% lakes on a mixture of titanium dioxide and asbestos. They have the excellent properties of the Benzidine Yellow and Solfast Sky Blue from which they are derived.

D-2832: Serene Green Light - Approximate shade of Shamrock Green, 11184. Recommended for water paints and kalsomines.

D-2833: Serene Green Dark - Approximate depth of shade of 11185. Recommended for water paints and kalsomines.

PAINT INDUSTRY - COLORS

BLUES AND VIOLETS

1. SOLFAST SKY BLUES (PHTHALOCYANINE BLUES):

Chemically Solfast Sky Blues are copper phthalocyanine. They are characterized by extreme chemical inertness, freedom from bleeding, and resistance to fading. Because of their exceptional properties, they are gradually replacing other types of blue pigments for practically all uses except where only the most inexpensive pigments are desired.

The Solfast Sky Blues have excellent resistance to light in full shade and tints, excellent resistance to heat, acid, and alkali, and do not bleed in oil, water, or alcohol.

Principal Standards

- CPX 483: Solfast Sky Blue - Standard shade phthalocyanine blue. Very brilliant. Formerly called CP 558. Stability in aromatic solvents questionable.
- CP 961: Solfast Sky Blue - Considerably redder than CPX 483. Same strength. Our own manufacture. Not recommended for paints or enamels where aromatic solvents are present. Satisfactory for outside house paints.
- CP 988: Solfast Sky Blue - Red shade Resinated type of CP 961. Weaker, cleaner, and less bronze than CP 961. Better grinding than CP 961 or CPX 483. Stability in aromatics questionable.

Special Standards

- CP 1020: Solfast Sky Blue Lake - Reduced CP 961, 25% pigment on whiting.
- CP 767: Solfast Sky Blue - Water dispersible type of CPX483. Recommended for water and emulsion paints.
- CP 1029: Solfast Sky Blue - Water dispersible type of CP 961. Recommended for water and emulsion paints.
- CP 1037: Solfast Sky Blue - Dry form. Non-crystallizing type. Similar to CPX 483 in shade and strength. Can be recommended for use where aromatic solvents are present.

NOTE: Information received as this is printed indicates that CPX 483 will not be available in the future. Substitute CP 1037 for it in every case.

Solfast Sky Blue is also available dispersed in a mixture of Litho Varnish and Non-Break Linseed Oil (CP 766) for use in the paint industry.

2. IRON BLUES:

Iron Blues are ferric ferrocyanide complexes containing other modifying elements in the pigment. Potassium was originally used as the modifying metal, and Potash Blues are still occasionally produced. However, most modern Iron Blues are of the ammonium type.

Three classes of Iron Blues are usually distinguished: Milori Blue, Chinese Blue, and Prussian Blue. The Milori Blues are redder in toptone than the other types, but are the most widely favored as general purpose blues because of their inherently softer texture and freedom from reactivity. Chinese Blues are characterized by their clean blue masstone and strong green tint, and are used where their distinctive color properties are required. Prussian Blues have a dark toptone and a red tint. They find their greatest use in the toning of black enamels.

PAINT INDUSTRY - COLORS - BLUES AND VIOLETS

Iron Blues are very sensitive to alkali, and cannot be used in applications where alkali resistance is important. They have excellent durability in full shade enamels, but show some tendency to develop a bronze on outdoor exposure; this is greatest in the Milori type and least in Prussian Blue. Color retention is excellent in full shades, but decreases markedly on extension with prime white pigments. Solfast Sky Blues should be used where Alkali resistance is involved, and in medium to light tints requiring a high degree of fastness to light.

Iron Blues find wide use in automotive and industrial enamels and trade sales items, in dark to medium shades of trim paints, and for tinting where a moderate degree of light fastness suffices.

Resistance to light, heat, and acid is excellent, to alkali poor. They are non-bleeding in varnish, water, paraffin, coal tar thinner, and alcohol. Baking is satisfactory at 320°F.

- 11086: CP Milori Blue - Most popular Milori Blue standard. Clean, green masstone and tint. Suitable for use with yellows to make greens.
- 11840: CP Milori Blue - Low oil absorption type, redder masstone, and less tinting strength than 11086.
- 11148: CP Potash Blue - True Potash Blue. Redder masstone and slightly weaker than 11840.
- 11023: CP Chinese Blue - Regular Chinese Blue. Jet in masstone, with greenish tint.
- D-2875: CP Chinese Blue - Improved Chinese Blue. Cleaner and stronger in tint than 11023. Shows less absorption of driers in enamel formulations than 11023. Less reactivity with synthetic vehicle, and slightly better grinding than 11023.
- 11186: CP Non-Bronze Blue - Somewhat jetter in masstone than 11023 or D-2875. Recommended for lacquers and synthetics.
- 11096: CP Prussian Blue - Jet masstone, tint much redder than Chinese Blue type.

3. ALKALI BLUES:

Alkali Blues are mono sulfonic acids of phenylated fuchsine. They are produced in a wide range of shades from a greenish blue to a violet blue. Five shades are commonly recognised; Extra Green, Green, Medium, Red, and Extra Red.

Alkali Blues are the strongest blue pigments available, being about 50% stronger than Phthalocyanine Blue. They have good resistance to light, good resistance to heat and acid, good resistance to cold alkali, and poor resistance to hot alkali. They do not bleed in water or paraffin, but bleed slightly in lacquers and synthetics.

The largest use of Alkali Blues is in printing inks. However, they are used in inside paints and enamels where extreme durability is not necessary, and it is desired to take advantage of their excellent strength. They should not be used in full shade because of bronzing. They are not recommended for lacquers because of bleeding. They are widely used for toning blacks because of their great strength.

PAINT INDUSTRY - COLORS - BLUES AND VIOLETS

The following dry standards are available:

CP 258: Alkali Blue G - Green shade.

CP 812: Alkali Blue R - Red shade.

For a complete list of the Alkali Blues available in ink form, see the section on the printing ink industry.

4. SOLFAST VICTORIA BLUES:

Solfast Victoria Blues are not widely used in the paint industry because they are too expensive. They are in general similar to the Alkali Blues in properties, having a slight bleed in lacquer solvents. For the standards available, see the section on printing inks.

5. METHYL VIOLETS:

These pigments are produced by the precipitation of suitable dyestuffs with phosphotungstic acid or phosphomolybdic acid. There are two types available: Solfast Methyl Violet and Royal Purple.

These pigments are not widely used in paints and enamels, although for certain types of enamels, the Solfast Methyl Violet does find a place. For the details of the standards available, see the section in printing inks.

I. PRODUCTS FOR THE PAINT INDUSTRY

B. FLUSHED COLORS

Dispersed Colors or Flushed Colors are today accepted by the paint, lacquer, and enamel manufacturer as a decided improvement in the handling of colors over that of dry grinding. In the manufacture of Flushed Colors, a wet filter cake or presscake of pigment is put in a large mixer, and a suitable vehicle is added. The mix is agitated thoroughly in the presence of heat and about 80 to 90% of water is released and mechanically poured or flushed off. The remaining water is removed with heat and vacuum. The base is then reduced with additional vehicle and thinner to standard body, weight per gallon, tinting strength, or whatever the controlling factors happen to be.

Some of the advantages of Flushed Colors over the use of dry pigments and grinding on a mill are as follows:

1. It is not necessary to use ball mills or roller mills for making paint, enamel, or lacquer batches. The Flushed Color only need be stirred into the vehicle. This is particularly advantageous for small batches where the time in cleaning ball mills and roller mills would be an important factor. Another advantage is in filling rush orders.
2. Flushed Colors have a lower oil absorption than the corresponding dry ground base; consequently the enamel has good uniformity and better flow.
3. Difficulties caused by silking and blooming of organic pigments, such as Para Reds, Toluidine Reds, and Graphic Reds, are reduced by the use of Flushed Colors.
4. Flushed Colors afford the best possible pigment dispersion obtainable. Excellent pigment dispersion has been found to be responsible for higher finish and gloss, greater tinting strength, and cleaner, brighter shades. Actual experience in the laboratory and reports of customers indicate the following:

Brilliance: With the following exceptions, equal brilliance is obtained by flushing as by dry grinding. Flushed Iron Blues are more jet and less bronzy, and Flushed Chrome Greens are cleaner and brighter than when dry ground. Para Reds give deeper and brighter shades when dry ground.

Gloss: In general, Flushed Colors give considerably higher gloss, only medium and light Chrome Yellows and Iron Blues being the exceptions.

Strength: Flushed Colors are always equal to, and in most cases stronger than dry ground pigments, the only exception being Para Reds.

The following types of Flushed Colors are available for use in paints and enamels:

1. Colors Flushed in V-15026 or XAD 26, a short oil Glyceryl Phthalate Alkyd Varnish, especially designed for automotive finishes and quick drying synthetic enamels.
2. Colors Flushed in CV 6090 or XADC3, a long oil Glyceryl Phthalate Alkyd Varnish designed for excellent compatibility with oleoresinous, oil, and synthetic type finishes.
3. Colors Flushed in Linseed Oil.

Specific information on the code numbers and colors available can be obtained from the current bulletin on Dispersed Colors.

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I. PRODUCTS FOR THE PAINT INDUSTRY

C. WHITE PIGMENTS

1. BASIC CARBONATE WHITE LEAD

Ozark Basic Carbonate White Lead is produced by the Quick Process. It has higher consistency, higher tinting strength, more hiding power, and better color than white lead produced by the Old Dutch Process.

Ozark Basic Carbonate White Lead is produced in a closely controlled carbonate ratio with 10.4 to 11.0% CO_2 . It is dependably uniform in texture, fineness, and color. The following are its properties: Specific Gravity, 6.70. Pounds per Solid Gal., 52.8. Bulking Value, 1.772 Gal./100 lbs. It is packed in strong five-ply paper bags of 50 pounds net weight.

Basic Carbonate of White Lead was for years the standard pigment for outside paints. Although its use as the only pigment in the paint has decreased considerably, it is still widely used because of the better resistance to erosion and better clean-up which it affords. It usually makes up from 5 to 20% of the total pigment weight.

The basic nature of White Lead renders it active to the acid present in the oil vehicles. Lead soaps are formed which are a great aid in the wetting of the pigment by the oil and in obtaining a good bond between the oil and pigment in the film. The lead soap is soft and plasticizes the film, giving it elasticity and prolonging its life.

2. LEADED ZINC OXIDE:

Ozlo is the brand name for a series of 100% co-fumed leaded zinc oxides produced by mixing and heating the lead and zinc ores together to volatilize the metal content. The resulting fume is oxidized and condensed as a unit pigment which possesses the desirable intimate combination of lead and zinc in a physical form which imparts maximum durability to the paint.

Four grades of Ozlo are available:

Ozlo 35/65 - 35% lead pigment, 65% zinc oxide
Ozlo 50/50 - 50% lead pigment, 50% zinc oxide
Ozlo 20/80 - 20% lead pigment, 80% zinc oxide
Ozlo 12/88 - 12% lead pigment, 88% zinc oxide

Ozlo is packaged in three-ply brown paper bags, suitably marked, containing 50 pounds net weight, or in wooden barrels (tare weight 20 pounds, net weight 350 pounds).

Typical Analysis and Physical Properties:

	<u>Ozlo 35/65</u>	<u>Ozlo 50/50</u>	<u>Ozlo 20/80</u>	<u>Ozlo 12/88</u>
Zinc Oxide (ZnO)	64.75	50.28	80.30	87.6
Lead Sulfate (PbSO_4)	29.98	41.20	17.14	10.6
Lead Oxide (PbO)	5.09	8.38	2.47	0.7
Total Lead Pigment	35.07	49.58	19.61	11.3
Moisture	0.07	0.07	0.07	0.1
Specific Gravity	5.83	5.94	5.72	5.66
Pounds per Solid Gal.	48.56	49.48	47.65	47.15
Bulking Value (gal./100 lbs.)	2.06	2.02	2.10	2.12

Ozlo 35/65 meets A.S.T.M. Spec. D-80-41 and Federal Spec. TT-Z-321.

Ozlo 35/65, Ozlo 50/50, and Ozlo 20/80 may be used in Federal Spec. TT-P-40 for Type I, Class A and C, paints.

PRODUCTS FOR THE PAINT INDUSTRY - WHITE PIGMENTS

Basicity: Actually little or no lead oxide (PbO), as such, exists in co-fumed leaded zinc oxide but rather the basicity of the leaded zinc is due to basic lead sulfate, ($PbO \cdot PbSO_4 \cdot xPbSO_4$). For convenience the basicity is expressed as PbO content. The effect on durability of high or low basicity in leaded zinc oxide is not too well known. For uniformity the so-called PbO content is carefully controlled within a relatively narrow range of 4 to 7% for Ozlo 35/65 and 6 to 10% for Ozlo 50/50.

Oil Absorption: Ozlo leaded zinc oxides in general have low oil absorption. For this reason they give the formulator greater flexibility in selecting and utilizing other pigments and raw materials in his formulation. High, creamy consistency in house paints may be obtained with Ozlo leaded zinc oxides by replacing 1/4 to 1/2 gallon of the bodied oil in the vehicle per 100 gallons of paint with an equal quantity of a highly polymerized linseed oil or some other bodying agent. High-oil absorption extenders may also be used to increase the consistency.

Usage: Ozlo leaded zinc oxides find their greatest usage in the paint industry, where they are considered as the keystone pigments in exterior house paints. In combination with other pigments they give maximum durability combined with good general appearance, tint and whiteness retention, self-cleaning, and slow weathering, which leaves the surface in an excellent condition for repainting.

The co-fumed type has superior performance over the blended or mechanical mixture type in house paints in such important properties as greater resistance to checking and cracking, greater mildew resistance, greater oil-retention, and slower rate of reactivity with the fatty acids of the vehicle. The blended type usually is whiter than the co-fumed, but this is unimportant in modern house paint with its high titanium content.

Competitive Grades: Of the many competitive grades available, only Azo 35L is a close match for Ozlo 35/65 in performance. None is comparable to Ozlo 20/80. The following are the brands and types available:

Types	New Jersey Zinc Co.	American Zinc Sales Co.	Eagle-Picher Lead Co.	Sherwin- Williams Co.
35% Leaded	Lehigh 6 co-fumed *	Azo 35L co-fumed	Eagle A 350 co-fumed *	Ozlo 35/65 co-fumed
50% Leaded	Lehigh 250 Blended	Azo 50L co-fumed	Eagle A 500 co-fumed *	Ozlo 50/50 co-fumed

* It is doubtful whether these are 100% co-fumed.

Ozlo 35/65 may be used in place of the blended 35% leaded zinc oxides sold by N.J. Zinc as Lehigh 61 and Lehigh 635 and Eagle-Picher Lead as A-354 and A-355; but normally a bodying agent will have to be used to get the same consistency.

3. LITHOPONE:

Permolith is the brand name for a series of single-strength co-precipitated lithopones containing 28 to 29% zinc sulfide and 71 to 72% barium sulfate (blanc fixe). These lithopones show good light resistance, color, brightness, texture, and tinting strength. The following grades are available.

PRODUCTS FOR THE PAINT INDUSTRY - WHITE PIGMENTS

Regular Grades:

Permolith 20L: Low consistency. Low reactivity.

Permolith 40M: Medium consistency. Fine texture. High gloss. For enamels or flat-wall paints.

Permolith 60H: Medium high consistency.

Regular lithopones of intermediate consistencies are also available if desired.

Water-Sensitive Grades:

Permolith W-320: A high dry hiding lithopone. Suitable for use in flat wall paints and emulsion paints where high dry hiding properties are desired. Medium high consistency in both oil and emulsion paints.

Permolith W-421: A highly water-dispersible lithopone. Low water absorption. Easy dispersible properties in water and water-containing compositions.

Permolith W-420: A highly water-dispersible lithopone. Medium water absorption. Easy dispersible properties in water and water containing compositions.

Permolith W-560: A highly water-dispersible lithopone. Medium high water absorption. Similar to W-420 but usually gives slightly higher consistencies.

Physical and Chemical Properties:

	T.S. (Min.)	"A" Factory Consistency	Water Absorption	P.C. Factor	ZnC (Max.)	Sp. Res. (Min.)	pH
Permolith 20L	104	15-19	-	2.5-3.5	0.3	-	8-9
Permolith 40M*	102	20-35	-	4.0-6.0	0.3	-	8-9
Permolith 60H	100	26-30	-	5.5-7.5	0.3	-	8-9
Permolith W-320	102	-	18-21	-	0.3	3500	7.3-8.6
Permolith W-421	100	-	17-20	-	0.3	-	8.5-9.5
Permolith W-560	100	-	18-21	-	0.3	-	8.5-9.5

* Permolith 40M should be ground at K7 set or equivalent for uniform gloss and texture.

All grades of Permolith have the following properties: Specific Gravity, 4.30. Pounds per Solid Gal., 35.82. Bulking Value, 2.79 gal./100 lbs.

All grades meet A.S.T.M. Spec. D 477-45 and Federal Spec. TT-L-426.

Permoliths are packaged in strong paper bags having 50 lbs. net weight.

PRODUCTS FOR THE PAINT INDUSTRY - WHITE PIGMENTS

Usage: Below are listed the grades of Permolith that should be most suitable for the principal paint and enamel applications. It should be kept in mind that these are general recommendations and for a particular formulation another grade may prove to be the best. If the recommended grade does not give the desired results, other grades should be tried in the laboratory based on the best information obtainable from the prospective customer. The preferred choice is listed as 1, second as 2, etc. However, if high-dry-hiding is desired, as under Flat Wall Paint, the order may be reversed and Permolith W-320 would be preferable.

	<u>Regular Grades</u>			<u>Water-Sensitive Grades</u>			
	<u>20L</u>	<u>40M</u>	<u>60H</u>	<u>W-320</u>	<u>W-421</u>	<u>W-420</u>	<u>W-560</u>
Exterior House Paints	1	2	3				
Traffic Paints	3	2	1	4			
Floor Enamels	2	1	3				
Undercoaters (interior)	1	2	3				
Flat Wall Paints	1	2	3	4			
Semi-Gloss Enamels	2	1	3				
High Gloss Enamels		1	2				
Industrial Finishes	2	1	3				
Kalsomine				4	3	2	1
Water and Emulsion Paints		5		1	2	4	3

Competitive Grades: Below is listed the closest match of Permolith standards for given brands of each of our competitors. It should, of course, be understood that this comparative table is only a guide in selecting a given grind, and further information may be necessary to select an exact match in a given case.

<u>NEW JERSEY</u>		<u>CHEMICAL</u>	<u>CHEMICAL</u>	<u>EAGLE-</u>	
<u>ZINC</u>	<u>DUPONT</u>	<u>PIGMENT</u>	<u>PIGMENT</u>	<u>PICHER</u>	<u>SHERWIN-</u>
		<u>(CALIF.)</u>	<u>(ILL.)</u>	<u>LEAD</u>	<u>WILLIAMS</u>
(Albalith)	(Ponolith)	(Astrolith)	(Sunolith)	(Eagle)	(Permolith)
14	EL-112	L. O.	L. O.	A	<u>20L</u>
	NR-8		L. O. NR		<u>20L</u>
14	EL-133			AA	<u>40M</u>
806	LR-142				<u>40M</u>
807					<u>40M</u>
10	HO-153	H. O.	H. O.	AAA	<u>60H</u>
11	LR-142	76TL		HHH	<u>W-320</u>
10					<u>W-320</u>
351					<u>W-320</u>
332	HCW				<u>W-320</u>
362	HC				<u>W-320</u>
332	HCW		86	A-1-L	<u>W-560</u>
			86		<u>W-420</u>
			JR	A-1-L	<u>W-421</u>
				AAA-K	<u>W-421</u>

I. PRODUCTS FOR THE PAINT INDUSTRY

D. MISCELLANEOUS PIGMENTS

1. LITHARGE:

Litharge, sold under No. 12500, is made from selected pig lead. PbO content averages 99.5%.

Litharge is used in dark colored house paints and metal primers to accelerate drying, which is accomplished by the formulation of lead soaps in the vehicle. The use of litharge is more economical than the incorporation of special-lead driers.

2. RED LEAD:

Regular Grades:

No. 12510 Red Lead: 95% Pb₃O₄ content. This has been the leading grade on the market for many years. It is standardized on a color basis for paint grinders and is closely controlled for uniformity.

No. 12511 Red Lead: 97% Pb₃O₄ content. It is identical with the 95% grade, except where highly oxidized red lead is desired. This grade is being used to a greater extent in recent years.

No. 12512 Red Lead: 98% Pb₃O₄ content. It is a fine-textured red lead, suitable where highly oxidized red lead is desired. This grade is being used to a greater extent in recent years.

Special Fumed Grades:

No. 12510F Red Lead: 95% Pb₃O₄ content. Fumed.

No. 12511F Red Lead: 97% Pb₃O₄ content. Fumed.

No. 12512F Red Lead: 98% Pb₃O₄ content. Fumed.

Properties of Red Lead:

Apparent Density (gms/cu.in.): Regular Grades, 17-21; Fumed Grades, 12-16.

	<u>Specific Gravity</u>	<u>Pounds Per Solid Gal.</u>	<u>Bulking Value (gal/100 lbs.)</u>
95% Red Lead	8.96	74.64	1.34
97% Red Lead	8.89	74.05	1.35
98% Red Lead	8.83	73.55	1.36

Uses: Red Lead is used in metal primers or metal protective paints because of its rust inhibiting properties. In Chromic Primers, Red Lead is used in conjunction with lead chromate and zinc chromate. In Red Lead Primers, it is the exclusive pigment. Certain Government specifications call for Red Lead in "Rust Inhibitive, Primers".

Red Lead usually makes up about 15 to 70% of the pigment by weight. It may be used with oil and synthetic vehicles provided the latter are of the low acid value type.

I. PRODUCTS FOR THE PAINT INDUSTRY

E. VARNISHES AND RESINS

1. SYNTHETIC VEHICLES

This term is a broad one covering the vehicles usually manufactured in the set kettle type of equipment. It includes the alkyd type of vehicles as well as the so-called interester class such as Dyal XMD 6.

Synthetic vehicles are usually made by reacting polybasic acids, such as phthalic anhydride, and polyhydric alcohols, such as glycerine, with various vegetable oils present as modifying agents. They are marketed by The Sherwin-Williams Company under the trade name "Dyal". Further information on the properties and uses of these materials can be obtained from the Dyal Catalog and numerous Dyal bulletins distributed by the Varnish and Resin Laboratory. See the table at the end of this manual.

2. OLEORESINOUS VEHICLES:

This class of vehicles covers those manufactured by the incorporation of a hard resin (synthetic or natural) into an oil. As such, they differ from "Synthetic Vehicles" in that the resin is introduced as a separate material rather than being made "in situ" as a part of the vehicle manufacture. The resins used in such vehicles are: the natural resins, such as rosin, East India gum or Congo; the semi-synthetics such as the rosin derivatives, ester gum, limed rosin; and the synthetics - phenolics, maleics, and terpene resins.

Sherwin-Williams activities in marketing such vehicles to the paint industry are rather limited because of the economics involved. The possibilities are better for marketing the synthetic resins used for manufacturing oleoresinous vehicles.

3. SYNTHETIC RESINS:

Synthetic resins are the chemically prepared resins used in the oleoresinous vehicles discussed above, as well as for modifying the synthetic or alkyd type vehicles. Such modifications can be made either by cooking the resin into the vehicle as part of its manufacture or by blending in cold cuts (solutions in a solvent) of the resins.

Resins in this category are: 100% Phenolics, which are made by condensing and polymerizing various phenolics with formaldehyde. These resins are characterized by the extreme hardness, excellent chemical resistance, and fast drying properties they impart to vehicles. They are marketed under the name, "Dyphenes".

Modified Phenolics, which are esterified rosin modifications of the 100% phenolics. They represent economical ways of imparting the phenolic properties to vehicles where extremely good requirements need not be met and where wider solubility and compatibility are desired. These are sold as "Dyphenites".

Maleica (or Fumarica) are the rosin-maleic anhydride (or fumaric acid) adduct products esterified with polyhydric alcohols, such as glycerine or pentaerythritol. These resins are known for their good color retention, water resistances, and hardness properties. They are sold as "Dymala".

PRODUCTS FOR THE PAINT INDUSTRY - VARNISHES AND RESINS

HARD RESINS FOR VARNISHES

		<u>Bar M.P. °F.</u>	<u>Acid Value</u>	
Dyphene	XRV 5	135-142	15-25	100% Phenolic
"	XRV 7	185-220	10-20	" "
"	XRV 8	135-145	15-25	" "
"	XRV 10	145-155	14-22	" "
"	XRV 80	260-280	-	" "
Dyphenite	XRV 79	275-285		Mod. Phenolic
"	XRV 130	241-255	20-35	" "
"	XRV 133	275-280	25-35	" "
Dymal	XRP 79	275-315	100-115	Maleic
"	XRP 149	275-300	365	"
"	XRP 218	315-322	-	"

4. DEHYDROL:

Dehydrol is the trade name of the dehydrated castor oil made by The Sherwin-Williams Co. Raw castor oil as it is obtained from the castor bean is a non-drying oil. Because of its chemical composition, this oil can be converted into a drying oil by dehydration.

Dehydrated castor oil is a very useful oil for the manufacture of varnishes and alkyd resins. It has excellent color retention, good drying, good water resistance, and good weather durability properties. It is used in increasing quantities in alkyd formulations, where color retention is important; and in oleo-resinous vehicles, particularly with modified phenolic resins, to give varnishes of good drying and very satisfactory water resistance and durability.

The following types are available: XOT 6: Dehydrol - 50 second Viscosity;
XOT7: Dehydrol - U to V Viscosity.

5. HIGH POLYMER OIL NO. 11:

High Polymer Oil No. 11 is a "reconstructed drying oil" derived from soya bean oil. It was developed for use as the bodied portion of the vehicle in exterior paints in order to overcome some of the inherent disadvantages of bodied linseed or bodied soya-china wood combinations when used for this purpose.

High Polymer Oil No. 11, has the following advantages when used as the bodied portion of paint vehicles:

- A. Good durability and package stability because non-reactive with pigments.
- B. Good through drying and decreased tendency to wrinkle.
- C. Freedom from after tack and less dirt collection.
- D. Excellent color retention of soya without the slow drying and after tack of soya.

High Polymer Oil is suggested for exterior paints, architectural whites, varnishes, and gloss, semi-gloss, and flat wall finishes.

I. PRODUCTS FOR THE PAINT INDUSTRY.

F. CANS

The position of The Sherwin-Williams Company as a supplier of cans to the paint industry is too well known to require any detailed explanation. However, a brief summary is given below.

The following types are available:

1. Standard Round Plain Doubletite Cans - Also available in single friction closure in 1/4 pint, 1/2 pint, and one pint size.
2. Round or Oblong Cans with special S-W Pour Top wide opening.
3. F type - Oblong - With small opening - Closure of the screw type, cork and seal, National Seal Duplex, or U-Press-It.
4. Circle Seal - New type such as used for Kem Glo line. Some of the advantages of the Circle Seal are:
 - a. Shade name may be printed on the seal and does not need to be printed on the body. A big advantage for lithographed cans.
 - b. More effective resealing characteristics.
 - c. Better pouring because of the nozzle.
 - d. Easier for use with brush because of the nozzle.
 - e. Easier opening and closing.
 - f. Positive seal which reduces danger of lids popping off, and entraps less air than the Doubletite type.

Cans are available lithographed and plain. They are available in SCMT (Special Coated Manufacturers Terne); .25 lb. electrolytic tin plate; .50 lb. electrolytic tin plate; .75 lb. electrolytic tin plate; 1.25 lb. hot dip tin plate; 1.50 lb. hot dip tin plate; 8 lb. coated terne plate; 12 lb. coated terne plate; 15 lb. coated terne plate; and blackplate.

For specific information see the latest price list.

1500 - 14-12-12-12
30 - 12-12-12-12

11. PRODUCTS FOR THE PRINTING INK INDUSTRY

A. COLOR PIGMENTS

NOTE: For a description of each class of color and a discussion of its properties, see the section on "Products for the Paint Industry." Properties which are important only to the printing ink industry are discussed below.

YELLOWS AND ORANGES

I. CHROME YELLOWS AND ORANGES:

Spec. Properties: All are resistant to lithographic fountain solution and stable in moisture set, heat set, and aniline inks, except those indicated otherwise.

Principal Standards

Special Standards

CP PRIMROSE YELLOW

- 12074: Lightest and cleanest shade.
12131: Appreciably redder and stronger than 12074.

CP CHROME YELLOW LIGHT

- 12147: Best lemon yellow standard. D-2903: Considerably redder and stronger than 12131. Considerably lighter than 12147.
D-2652: Somewhat redder than D-2903. Slightly lighter and weaker than 12147. Not resistant to fountain solution.
12148: Special for comic inks. High strength, rapid grinding, dirtier shade than other lemon yellows.

CP CHROME YELLOW MEDIUM

- 12150: Best quality medium yellow. Low reactivity in high acid value vehicles. Not stable in aniline inks. D-2805: Special for comic inks. Dirty shade. Rapid grinding.
12152: ~~Considerably~~ ^{Some what} brighter in shade and ^{more} ~~than~~ ^{than} 12150. ^{(more) brighter} ~~than~~ ^{than} 12150. ^{is features a} ~~than~~ ^{than} 12150. CP CHROME ORANGE

- 12311: CP Chrome Orange Light - Standard light orange shade.
12082: CP Chrome Orange Medium - Somewhat deeper than 12311.

106 - PCOA & OCAA

G - MNPT & OCAA

M - MNPT } + OCAA
 MNPA }

House 106
G
17

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PRINTING INK INDUSTRY - COLORS - YELLOW AND ORANGES

2. MOLYBDATE ORANGES:

Spec. Properties: Molybdate Oranges work much better on the rolls than chrome oranges due to their lower gravity and higher oil absorption. In addition, they offer better money value due to their higher tinting strength than the Chrome Oranges (4.5 times greater).

All standards are resistant to fountain solution, and are stable to moisture set, heat set, and aniline inks.

12095: Molybdate Orange Light - Standard light shade. High tinting strength.

D-2843: Molybdate Orange Light - Close in shade to 12095, but slightly stronger.

D-2822: Molybdate Orange Light - Close in shade and strength to 12095. Special for aniline inks. *not for use in aniline inks*

3. ZINC YELLOW:

Not used in printing inks.

4. PERMANSA YELLOWS (HANSA YELLOWS):

Spec. Properties: All Permansa Yellows are resistant to lithographic fountain solution, and stable in moisture set, heat set, and aniline inks.

12105: Permansa Yellow 10G - Standard Hansa 10G shade. Considerably lighter than G Shade. Corresponds in shade to Primrose Chrome Yellows.

D-2648: Permansa Yellow 3G - Not to be recommended when G shade is available because light fastness is not as good. Masstone somewhat lighter and not as clean as 12107.

12107: Permansa Yellow G - Standard G shade for all types of printing inks.

12104: Permansa Yellow G - Resinated type Hansa G. More transparent, better finish than 12107. *not in use - better than 12107*

12112: Permansa Yellow M - Considerably redder than 12101 or 12107. Shade comparable to medium Chrome Yellow. Good strength.

5. BENZIDINE YELLOWS:

Spec. Properties: All Benzidine Yellows are resistant to lithographic fountain solution and have excellent stability in moisture set, heat set and aniline inks. They are non-bleeding in all ink vehicles except lacquer solvent type.

Principal Standards

12190: Benzidine Yellow - Regular opaque type standard. Intermediate in strength.

*12190 Y-59
12190 Y-6*

Special Standards

D-2853: Benzidine Yellow - Grease-proof type. Improved 12192 type pigment. Slightly cleaner in shade and slightly stronger than 12192.

PRINTING INK INDUSTRY - COLORS - YELLOW AND ORANGES

Handwritten:
Benzidine Yellow
Harrison YB57
Zinnser?

Handwritten:
99 DCB
+
A. H. H. H. H. H.

Handwritten:
(OTAB 17 33 X 6)

12191: Benzidine Yellow - Transparent type standard. Strongest Benzidine Yellow.

D-2840: Benzidine Yellow - Light fast type. Very transparent. Shade similar to 12190, 12191, and 12192. Strength equal to 12192.

12192: Benzidine Yellow - Grease-proof type. Resistant to fats, oils, and paraffin. More opaque and somewhat lighter in shade than 12190. Slightly weaker than 12190. Light fastness slightly better than 12190 or 12191.

D-2841: Benzidine Yellow Medium - Light fast type. Very opaque. Medium shade similar to medium chrome yellow or Permanent Yellow, 12112. Strength equal to 12191. Best working properties.

6. PERMANSA ORANGE (DINITRANILINE ORANGE):

Handwritten:
D 2916 - exact match Harrison YB57 (we b. H. H. H. H. H.)
12191 - we weaker y. ch. (BN + BN)

Spec. Properties - Permansa Orange is excellent in resistance to fountain solution and is stable in moisture set, heat set, and aniline inks.

10369: Permansa Orange - Regular dinitraniline orange toner.

10805: Permansa Orange - Resinated type. Rapid grinding. Has better finish than 10369 for printing inks. Same shade and strength as 10369.

7. PERMANENT ORANGE (ORTHONITRANILINE ORANGE): (ON + BN)

Spec. Properties - All Permanent Orange standards are rated as having good resistance to lithographic fountain solution, and are stable in moisture set, heat set, and aniline inks.

10330: Permanent Orange Toner - Regular orthonitraniline orange standard.

10376: Permanent Orange Toner - The best standard. Trifle lighter, cleaner, and stronger than 10330.

10804: Permanent Orange Toner - Resinated type. Rapid grinding. Shade and strength comparable to 10376. Better finish than 10376.

8. BENZIDINE ORANGE:

Handwritten:
Benzidine Orange is an organic toner prepared from dichlorobenzidine. It is much stronger and somewhat lighter and yellower in tint than Permansa Orange. Light resistance in full shade is excellent, in tints good. Heat, alkali, and acid resistance to fats, oils, and paraffin are good. Resistance to lithographic fountain solution is excellent, and it is stable in moisture set, heat set, and aniline inks.

Benzidine Orange is an organic toner prepared from dichlorobenzidine. It is much stronger and somewhat lighter and yellower in tint than Permansa Orange. Light resistance in full shade is excellent, in tints good. Heat, alkali, and acid resistance to fats, oils, and paraffin are good. Resistance to lithographic fountain solution is excellent, and it is stable in moisture set, heat set, and aniline inks.

12193: Benzidine Orange - Standard shade. Recommended for all types of printing inks; however not as good a buy for soap-fast and grease-proof inks as Solfast Orange, D-2878.

9. SOLFAST ORANGE:

Handwritten:
Solfast Orange is an azo type organic orange pigment. Light resistance in full shade is excellent, in tints fair. Heat, alkali, and acid resistance are excellent. Resistance to grease, fats, and oils is excellent. Resistance to fountain solution is excellent, and Solfast Orange is stable in moisture set, heat set, and aniline inks.

Solfast Orange is an azo type organic orange pigment. Light resistance in full shade is excellent, in tints fair. Heat, alkali, and acid resistance are excellent. Resistance to grease, fats, and oils is excellent. Resistance to fountain solution is excellent, and Solfast Orange is stable in moisture set, heat set, and aniline inks.

PRINTING INK INDUSTRY - COLORS - YELLOWS AND ORANGES

Solfast Orange is particularly recommended for grease-proof and soap-fast inks.

D-2878: Solfast Orange - Slightly deeper and redder in shade than Benzidine Orange. More economical product than Benzidine Orange considering initial cost and strength. However, light fastness of tints is not quite as good as benzidine Orange. No competitive product on the market.

Benzidine yellow in order of strength.

D2916 - best

12191

12190

D2853

12192 - worst

D2471 coming back = Vulcan Yellow 6 RA

PRINTING INK INDUSTRY - COLORS

REDS AND MAROONS

I. GRAPHIC REDS AND BRITONE REDS (LITHOL REDS):

Spec. Properties: Lithol Reds are the most widely used red colors for printing inks. They offer the printing ink industry the following advantages: 1. Inexpensive; 2. Excellent working properties; 3. Excellent Strength; 4. Brilliant Shade; 5. Fair light fastness.

Resistance to fountain solution is fair to poor for Lithol Reds, the barium and calcium salts being better than the sodium. The sodium Lithol Reds are not recommended for heat set and aniline inks. The barium and calcium Lithol Reds are stable in heat set inks. The non-resinated barium and calcium standards are recommended for aniline inks, but the resinated colors are too transparent for use. The regular Lithol Reds are not recommended for moisture set inks, however special standards, described below, are available for each type.

Principal Standards

Special Standards

SODIUM LITHOL REDS - REGULAR TYPE

- | | |
|--|---|
| CP 272: Graphic Red Y - Standard type. | CP 941: Graphic Red Y - Considerably lighter masstone, yellower undertone and tint than CP 272. Developed for moisture set inks. |
| CP 384: Graphic Red Y - Appreciably lighter masstone, yellower undertone and tint, slightly more bronze, and weaker than CP 272. | CP 839: Graphic Red Y RG - Shade similar to CP 272. Higher finish, slightly stronger than CP 272. Good flow and grinding properties. Used as substitute for Lake Red C for lithography. |

SODIUM LITHOL REDS - RESINATED TYPE

- | | |
|--|--|
| CP 817: Britone Red Y RG - Regular standard. Easiest grinding and best flow of all standards. | CP 416: Britone Red Y - Lighter in shade than CP 817. |
| CP 933: Britone Red Y - Slightly lighter and brighter and considerably yellower than CP 817. Slightly stronger than CP 817. | CP 423: Britone Red Y - Close to CP 817. Slightly weaker. |
| CP 788: Illini Red - Deepest masstone of all resinated sodium lithol reds. Considerably deeper, slightly bluer undertone and tint, and less bronze than CP 817. Close to Barium Lake Red C in shade, and widely used as Lake Red C Substitute. 10% stronger than CP 817. | CP 648: Illini Red - Slightly lighter and weaker than CP 788. |
| | CP 789: Illini Red - Slightly lighter and weaker than CP 788. |
| | CP 991: Britone Red Y - Considerably darker, and higher finish, and slightly bluer than CP 941. Developed for moisture set inks. |
- for May*

PRINTING INK INDUSTRY - COLORS - REDS AND MAROONS

BARIUM LITHOL REDS - REGULAR TYPE

- CP 233: Graphic Red M - A medium red having a clean undertone and fair strength.
- CP 345: Graphic Red M - Lightest masstone of this class. Strength and tint shade similar to CP 233.
- CP 800: Graphic Red M RG - Rapid grinding type. Slightly darker, brighter, and 10% stronger than CP 233, and yellower undertone. Recommended especially for aniline inks.
- CP 918: Graphic Red M - Very light masstone. Considerably lighter and cleaner than CP 233, and about 10% stronger.
- CP 835: Graphic Red M RG - Slightly darker and 10% stronger than CP 800. Same good body and grind as CP 800.
- CP 940: Graphic Red M - Similar in shade and strength to CP 233. Especially suited for moisture set inks.
- CP 816: Graphic Red M RG - Rapid grinding type. Slightly bluer, darker, and appreciably stronger than CP 800.
- CP 939: Graphic Red M - Similar to CP 940, but slightly cleaner and stronger. Special for moisture set inks.
- CP 668: Graphic Red M - Considerably darker masstone, higher bronze, and 20 to 25% greater strength than CP 233. Undertone and tint shades similar. Strongest pigment of this class. Slight oil bleed.

BARIUM LITHOL REDS - RESINATED TYPE - STANDARD SHADE

- CP 901: Britone Red M - Lightest standard of this class. Very easy grinding. Used extensively for news inks.
- CP 602: Britone Red M - Darkest and yellowest of this type. Considerably darker masstone, yellower undertone and tint, and slightly weaker than CP 974.
- CP 802: Britone Red M RG - Slightly darker and yellower than CP 901. Better flow and same grind as CP 901.
- CP 974: Britone Red M - 10% stronger and considerably darker and yellower than CP 901. Slightly harder than CP 901 or CP 802.

BARIUM LITHOL REDS - RESINATED TYPE - YELLOW SHADE

- CP 832: Britone Red M RG - Lighter and cleaner than CP 805. Better grinding, and inks have considerably more flow than CP 805.
- CP 813: Britone Red M RG - Slightly cleaner than CP 805. Somewhat harder grinding than CP 805.
- CP 805: Britone Red M RG - Standard yellow shade type. Slightly darker masstone than CP 832. Excellent grinding and flow qualities.

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PRINTING INK INDUSTRY - COLORS - REDS AND MAROONS

CALCIUM LITHOL REDS - REGULAR TYPE

- CP 234: Graphic Red R - Normal Calcium Graphic Red. Good strength.
- CP 822: Graphic Red R RG - Slightly darker and brighter than CP 234. Cleaner undertone, tint, and print shade. Approximately 10 to 12% stronger. Easier grinding, and produces free flowing ink.
- CP 837: Graphic Red R RG - Moderately darker and slightly bluer, gives moderately higher finish, and is about 15% stronger than CP 822. Is as easy grinding as CP 822 and at equal strength gives inks having the same good body and flow.
- CP 564: Graphic Red R - Slightly lighter and brighter masstone, cleaner undertone, and less bronze than CP 234. 5 to 8% stronger than CP 234.
- CP 355: Graphic Red R - Appreciably darker, slightly yellower. 5 to 7% stronger than CP 234.
- CP 614: Graphic Red R - Slightly darker, slightly yellower undertone, more bronze, and 15% stronger than CP 234.

CALCIUM LITHOL REDS - RESINATED TYPE

- CP 318: Britone Red R - Slightly deeper and redder masstone, cleaner undertone and tint, better strength, and less bronze than CP 234.
- CP 808: Britone Red R RG - Considerably darker masstone, more bronze, and slightly stronger than CP 318.
- CP 565: Britone Red R - Slightly darker and brighter masstone, slightly yellower and brighter print shade than CP 808, and trifle stronger. Slightly better permanence.
- CP 979: Britone Red R - Similar to CP 565. Recommended for moisture set inks.
- CP 833: Britone Red R RG - Similar to CP 808. Recommended for moisture set inks.

2. BRITONE MAROONS (LITHOL MAROONS):

Spec. Properties: Properties of the Britone Maroons are similar to those of the Calcium Lithol Reds.

- CP 377: Britone Maroon - Typical Lithol Maroon. Fairly deep masstone, blue undertone and tint.
- CP 820: Britone Maroon RG - Considerably darker and brighter masstone, slightly yellower undertone, more bronze, and approximately 25% stronger than CP 377. Improved grind and flow.

PRINTING INK INDUSTRY - COLORS - REDS AND MAROONS

CP 834: Britone Maroon MC - Similar to CP 820. Special for moisture set inks.

CP 838: Britone Maroon RG - Masstone and tint shade same as CP 820, but 15% stronger. Inks made from CP 838 have the same texture after grinding as those made from CP 820, but the CP 838 inks pass through the mill faster than the CP 820 inks. Recommended as stable in moisture setting inks. To be preferred to CP 834.

3. LAKE RED C:

Lake Red C is made by coupling 2-chlor 5-amino toluene 4-sulfonic acid with beta naphthol and forming various metal salts. Lake Red C Y is the sodium salt. Lake Red C R is the barium salt.

The sodium salt (sometimes known as "Bronze Orange") is a bright orange shade having a very clean yellowish undertone. It has a very high bronze print shade. The barium salt is a bright yellow shade. It has a brighter and yellower masstone and undertone than Graphic Red M. It is more transparent than Graphic Red M.

Lake Red C has fair resistance to light in full shade, poor in tint. Resistance to acid and alkali is good for the barium salt type and fair for the sodium salt type. The barium salt type does not bleed in water whereas the sodium salt type does.

Lake Red C is an excellent color for printing inks, possessing excellent working properties, brilliance, and transparency. Resistance to fountain solution is good and therefore Lake Red C is widely used in offset printing. Stability in heat set and moisture set inks is satisfactory. These pigments do not have enough covering power for use in aniline inks.

LAKE RED C Y (SODIUM TYPE)

CP 470: Lake Red C Y - An excellent standard of the sodium type. Light masstone, yellow undertone.

LAKE RED C R (BARIUM TYPE - REGULAR)

CP 281: Lake Red C R - Popular medium shade. Bright, transparent masstone. Clean undertone. Good strength.

CP 803: Lake Red C R - Slightly darker masstone, slightly yellower undertone and tint. Same strength as CP 281. Improved working properties and flow characteristics, and improved resistance to fountain solution over CP 281.

CP 836: Lake Red C R - Similar to CP 803 but 10% stronger.

LAKE RED C R (BARIUM TYPE - RESINATED)

CP 328: Lake Red C R - Considerably darker, brighter masstone, much yellower undertone and tint. Less bronze in print shade than CP 281. Very transparent. Good strength.

CP 989: Lake Red C R - Similar to CP 328 but 8% stronger.

PRINTING INK INDUSTRY - COLORS - REDS AND MAROONS

4. RUBANOX REDS (LITHOL RUBINES):

Spec. Properties: Rubanox Reds are valuable pigments for printing inks because they possess good light fastness and their brilliant blue shades of red and high tinting strength are highly desirable. They also give inks having fairly good working properties which lithograph well. Their good resistance to bleeding is also important. They have good stability in heat set and moisture set inks, and good resistance to fountain solution.

Principal Standards

- CP 543: Rubanox Red - Non-resinated type. Medium red Rubanox. Considerably lighter masstone and appreciably bluer undertone, appreciably more bronzy print tone, 10% stronger than CP 368. More opaque than other Rubanox Reds, and better for aniline inks for that reason.
- CP 368: Rubanox Red - Resinated type. Deep brilliant masstone. Clean blue undertone in tint and print shade. Good strength.
- CP 1019: Rubanox Red - Resinated type. Similar in shade to CP 368, but about 15% stronger.

Special Standards

- CP 762: Rubanox Red - Resinated type. Slightly lighter and about 8% stronger than CP 368.
- CP 776: Rubanox Red - Resinated type. Between CP 762 and CP 368 in depth of masstone. Slightly cleaner undertone and tint. 12% stronger than CP 368.
- CP 448: Rubanox Red Lake - Non-resinated type. 60% pigment on mixed base. Considerably lighter masstone, bluer undertone, more bronzy than CP 543.

*WLN
12-*

*20% Co 500
14% alum. hydrate*

5. SOLFAST REDS:

Spec. Properties: Solfast Reds are considered poor for fountain solution resistance, with the exception of CP 663. They have good stability in moisture set and heat set inks, but are too transparent for aniline inks.

LIGHT SHADE - YELLOW UNDERTONE

- CP 663: Solfast Red - Corresponds to "Watchung" Red. Outstanding in resistance to bleeding. Best resistance to grease and bacon fat. Widely used for printing bacon wrappers, etc. Has good stability in fountain solution and Laketime.
- CP 967: Solfast Red - Considerably darker in masstone and same shade in tint as CP 663. Same strength as CP 663. Less bronze in print shade than CP 663. Better resistance to bleeding than all other Solfast Reds except CP 663.

DARK SHADE - BLUE UNDERTONE

- CP 787: Solfast Red - Slightly lighter masstone than CP 780. Trifle yellower undertone and tint and 4% weaker than CP 780.
- CP 831: Solfast Red R G - Trifle bluer than CP 787. Trifle weaker than CP 787 in zinc oxide tints, but same strength in aluminum hydrate tints. Inks are considerably easier grinding, have better flow, lighter body, and better stability than inks made from CP 787.

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PRINTING INK INDUSTRY - COLORS - REDS AND MAROONS

CP 780: Solfast Red - Shade characteristics similar to Rubanox Reds. Darker masstone and bluer undertone than CP 776. Darker and slightly stronger than CP 787.

CP 1028: Solfast Red - Similar to CP 780. About 15% stronger and improved light fastness over CP 780.

6. PIGMENT RUBINES:

Spec. Properties: Pigment Rubines are stable in heat set inks. They have good resistance to fountain solution. They are particularly suitable for lithographing on tin. They are not satisfactory for moisture set inks.

CP 1030: Pigment Rubine Y - Light, yellow shade. This new standard has good flow and light body.

CP 1031: Pigment Rubine B - Medium shade. Has good flow and light body.

7. PARA REDS:

Spec. Properties: Para Reds are not widely used in printing inks, since their print tones are dull compared to those obtained with Graphic Reds. They are satisfactory, however, for most types of inks and are used where their characteristic shades are suitable.

10355: Para Red Light - Considerably lighter in shade and stronger than 10333.

10333: Para Red Light - Standard light Para Red.

10802: Para Red Light - Dark masstone, very yellow and strong in tint. Special for gravure brown inks.

10295: Para Red Dark - Slightly lighter and considerably stronger than 10109. Much harder grinding.

10109: Para Red Dark - Dark masstone, bluest undertone of the dark Paras. Low tinting strength. Maximum opacity. Very easy grinding.

10384: Para Red Dark - Resinated type. Darker and stronger, and better finish than 10109.

8. TOLUIDINE REDS:

Spec. Properties: Toluidine Reds are resistant to fountain solution and are stable in moisture set, heat set, and aniline inks.

Principal Standards

10450: Toluidine Red Light - Slightly lighter, considerably cleaner, and considerably stronger than 10189.

Special Standards

10298: Toluidine Red Extra Light - Lightest masstone and yellowest tint. Not as clean as 10450.

PRINTING INK INDUSTRY - COLORS - REDS AND MAROONS

- | | |
|--|---|
| 10189: Toluidine Red Light - Standard Toluidine Red shade. Bright masstone with blue tint. | 10385: Toluidine Red Light - Similar in shade to 10189 but considerably stronger. Not as bright as 10450. |
| 10801: Toluidine Red Light - Resinated type. Better finish than 10189. Shade trifle lighter and not as clean as 10189. Rapid grinding. | D-2904: Toluidine Red Medium - Slightly deeper than 10189 and considerably lighter than 10395. Match for Imperial's A-2990. |
| 10395: Toluidine Red Dark - Regular dark Toluidine Red standard. | D-2914: Toluidine Red Extra Dark - Slightly deeper than 10395. Match for Maritan Red RT-505-D, (Du Pont). |

9. PERMANSA REDS (FIRE RED):

Spec. Properties: Permansa Red is resistant to fountain solution and stable in heat set, moisture set, and aniline inks.

- 10363: Permansa Red - Regular standard for printing inks.
- 10800: Permansa Red - Resinated type. Slightly deeper and stronger with yellower tint than 10363. Better finish. Rapid grinding.

10. SOLFAST RHODAMINE REDS:

Spec. Properties: These pigments have fair resistance to fountain solution, and are stable in heat set, moisture set, and aniline inks.

- 10371: Solfast Rhodamine Y - Typical rose shade Rhodamine Red. Good permanence.
- D-2717: Solfast Rhodamine Y - Slightly stronger, slightly poorer permanence than 10371.
- 10373: Solfast Rhodamine B - Bluer shade than 10371. Same general properties except permanence of tints not quite as good.

11. SCARLET LAKE:

Not used in printing inks.

12. SOLFAST SCARLET, SOLFAST REDS (ARYLIDE REDS OR SOAP-FAST REDS):

Spec. Properties: Of the arylide reds, the only ones used in printing inks are those with exceptional resistance to alkali. They are widely used for printing soap wrappers, and are commonly referred to in the trade as "Soap-Fast Reds". They have excellent resistance to fountain solution and are stable in moisture set, heat set, and aniline inks. All are recommended for grease-proof inks.

- D-2799: Solfast Scarlet Light - Slightly lighter than 10397. Somewhat darker than Permansa Red 10363. Excellent resistance to light in full shades and tints. This standard is an improvement over 10397, which should not be recommended for soap-fast inks.

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PRINTING INK INDUSTRY - COLORS - REDS AND MAROONS

10398: Solfast Red Medium - Stronger and deeper than D-2799, and has a slightly bluer tint. Excellent resistance to light in full shades, fair in tints.

10399: Solfast Red Deep - Considerably deeper and bluer than 10398. Approximate shade in print tone of Rubanox Reds.

13. MAROON TONERS (LAKE BORDEAUX MAROONS):

Spec. Properties: The manganese Maroon Toners have good resistance to fountain solution and are stable in moisture set and heat set inks. Unlike Lithol Maroons, these pigments have good or excellent light resistance and can be used for outside exposure.

CALCIUM TYPE

CP 1034: Maroon Toner - Dark Maroon type. Brighter and yellower than CP 779. Recommended for enamels and lacquers. Light stability not quite as good as CP 779.

MANGANESE TYPE

CP 429: Maroon Toner - Light maroon type. A reduced pigment on barytes. Recommended for its soft grinding.

CP 1032: Maroon Toner - Light maroon type. 50% stronger than CP 429. Otherwise similar to CP 429. Soft grinding.

CP 779: Maroon Toner - Dark maroon type. Darker and brighter than CP 429. Good hiding power. Hard grinding.

CP 1033: Maroon Toner - Dark Maroon type. Considerably darker and brighter than CP 779. Hard grinding.

14. ALIZARINE LAKES:

15. BORDEAUX LAKES:

These pigments are not generally used in printing inks.

PRINTING INK INDUSTRY - COLORS

GREENS

1. CHROME GREENS:

Chrome Greens are not widely used in the printing ink industry, since customers prefer to buy Chrome Yellows and Iron Blues and mix them themselves. The standards listed in the paint industry section and other special standards are available for those customers who are interested.

2. SOLFAST GREENS (PHTHALOCYANINE GREENS):

Spec. Properties: Solfast Greens have excellent resistance to fountain solution, and are stable in moisture set, heat set, and aniline inks.

CP 771: Solfast Green - Standard Phthalocyanine Green pigment.

CP 983: Solfast Green - Masstone slightly darker than CP 771. Same strength.

Solfast Greens are also available in the dispersed form for the convenience of customers. In this form they have the advantages of dispersed colors in that they give an increase in strength over dry ground pigments, and they are much easier handling.

CP 772: Solfast Green Dispersed in Litho Varnish - CP 771 type. 35% pigment, 65% No. 3 Regular Litho Varnish.

CP 956: Solfast Green Dispersed in Litho Varnish - CP 771 type. 28% pigment, 28% No. 3 Regular Litho Varnish, 44% Non-Break Linseed Oil.

CP 995: Solfast Green Dispersed in Heat-Set Varnish - CP 771 type. 30% pigment, 70% vehicle.

3. SHAMROCK GREENS:

Not widely used in printing inks.

4. PERMANSA GREENS (PIGMENT GREEN B):

Spec. Properties: The Permansa Greens have excellent resistance to fountain solution and are stable in moisture set, heat set, and aniline inks.

CP 594: Permansa Green - Standard olive shade.

CP 986: Permansa Green - Standard yellow shade. Properties similar to CP 594.

5. SOLFAST GREENS (PHOSPHO TUNGSTIC GREENS):

Spec. Properties: These pigments are resistant to fountain solution and are stable in heat set, moisture set, and aniline inks.

11174: Solfast Brilliant Green - Extremely bright yellow green shade.

11182: Solfast Marine Green - Considerably deeper and bluer than 11174.

6. SERENE GREENS:

Not used in printing inks.

PRINTING INK INDUSTRY - COLORS

BLUES AND VIOLETS

1. SOLFAST SKY BLUES (PHTHALOCYANINE BLUES):

Spec. Properties: Solfast Blues are outstanding for all types of printing inks because of their permanence and resistance to bleed. They are excellent in fountain solution and stable in heat set, moisture set, and aniline inks.

CP 1037: Solfast Sky Blue - Standard shade Phthalocyanine Blue. Very brilliant. Replaces CPX 483 and CP 559.

CP 961: Solfast Sky Blue - Considerably redder than CP 1037. Same strength. Our own manufacture.

CP 988: Solfast Sky Blue - Red shade. Resinated type of CP 961. Weaker, cleaner, and less bronze than CP 961. Better grinding than CP 961 or CP 1037.

Solfast Sky Blue is also available in dispersed form for the convenience of the customer. In this form it has all the advantages of dispersed colors, that is about 10 to 15% increased strength over the dry ground pigments and easier handling in the factory.

CP 660: Solfast Sky Blue Dispersed in Litho Varnish - CP ^{55P}~~559~~ type pigment. 33% pigment, 67% No. 3 Regular Litho Varnish.

CP 766: Solfast Sky Blue Dispersed in Litho Varnish - CP 961 type. 20% pigment, 38% No. 3 Regular Litho Varnish, 42% Non-Break Linseed Oil.

CP 969: Solfast Sky Blue Dispersed in Litho Varnish - CP 961 type. 33% pigment, 67% No. 3 Regular Litho Varnish.

CP 996: Solfast Sky Blue Dispersed in Litho Varnish - Green shade Phthalocyanine Blue. 33% pigment, 67% No. 3 Regular Litho Varnish.

CP 999: Solfast Sky Blue GG Dispersed in Litho Varnish - Extra Green shade. 36% pigment, 64% No. 3 Regular Litho Varnish.

CP 795: Solfast Sky Blue Dispersed in Maleic Alkyd Varnish XL 39 - CP ^{55P}~~559~~ type. 26% pigment, 74% varnish.

CP 1026: Solfast Sky Blue Dispersed in Phthalic Alkyd Varnish - CP 1037 type. 26% pigment, 74% varnish.

CP 993: Solfast Sky Blue Dispersed in Heat Set Varnish - CP 961 type. 30% pigment, 70% vehicle.

2. IRON BLUES:

Spec. Properties: Iron Blues are resistant to fountain solution and stable in moisture set and heat set inks.

11086: CP Milori Blue - Most popular Milori Blue standard. Clean, green masstone and tint. Suitable for use with yellows to make greens.

PRINTING INK INDUSTRY - COLORS - BLUES AND VIOLETS

- 11840: CP Milori Blue - Low oil absorption type, redder masstone, and less tinting strength than 11086. Suitable for making greens.
- D-2817: CP Milori Blue - Similar to 11086, but especially recommended for aniline inks.
- 11148: CP Potash Blue - True Potash Blue. Redder masstone and slightly weaker than 11840.
- 11023: CP Chinese Blue - Regular Chinese Blue. Jet in masstone, with greenish tint.
- D-2875: CP Chinese Blue - Improved Chinese Blue. Cleaner and stronger tint than 11023. Less reactivity with synthetic vehicles and slightly better grinding than 11023.
- 11096: CP Prussian Blue - Jet masstone, tint much redder than Chinese Blue type.

3. ALKALI BLUES:

Alkali Blues are widely used in all types of printing inks because of their good working properties and excellent strength (about 50% stronger than Phthalocyanine Blues).

As noted in the section on the paint industry, Alkali Blues are available in dry form and dispersed in Litho Varnish, Phthalic Alkyd Varnish, Maleic Alkyd Varnish, Moisture Set Varnish, Heat Set Varnish, and Mineral Oil. The uses and advantages of each are listed below:

Dry Form: Used in aniline inks, rotogravure inks, and cases where there are special vehicle requirements.

Dispersed in Litho Varnish: Widely used for toning black inks. Very good for half-tone printing. Because of high tinting strength, only a small amount of color need be used and therefore the pigment does not obscure the screen in half-tone printing. Excellent resistance to fountain solution.

Dispersed in Alkyd Varnishes: Both types, phthalic and maleic alkyd dispersions, give harder films and dry faster than litho varnish. Phthalic alkyd in particular gives a hard scuff-resistant film suitable for tin printing.

Dispersed in Heat-Set Varnish: Especially developed for heat-set printing processes. Boiling point of solvent, 375° to 425°F. To our knowledge, no competitive materials are available.

Dispersed in Mineral Oil: Developed for use in comic inks and wherever light bodied inks are required. Excellent strength and light body.

The dispersed Alkali Blue Inks have the same general advantages of dispersed pigments. They have a 10 to 15% advantage in strength over the dry ground colors, and they are much cleaner to handle in the dispersed form. The standards listed below do not skin in the package but dry readily to a hard finish:

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PRINTING INK INDUSTRY - COLORS - BLUES AND VIOLETS

ALKALI BLUE SHADE	DRY PIGMENT NO.	NUMBER WHEN USED IN VARIOUS VARNISHES					
		LITHO VARNISH	PHTHALIC ALKYL VARNISH CV 5010	MALEIC ALKYL VARNISH XIV 38*	MOISTURE SET VARNISH V 17074	HEAT SET ** VARNISH	MINERAL OIL
EXTRA GREEN	-	CP 439	-	-	-	-	-
GREEN	CP 258	CP 311	CP 1024	CP 749	CP 1035	CP 1022	CP 984
GREEN	CP 258	CP 414	-	-	-	-	-
GREEN	CP 258	CP 736	-	-	-	-	-
MEDIUM	-	CP 775	-	-	-	-	-
RED	CP 812	CP 402	CP 1023	CP 746	CP 943	CP 1018	CP 966
RED	CP 812	CP 675	-	-	-	-	-
RED	CP 812	CP 950	-	-	-	-	-
RED	CP 812	CP 316	-	-	-	-	-
RED	CP 812	CP 332	-	-	-	-	-
EXTRA RED	-	CP 279	-	-	-	-	-

REINSATED LAKES:

RED CP 970 50% Resinated Lake
RED CPX 486 50% Resinated Lake

- * Especially designed for printing inks.
- ** Boiling range 375° to 425°F.

Note: See the current list of Dispersed Color Standards for exact composition of each of above inks.

Water Pulps of Alkali Blue are available. They are used mostly for flushing into printing ink vehicles and other special purposes.

CP 792: Alkali Blue R - Water pulp of red shade.

CP 793: Alkali Blue G - Water pulp of green shade.

4. SOLFAST VICTORIA BLUES:

Solfast Victoria Blues are made by precipitation of the basic dyestuff with mixed phosphotungstic and phosphomolybdic acid. They have excellent strength and are clean and very brilliant in tints. Because of their excellent paraffin resistance, they are widely used for printing of bread wrappers where their brilliant shade is very desirable.

CP 476: Solfast Victoria Blue - Dry form. Standard Victoria Blue shade.

CP 472: Solfast Victoria Blue Dispersed in Litho Varnish - 52% pigment 48% No. 2 Regular Litho Varnish.

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PRINTING INK INDUSTRY - COLORS - BLUES AND VIOLETS

CP 189: Solfast Victoria Blue Dispersed in Litho Varnish - 20% Solfast Victoria Blue, 20% Alkali blue G shade, 45% No. 0 Regular Litho Varnish, 15% Non-Break Linseed Oil.

CP 991: Solfast Victoria Blue Dispersed in Heat-Set Varnish - 35% pigment, 65% vehicle.

CP 1036: Solfast Victoria blue Dispersed in Phthalic Alkyd CV 5010 Varnish - 52% pigment, 48% vehicle.

The following water pulp is also available: CP 687.

5. METHYL VIOLETS:

These pigments are produced by the precipitation of the basic dyestuff with phosphotungstic acid or phosphomolybdic acid. There are two types available: Solfast Methyl Violet and Royal Purple.

Solfast Methyl Violet has excellent strength, good permanence in full shade and tints, and produces very clean tints. It has good working properties in general. It does not bleed in oil, water, or paraffin, but has a slight bleed in lacquer solvents. It has excellent resistance to fountain solution and is used in all types of printing inks.

Royal Purple has excellent strength, but is slightly inferior to Solfast Methyl Violet in cleanliness of tints, and it darkens more readily on exposure to sunlight. It is a good utility color at a low cost. It is used in all types of printing inks.

CP 490: Solfast Methyl Violet - Dry form. Excellent strength. Good permanence.

CP 482: Solfast Methyl Violet Dispersed in Litho Varnish - 44% pigment, 56% No. 2 Regular Litho Varnish.

CP 619: Royal Purple - Dry form. Excellent strength. Fair permanence.

CP 613: Royal Purple Dispersed in Litho Varnish. 39% pigment, 40% No. 0 Regular Litho Varnish, 10% No. 2 Regular Litho Varnish, 11% Blanc Fixe.

CP 748: Royal Purple Dispersed in Maleic Alkyd Varnish, XLV 38 - 39% pigment, 53% varnish, 8% Blanc Fixe.

CP 1025: Royal Purple Dispersed in Phthalic Alkyd Varnish CV 5010 - ^{35%}~~32%~~ pigment, 61% varnish.

The following water pulps are also available:

CPX 467: Solfast Methyl Violet

CPX 410: Royal Purple

II. PRODUCTS FOR THE PRINTING INK INDUSTRY

B. FLUSHED COLORS

See the section on Products for the Paint Industry, Flushed Colors, for a discussion of the advantages of Flushed Colors over dry ground colors.

The types of Flushed Colors available for the printing ink industry are as follows:

1. Colors Flushed in Litho Varnish.
2. Colors Flushed in Mineral Oil or combinations of Litho Varnish and Mineral Oil. These are designed especially for Comic Inks.

II. PRODUCTS FOR THE PRINTING INK INDUSTRY

C. WHITE PIGMENTS

LITHOPONE:

Lithopone is used in white and colored inks because of its fineness, soft texture, good color, and hiding power.

The following grades are recommended in order of preference: Permolith W-320 (high consistency), Permolith 40M (medium consistency, high gloss), Permolith 20L (low consistency).

II. PRODUCTS FOR THE PRINTING INK INDUSTRY

D. VARNISHES AND RESINS

1. LITHO VARNISHES:

The term Litho Varnishes covers the vehicles used in the manufacture of printing inks, most of which are straight heat bodied oils. For years linseed oils in a range of closely controlled viscosities have been used in the largest volume. Also used, to a greater extent in recent years, are long oil length alkyds or interester vehicles.

The Litho Varnishes are the carrier portion of the inks into which the printing ink colors are dispersed. They also represent the binder for holding the color to the paper.

The following are available:

Linseed Litho Varnishes: Regular and pale (transparent) types. Viscosities ranging from 00000 to 10.

Dehydrol Litho Varnishes: Litho Varnishes based on Dehydrol. Viscosities: 0, 2, 5.

Alkyd Litho Varnishes: Used for metal-decorating inks and where added hardness is needed. All are made from linseed oil.

ALKYD LITHO VARNISHES

DIAL	N.V.M. %	LITHO VISCOSITY	VISCOSITY	COLOR	ACID VALUE (SOLIDS)	OILS %	P.A. %	LBS. PER GAL.	TYPE
XLV 70	100	0	W-X	10-13	6-8	80	0	8.19	Maleic
XIV 38	100	1	Z-Z ₁	10-13	8-10	78	0	8.25	Maleic
XLV 59	100	3	Z ₄ -Z ₅	10-13	8-10	77	0	8.26	Maleic
XLV 72	100	5	Z ₅ -Z ₆	10-13	10-12	77	0	8.33	Maleic
XLV 89	100	7-8	11.5-14	10-13	11-13	64	27	8.87	Phthalic
XLV 100	100	1-3	Y-Z	5-7	5-7	72	20	8.56	Phthalic
XLV 118	100	0	W-X	9-11	5-7	73	20	8.56	Phthalic

2. MOISTURE SET RESIN SOLUTIONS:

These resin solutions are usually high melting point maleic or fumaric resins (seldom esterified) dissolved in ethylene glycol. They are designed especially for moisture set inks. The color is dispersed in the resin solution and is applied to the paper by one of several printing methods. The resins by nature have a limited and definite affinity for moisture; so that when the paper is passed through a high humidity atmosphere, the resins precipitate or separate from the glycol solvent, which penetrates into the paper. The resin is left as a hard, glossy binder for the color. Thus a relatively cheap, convenient method is provided for getting a very fast drying, hard, and glossy print.

PRODUCTS FOR THE PRINTING INK INDUSTRY - VARNISHES AND RESINS

The following Dymal Solutions are available:

MOISTURE SET INK VEHICLES

	<u>% N.V.M.</u>	<u>BODY</u>	<u>COLOR</u>	<u>ACID VALUE</u>	<u>LBS./GAL.</u>
XLV 6	50	Z3-Z5	9-11	140	9.60
XLV 74	50	Z1-Z2	9-11	140	9.68
XLV 112	40	Q-S	9-11	140	9.52
XLV 136	60	10'-14'	9-11	140	9.88
XLV 255	50	Z1-Z2	9-11	140	9.55
XLV 474	50	Z2-Z3	Black	0	9.38

3. SYNTHETIC HARD RESINS:

There are several types of resins besides those used for the paint trade that are also used in the printing ink industry. One of the most interesting is the maleic (or fumaric) type used in heat set inks. Many other types are also used for special types of heat set and quick drying inks and other more specialized purposes.

The following are available (see also the section on Paint Products):

HARD RESINS FOR PRINTING INKS

		<u>BAR. M.P.</u> <u>°F.</u>	<u>ACID</u> <u>VALUE</u>	<u>TYPE</u>
Dymal	XRP 79	275-315	100-115	Maleic
"	XRP 149	275-300	365	"
"	XRP 218	315-322	-	"

4. LABEL VARNISHES

These varnishes are usually made by cutting resins into a solvent with little or no plasticizers. They are applied to labels to provide a glossy, slick, protective coating. For years the most popular type of label varnish has been made by dissolving manila gum in alcohol. Other resins have been used with great success however.

These varnishes are applied by roller coating and are flash dried in 10 to 30 seconds at 200 to 250°F. Gloss, scuff-proofness, and freedom from sticking on stacking are the most important features to be incorporated into label varnishes.

The following are available.

PRODUCTS FOR THE PRINTING INK INDUSTRY - VARNISHES AND RESINS

LABEL VARNISHES

	<u>N. V. M.</u>	<u>BODY</u>	<u>COLOR</u>	<u>SOLVENT</u>	<u>TYPE</u>
XLB 9	50	G-H	10	Ethyl Alc. - Isopropyl	Rosin-Zein
XLB 83	50	C	11	Ethyl Alcohol	Rosin-Zein
XLB 500	50	G-H	13-Max.	Ethyl Alcohol	Rosin-Zein
XLB N2	48	B	10 Max.	Ethyl Alcohol	Rosin-Zein
XLB N9	44	F-H	10-12	Ethyl Alcohol	Rosin-Zein
XLB 509	45-50	E-G	8-10	Ethyl Alcohol	Manila*
XLB N5	48	F-H	11-Max.	Ethyl Alcohol	Manila
XLB C2	50	N	12 Max.	Alcohol	Manila
XLB C3	50	G-I	9-11	Alcohol	Manila
XLB C5	50	U-X	7-10	Isopropyl Alcohol	Manila
XLB 85	50	F-H	7-10	Ethyl Alcohol	Manila
XLB 511	50	G-I	10 Max.	Alcohol-Naphtha	Rosin-Manila
XLB 99	65	E-G	9-11	Naphtha	Rosin-Wax
XLB N4	60	A ₁	10-11	Naphtha	Rosin-Wax

* Especially chafe resistant.

III. PRODUCTS FOR THE CHEMICAL AND DYE INDUSTRY

A. CHEMICALS AND INTERMEDIATES

1. ACETIC ACID: Used as a general chemical raw material in making a wide variety of chemicals. It is available in the following strengths: 28%, 56%, 70%, 80%, 84% and Glacial.
2. ARSENIC ACID: Used as a raw material in the manufacture of arsenates for general chemical purposes. Also used as a raw material in the manufacture of weed killers for crab grass.
3. BETA NAPHTHALENE SULFONIC ACID, SODIUM SALT, CPX 137: Chiefly used as a raw material in the production of wetting agents of the sodium alkylaryl sulfonate type.
4. BETA NAPHTHOL: Technical Grades, CP ³⁷ 837 and CP 265. Resublimed Grade, CP 224 - Used as a raw material in the producing of miscellaneous chemicals, including anti-oxidants and accelerators for rubber. Also sold to packing houses where it is used as a preservative in glues.
5. BETA OXY NAPHTHOIC ACID, CP 557: Used as a raw material in the manufacture of anilides which are then sold to the pigment color manufacturers for use as intermediates.
6. LITHARGE: No. 12500 Litharge. Used in the manufacture of lead driers and miscellaneous lead chemicals.
7. MONO SULFONIC ACID, CP 41: This is processed further and sold to the pigment and color industry for use as an intermediate in the manufacture of colors.
8. PARA CRESOL, 98%, CP 945: Use as a raw material in the manufacture of disinfectants, plastics, dyestuffs, synthetic flavors, and ore flotation compounds.
9. PARANITRANILINE, CP 30: Use as a raw material in the manufacture of Para Phenylene Diamine.
10. PARA PHENYLENE DIAMINE: Technical Grades; CP 120 Lump, CP 192 Powder - Used in the manufacture of anti-oxidants and accelerators for rubber. Also used for dyeing furs, in which case it is sold to chemical manufacturers who blend it with other products.
11. TOBIAS ACID, CP 783: Further processed to produce "J Acid" which is used in the manufacture of color pigments.
12. 2,4 DICHLOR PHENOXY ACETIC ACID: Used in the manufacture of weed killers.
13. 2,4 DICHLOR PHENOXY ACETIC ACID, BUTYL ESTER: Used in the manufacture of weed killers.
14. ZINC SULFATE: Used as a source of zinc in the manufacture of insecticides and miscellaneous zinc chemicals. See section on Products for the Textile Industry for grades available.

IV. PRODUCTS FOR THE TEXTILE INDUSTRY

A. CHEMICALS AND INTERMEDIATES

1. BETA NAPHTHOL: Technical Grade, CP 337 and CP 265. Resublimed Grade, CP 224 - Used as a "developer." In that use the color is produced directly on the cloth by the coupling of the diazo intermediate and Beta Naphthol.
2. META NITRO PARA TOLUIDINE, CP 42: Also known as Fast Red G Base. For production of colors directly on the cloth by diazotizing and coupling "in situ."
3. ZINC SULFATE: Zinc sulfate is used in the rayon industry for weighting of the rayon fabric and as a hardening agent.

The following is the analysis of the various grades available:

	25.5% 5 Mole	36% 1 Mole Regular	36% 1 Mole Special
Formula	Zn SO ₄ . 5H ₂ O	Zn SO ₄ . H ₂ O	Zn SO ₄ . H ₂ O
Zinc Content	25.5 - 26%	36. - 36.6%	36. - 36.6%
SO ₃ "	31.9%	45.5%	45.5%

The following gives the chemical and physical properties of the various grades:

	25.5% 5 Mole	36% 1 Mole Regular	36% 1 Mole Special
pH	6.1	6.1	6.1
Bulking Value (#/cu.ft.)	87.	92.	67.
Solubility Rate*	Over 2 min.	Over 2 min.	20 seconds
Solubility in Dilute Sulfuric residue	Small	Small residue	Completely clear

The 5 Mole salt may present a problem from caking on long storage but should go into solution easier than the 1 Mole Regular salt. The 1 Mole Special is finer, goes into solution faster than the 1 Mole Regular, and is free of insoluble matter.

* 20 gms. in 100 ml. water at 25-30°C.

IV. PRODUCTS FOR THE TEXTILE INDUSTRY

B. SHERDYE

Under the name of "Sherdye" is marketed a complete line of pigmented water-in-oil emulsions which have many advantages for printing a wide variety of fabrics. They are employed extensively by textile manufacturers throughout the country.

Among the advantages of Sherdye products over conventional methods of coloring textiles are the sharpness of mark, fidelity of reproduction of engravings, brilliancy of shade, excellent light fastness, and ease and economy of application. In general the pigments used in Sherdye must be much more permanent because textile products are almost always exposed to strong light.

Inquiries from customers regarding Sherdye should be referred to the New York Office.

V. PRODUCTS FOR PIGMENT AND COLOR MANUFACTURERS

Note: Paint manufacturers or printing ink companies may also be properly classed under this group if they also make their own colors.

A. COLOR PULPS

Color pigments are sold in water pulp form to pigment and color manufacturers who either dry them and sell them as is, or convert them to other shades, dry, and sell them. The following are available:

Graphic Reds: CP 96 (Y shade), CP 227 (M shade), CP 288 (R shade).

Lake Red C: CP 375 (sodium salt), CP 282 (barium salt)

Rubanox Red: CP 518

Permansa Green: CP 765 (CP 594 type).

B. WHITE PIGMENTS

1. LITHOPONE:

Lithopone is used occasionally in the production of lakes or reduced colors. See the section on Products for the Paint Industry for grades available.

2. BASIC CARBONATE WHITE LEAD:

White Lead was formerly used extensively with Litharge in production of Chrome Yellows. Litharge has now replaced White Lead almost exclusively.

C. VARNISHES AND RESINS

LITHO VARNISHES:

The litho varnishes used by the pigment and color manufacturers are very much the same as those used by the ink makers, which are listed in the section on printing inks. They are used for making color dispersions and prepared inks, either by flushing colors into the litho varnishes, or by dry grinding.

V. PRODUCTS FOR PIGMENTS AND COLOR MANUFACTURERS

D. CHEMICALS AND INTERMEDIATES

1. ACETIC ACID: Used as a general chemical raw material in making a wide variety of chemicals. It is available in the following strengths: 28%, 56%, 70%, 80%, 84%, and Glacial.
2. BETA NAPHTHOL: Technical Grade, CP 337 and CP 265. Resublimed Grade, CP 224 - Used as an intermediate in the manufacture of color pigments. For further information see the section on Color Pigments under the particular colors made from this chemical.
3. BETA OXY NAPHTHOIC ACID, CP 557: Used as an intermediate in the manufacture of color pigments. For specific information see the section on Color Pigments under the particular colors made from this chemical.
4. DICHLOR BENZIDINE SULFATE, CP 794: Used as an intermediate in the manufacture of Benzidine Yellows.
5. HEPTALDEHYDE: This is a by-product of Dehydrol and is obtained from the Linseed Oil Mill, Cleveland. It is used as an intermediate in the manufacture of perfumes.
6. LAKE RED C AMINE, CP 229: Used as an intermediate in the manufacture of Lake Red C.
7. LITHARGE: No. 12500 Litharge is made from selected pig lead with consideration given to the requirements for manufacturing lead chromate and lead molybdate colors. The physical properties of No. 12500 Litharge are as follows: PbO content, 99.5%. Apparent Density, 30 to 38 gms./cu. in. Specific Gravity, 9.53. Pounds per Solid Gal., 79.38. Bulking Value, 1.26 gal./100 lbs.
8. META NITRO PARA TOLUIDINE, CP 42: Used as an intermediate in the manufacture of Toluidine Reds, Toluidine Maroons, and Hansa Yellows.
9. MONO SULFONIC ACID, CP 41: Used as an intermediate in Dark Para Toners and in modifying Lithol Reds.
10. ORTHO CHLOR PARANITRANILINE, CP 270: Used as an intermediate in the manufacture of Fire Red (Permanse Red).
11. PARANITRANILINE, CP 30: Used as an intermediate in the manufacture of Para Reds.
12. PARA TOLUIDINE META SULFONIC ACID, CP 711: Used as an intermediate in the production of Lithol Rubine pigments.
13. TOBIAS ACID, CP 783: Used as an intermediate in the manufacture of Lithol Reds and Lithol Maroons.
14. ZINC SULFATE: Used as a source of zinc in the manufacture of Zinc Yellows. See the section on Products for the Textile Industry for the grades available.

VI. PRODUCTS FOR THE FLOOR COVERING INDUSTRY

A. COLOR PIGMENTS

A large number of the pigments manufactured by the CP and Dry Color Departments may be used in floor coverings. Some that are listed below are not used at present because each company has certain definite ideas about what type of pigments are to be preferred from a quality-standpoint and what types of pigments may be used in their particular process and equipment. Accordingly, the colors listed below should be used as a guide only.

1. YELLOWS AND ORANGES:

- Chrome Yellow, 12147
- Chrome Yellow, 12150
- Chrome Orange, 12311
- Chrome Orange, 12082
- Molybdate Orange, 12095
- Benzidine Yellow, D-2853
- Benzidine Yellow, D-2841
- Solfast Orange, D-2911 - Brighter shade than printing ink standard D-2878. Lower tinting strength.
- Solfast Orange, D-2878 - See information under printing inks.

2. REDS AND MAROONS

- Graphic Reds - Are used for cheaper grades of linoleum and print paint for enamelled rugs.
- Rubanox Red - All grades.
- Solfast Reds - All grades, CP 663 and CP 967 being especially desirable.
- Pigment Rubine - CP 1030 and CP 1031.
- Solfast Scarlet, D-2799 -
- Solfast Scarlet Lake Light, D-2912 - 25% Lake of Solfast Scarlet, D-2799, on whiting. Lighter in shade than 10397. Does not migrate. Produces truly soap and alkali resistant products. Can be used for alkali resistant floor coverings.
- Solfast Red Medium, 10398
- Solfast Red Lake Light, D-2920 - 25% Lake of 10398 on whiting. Properties similar to D-2912.
- Solfast Red Dark, 10399
- Solfast Red Lake Dark, D-2913 - 25% Lake of 10399 on whiting. Properties similar to those of D-2912.

The only red pigments recommended where alkali resistance is required are the Solfast Scarlets D-2799, D-2912 and the Solfast Reds 10398, D-2920, 10399, and D-2913.

3. GREENS:

- Chrome Greens - All standards for all uses.
- Solfast Green, CP 771
- Permansa Greens, CP 594 and CP 986
- Serene Greens, D-2832 and D-2833

4. BLUES AND VIOLETS

- Solfast Sky Blues - All grades are used but Solfast Sky Blue Lake, CP 1020 is especially recommended because of preference of the industry for reduced pigments.
- Iron Blues - 11086, 11840, 11148, D-2817 and D-2875.

VI. PRODUCTS FOR THE FLOOR COVERING INDUSTRY

B. WHITE PIGMENTS

LITHOPONE:

Lithopone is used in several types of floor coverings to aid processing as well as to contribute to the durability and decorative features of the products. Its high tinting strength is used to advantage in brightening asphalt tile and battle-ship and inlaid linoleum. Its well known advantages in protective coatings are utilized in print paints applied to floor coverings.

The following recommended grades are listed in order of preference: Permolith 20L (Low consistency), Permolith 40M (medium consistency), Permolith 60H (high consistency).

VII. PRODUCTS FOR THE RUBBER AND PLASTIC INDUSTRIES

A. COLOR PIGMENTS

I. RUBBER INDUSTRY:

A wide variety of colors are suitable for use in rubber. Practically every type produced has been sold to the rubber industry at one time or another. However, only the most suitable are listed below. These are the standards which should be recommended:

a. YELLOWS AND ORANGES

Chrome Yellow, 12310

Chrome Orange, 12311

Molybdate Orange, 12095

Permanganate Yellows are used to a limited extent. They should not be recommended because of serious migration through the rubber.

benzidine Yellow, 12191

benzidine Yellow, 12192

benzidine Yellow, D-2641

benzidine Orange, 12193

Solfast Orange, D-2378

Solfast Orange, D-2911

b. REDS AND MAROONS

Graphic Red Y, CP 1102 - Special standard for rubber. CP 272 type.

Graphic Red M, CP 1100 - Special standard for rubber. CP 233 type.

Graphic Red B, CP 1101 - Special standard for rubber. CP 231 type.

Graphic Red W Pulp, CP 1110 - Special standard for rubber. CP 499 type.

Graphic Red R, CP 1114 - Special standard for rubber. CP 822 type.

Britone Maroon, CP 1113 - Special standard for rubber. CP 620 type.

Lake Red C, CP 1103 - Special standard for rubber. CP 231 type.

Lake Red C, CP 1104 - Special standard for rubber. CP 339 type.

Lake Red C, CP 1105 - Special standard for rubber. CP 303 type.

Rubinox Red, CP 1111 - Special standard for rubber. CP 712 type.

Solfast Red, CP 1107 - Special standard for rubber. CP 663 type.

Solfast Red, CP 1109 - Special standard for rubber. CP 967 type.

Solfast Red, CP 1108 - Special standard for rubber. CP 797 type.

Solfast Scarlet, D-2799

Solfast Reds, 10398 and 10399

c. GREENS

Permanganate Green, CP 1106 - Special standard for rubber. CP 594 type.

Permanganate Green, CP 1112 - Special standard for rubber. CP 986 type.

Solfast Green, CP 771

Chrome Greens - All standards

Serene Greens, D-2832 and D-2833

d. BLUES AND VIOLETS

Solfast Blue, CP 1037 and CP 961

Victoria Blue, CP 425 - Special heat-resistant type Victoria Blue for rubber and plastics. Shade somewhat similar to CP 476.

PRODUCTS FOR THE RUBBER AND PLASTICS INDUSTRIES - COLOR PIGMENTS

Water pulps of the above colors may be recommended for use in rubber latex. The requirements are: Properties similar to those desired for use in dry rubber and water pulp which can be easily dispersed in the latex.

2. CELLULOSE ACETATE:

Benzidine Yellows and Oranges - all types
Solfast Oranges - D-2878 and D-2911

Rubinox Reds - CP 368, CP 543, CP 762
Solfast Reds - CP 663, CP 967, CP 780, CP 787
Solfast Rhodamines - 10371, 10373
Solfast Reds - 10398, 10399

Solfast Green - CP 771 and CP 983

Solfast Sky Blues - CP 961, CP 1020, CP 1037
Solfast Victoria blue - CP 476, CPX 425

3. POLYSTYRENE AND POLYETHYLENE:

benzidine Yellow - D-2840
Solfast Green - CP 771 and CP 983

Solfast Sky Blues - CP 961 and CP 1037

4. METHYL METHACRYLATE (PLEXIGLAS AND LUCITE):

Permanse Yellow G- 12101
Permanse Yellow 10G - 12105
benzidine Yellow - 12192, D-2840, D-2841

Solfast Green. CP 771

Solfast Sky Blues - CP 961, CP 1037

5. VINYL AND VINYL COPOLYMERS:

Benzidine Yellows - 12192, D-2853
Chrome Yellows and Oranges - For interior use. Darken on exterior exposure.
Molybdate Orange - For interior use. Darken on exterior exposure.
Solfast Oranges - D-2878 and D-2911

Solfast Scarlet - D-2799
Rubinox Toners - CP 368, CP 543, CP 762
Solfast Reds - CP 663, CP 967
Lake Red C - 7 shade
Solfast Reds - 10398, 10399

Solfast Green - CP 771
Chrome Greens - For interior use only. Darken on exterior exposure.

Solfast Sky Blues - CP 988, CP 1020, CP 1037, CP 961

VII. PRODUCTS FOR THE RUBBER AND PLASTICS INDUSTRIES

B. WHITE PIGMENTS

LITHOPONE:

Lithopone is used in the rubber industry primarily for the whitening effect and secondarily to aid the reinforcement of the rubber product. It also aids processing, especially extruding, calendering, and spreading. It is inert in its effect on cure.

The following recommended grades are listed in order of preference: Permolith 40N, Permolith 20L, Permolith 60H. *Perm 10*

C. MISCELLANEOUS CHEMICALS

1. BLOWING AGENT, CP 975:

Blowing Agent, CP 975, is used to blow or expand rubber to form "chemically blown sponge". It should not be confused with "foaming agents" which are used to produce latex foam sponge.

It is added directly to the rubber on the mill or in the internal mixer. It emits ammonia during the cure, thereby expanding the rubber and holding it in the expanded state until cured. It accelerates the cure slightly and adjustments in the use of accelerators should be made. It is very often used with cheaper blowing agents such as Sodium Bicarbonate.

Some of the advantages of Blowing Agent, CP 975, over conventional blowing agents are as follows:

- a. Absolutely no staining of any kind. This is a decided advantage over DuPont's Unicel.
- b. Finished products need not be put through a wringer as they must be when Sodium Bicarbonate is used.
- c. It lends itself to use with other blowing agents such as Sodium Bicarbonate for reduction in cost. Although more expensive than Sodium Bicarbonate, it is not as expensive as Unicel.
- d. Accelerates the cure slightly, thereby making possible reduction of the expensive accelerators in the rubber recipe.
- e. Products of decomposition are not water soluble as are the products of Sodium Bicarbonate which may be leached out of the finished sponge with water.

2. STABILIZERS AND PLASTICIZERS FOR VINYL RESINS:

A line of Stabilizers and Plasticizers for vinyl resins is under development, and samples of several different products should be available soon for distribution. Information on the uses will be furnished at that time.

3. LITHARGE AND RED LEAD:

Litharge and Red Lead were in common use 25 to 30 years ago as activators for accelerators and as vulcanizing agents. The development of organic accelerators has gradually displaced the use of these products in rubber. However, there are still a few companies who seem to prefer the inorganic materials. During the development of synthetic rubbers, there was an increased interest in Red Lead, particularly for GP-S, Neoprene, and GR-I synthetics. However, other materials seem to have displaced Red Lead in these cases also.

VIII. PRODUCTS FOR THE PHARMACEUTICAL INDUSTRY

A. CHEMICALS AND INTERMEDIATES

1. ACETANILIDE, CP 29: Acetanilide is used in making sulfa drugs, aspirin, and related drugs.
2. ACETIC ACID: Acetic Acid is used as a general chemical raw material in making various drugs. It is available in the following strengths: 28%, 56%, 70%, 80%, 94% and Glacial.
3. ARSENIC ACID: Arsenic Acid is used as a raw material in the manufacture of several arsenical drugs.
4. BETA NAPHTHOL: Resublimed, CP 224 - This is further purified for direct sale as a drug.
5. ZINC SULFATE: Used as a source of zinc.
6. *Crude heptadecylic acid, undecylamine and for athlete feed.*
as Zinc undecylate.

IX. PRODUCTS FOR THE WALLPAPER INDUSTRY

A. COLOR PIGMENTS

Listed below is a line of dry colors and water pulp colors which are especially made for the wallpaper industry. These products can be used in ordinary wallpaper stainer mills, which the majority of the wallpaper producers have. Our former water pulp colors required ball milling, and were therefore only suitable to a few companies. The dry colors and water pulps listed below will work into the coating batch by merely a mixing operation.

An important point regarding these colors is the fact that none of them contains inert materials. They are more economical for the customer to use than the reduced pulp colors currently offered by Keystone, Eakins, etc., to the industry, even though they sell at a higher cost per pound.

These products do not contain large amounts of wetting agents such as do the present water dispersible dyes now on the market and offered to the wallpaper industry. Such dry pigments are not satisfactory because of poor resistance to washing due to the high amounts of wetting agent present.

- D-2645: CP Chrome Yellow Light - Dry Color Light shade chrome yellow. Little or no darkening on exposure to light in full shades and tints. Full shades somewhat dirtier than standard type light chrome yellow. This difference in shade is minimized in let-down tints and therefore is not noticed in wallpaper.
- D-2649: CP Chrome Yellow Medium - Dry Color Shade comparable to medium shade Chrome Yellow. Properties similar to D-2645.
- D-2883: Permansa Yellow 10G Pulp - Similar to 12105, which see under Paint Industry.
- D-2884: Lake Red P Pulp - Deep orange with clean peach tint.
- D-2885: ^{Printing}~~Permansa~~ Red Pulp - Shade comparable to 10189.
- D-2886: ^{Solfast}~~Permansa~~ Scarlet Pulp - Shade comparable to Solfast Scarlet 10397. More lightfast in tints than D-2885.
- D-2887: Rose Toner Pulp - Recommended for production of permanent rose tints.
- D-2888: English Carmine Pulp - Shade similar to Alizarine Red 10132.
- ~~D-2885 Permansa Yellow 11 Pulp~~
~~Water pulp of Solfast Sky Blue and Permansa Green will also be available in the future.~~
~~CP1034 Permansa Green B Pulp~~
~~CP1040 " " Y Pulp~~
~~CP1041 Solfast Day Blue Pulp~~

IX. PRODUCTS FOR THE WALLPAPER INDUSTRY

B. WHITE PIGMENTS

LITHOPONE:

Lithopone is used for its high tinting strength and hiding power in coatings for wallpaper.

The following recommended grades are listed in order of preference: Permolith W-560 (easy dispersed), Permolith W-420 (easy dispersed), Permolith W-421 (easy dispersed, low consistency), Permolith W-320 (less hydrophylic).

X. PRODUCTS FOR THE PAPER MANUFACTURERS AND COATERS

A. COLOR PIGMENTS

This classification covers two industries, namely paper coaters who apply a water dispersion by roller coating or brushing equipment, and paper manufacturers who use color pigments by adding them directly to the dispersed paper pulp. For both industries water pulps are used. Some of the requirements are ease of dispersion of the pulp, and a pigment free of acid and metallic salts so as to be unreactive with the protein binder in the coating process.

1. YELLOWS AND ORANGES:

Chrome Yellow, 12151 - water pulp of 12074
Chrome Yellow, 12201 - water pulp of 12147
Chrome Yellow, 12134 - water pulp of 12096
Chrome Orange, 12203 - water pulp of 12311
Permanna Yellow G, 12102 - water pulp of 12107
Permanna Yellow 10G, D-2883 - wallpaper pulp color. See section on wallpaper industry
Benzidine Yellow, D-2644 - water pulp of 12191
Benzidine Yellow, D-2666 - water pulp of 12192
Benzidine Yellow, D-2839 - water pulp of D-2840
Benzidine Yellow, D-2842 - water pulp of D-2841
Permanent Orange, 10358 - water pulp of 10376

2. REDS AND MAROONS:

Para Red, 10364 - water pulp of 10109
Toluidine Red, D-2885 - wallpaper pulp color. See section on wallpaper industry.
Permanna Red, 10365 - water pulp of 10363
Lake Red P, D-2884 - wallpaper pulp color. See section on wallpaper industry.
Solfast Rhodamine Y, 10379 - water pulp of 10371
Solfast Rhodamine B, 10374 - water pulp of 10373
Brilliant Scarlet, D-2886 - wallpaper pulp color. See section on wallpaper industry.
Rose Pulp, D-2887 - wallpaper pulp color. See section on wallpaper colors.
Carmine Pulp, D-2888 - wallpaper pulp color. See section on wallpaper colors.

3. GREENS:

Permanna Green, CP 997 - water dispersible color of CP 594
Permanna Green, CP 765 - water pulp color of CP 594 type
Shamrock Green, 11188 - water pulp of 11184
Shamrock Green, 11189 - water pulp of 11185

4. BLUES AND VIOLETS:

Steel Blue Pulp, 11097 - water pulp of 11086
Alkali Blue, CP 792 and CP 793
Solfast Victoria Blue, CP 627
Solfast Methyl Violet, CP 467
Royal Purple, CP 410
Solfast Sky Blue WL, CP 767 and CP 1029

B. WHITE PIGMENTS

LITHOPONE:

Lithopone serves the paper industry as a constituent of filled or coated paper products. It is used in heavier weight of filled papers and in coating colors for application to printing or waxing stocks to provide whitening and opacifying characteristics.

The following recommended grades are listed in order of preference: Permolith W-560, W-420, W-421, W-320, 20L, 40M, and 60H.

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XI. PRODUCTS FOR MISCELLANEOUS INDUSTRIES

A. COLOR PIGMENTS

1. CHALK AND CRAYONS:

The chalk and crayon industries prefer reduced colors. However, full strength colors are used by some companies. Some of the requirements are as follows: Must be non-toxic. Should be a brilliant shade. Should be non-bleeding in water and paraffin.

a. YELLOWS AND ORANGES:

Benzidine Yellow, D-2853.
Calumet Yellow, D-2558 - 13% Lake of benzidine Yellow, 12191, on blanc fixe
Benzidine Yellow, D-2841
Permanent Orange, 10330 and 10376
Solfast Orange, D-2878 and D-2911
Permanse Orange, 10379

b. REDS AND MAROONS:

Graphic Red M, CP 233 and CP 800
Graphic Red R, CP 234
Rubanox Red, CP 448
Solfast Red, CP 663 and CP 967
Scarlet Lake, 10180
Solfast Scarlet, D-2799
Solfast Red, 10398 and 10399
Alizarine Reds and Maroons, 10132 and 10352
Bordeaux Maroons, 10182 and 10340.

c. GREENS:

Lime-fast Greens, D-2463 and D-2464
Serene Greens, D-2832 and D-2833

d. BLUES AND VIOLETS:

Solfasc Blue Lake, CP 1020
Alkali Blue, CP 258, CF 812
Solfast Victoria Blue, CF 476
Solfast Methyl Violet, CF 490
Royal Purple, CP 639

2. CONCRETE AND CEMENT:

In general water dispersed colors are preferred for concrete and cement work.
The following are recommended:

Permanse Green WD, CP 997
Solfast Sky Blue WD, CP 767 and CP 1029

3. FABRIC COATING AND ARTIFICIAL LEATHER:

The requirements for these products are somewhat similar to those of the rubber and plastic industries. See the section on rubber and plastics for further information.

PRODUCTS FOR MISCELLANEOUS INDUSTRIES - COLOR PIGMENTS

4. OIL CLOTH:

The requirements for these products are somewhat similar to those of the rubber and plastics industries. See the section on rubber and plastics for further information.

5. SHADE CLOTH:

The requirements for these products are somewhat similar to those of the rubber and plastic industries. See the section on rubber and plastics for further information.

XI. PRODUCTS FOR MISCELLANEOUS INDUSTRIES

B. WHITE PIGMENTS

1. ARTISTS COLORS:

Lithopone is used in oil colors and water colors to provide dry whites or clear tints. The following recommended grades are listed in order of preference: Permolith 20L, Permolith W-320, Permolith W-560 (water colors).

2. CAULKING COMPOUNDS AND PUTTY:

Lithopone is used as a whitening agent. The following recommended grades are listed in order of preference: Permolith 20L (low consistency), Permolith W-320 (high consistency).

3. CHALK AND CRAYONS:

Lithopone is used as a whitening material in chalk and crayons. The following recommended grades are listed in order of preference: Permolith 20L, Permolith W-320.

4. COATED FABRICS:

Lithopone imparts many desirable effects to oleoresinous lacquers and plastic coating applied to fabrics and leathers. The problem of selecting specific grades is similar to that involved in paint products. Refer to the paint section for more information. The following recommended grades are listed in order of preference: Permolith 20L (low consistency), Permolith 40M (medium consistency), Permolith 60H (high consistency), Permolith W-320.

5. OIL CLOTH:

Lithopone contributes to the durability and decorative qualities of oil cloth without interfering with the drying process. The following grades recommended are listed in order of preference: Permolith 40M (medium consistency, high gloss), Permolith 20L (low consistency), Permolith 60H (high consistency).

6. PLASTER:

Lithopone serves as a convenient and inexpensive whitening agent in patching plasters. Permolith W-320 is recommended.

XI. PRODUCTS FOR MISCELLANEOUS INDUSTRIES

C. VARNISHES AND RESINS

I. PLASTICIZING RESINS

There are many different industries where the use of resins or resin solutions aids in the processing of a material or contributes valuable characteristics to a finished product. Some of the principal uses are in nitrocellulose, ethyl cellulose, or other plastics.

Most plasticizing resins which we have available are oil-modified alkyd resins. They are usually of the non-drying type, and very often are based on adipic, succinic, or sebacic acid rather than phthalic anhydride. The following are available:

XAN 84: See Dyal characteristics chart. Used in nitrocellulose and ethyl cellulose.

XAN 78: See Dyal chart. Used in nitrocellulose and urea and melamine resins.

XPL C1: Used for nitrocellulose paper coatings.

XPL C2: Used for lacquers for rubber goods.

XI. PRODUCTS FOR MISCELLANEOUS INDUSTRIES

D. CHEMICALS AND INTERMEDIATES

1. ARSENIC ACID: Used as a raw material in making insecticides, chiefly weed killers for crab grass.

2. LITHARGE: Used in the glass manufacturing industry in the so called "Lead glass", which screens out X-Rays, radio-active rays, and ultra violet light. "Lead glass" is used around X-Ray units and weatherometers.

Used in the battery manufacturing industry. Batteries of the type used in automobiles are composed of a series of plates, half of which contain litharge in fairly large quantities.

See the section on Products for Pigment & Color Mfgs. for grades available.

3. PARA CRESOL, 98%, CP 945: Used in the oil industry in the manufacture of lubricant additives.

4. 2,4 DICHLOR PHENOXY ACETIC ACID: Used in the manufacture of weed killers.

5. 2,4 DICHLOR PHENOXY ACETIC ACID, BUTYL ESTER: Used in the manufacture of weed killers.

6. ZINC SULFATE: Used by the insecticide manufacturing industry as a source of zinc. See the section on Products for the Textile Industry for grades available. Used in the manufacture of fertilizers, glue, and ore floatation compounds.

Table A. PROPERTIES OF COLOR PIGMENTS

		SPECIFIC GRAVITY	BULKING VALUE	OIL ABSORP.		SPECIFIC GRAVITY	BULKING VALUE	OIL ABSORP.
CHROME YELLOWS					PERMANENT ORANGE			
Prirose	12074	6.00 ~~5.44~~	.0206 ~~.0221~~	13-20	10330	1.49	.0806	42
Prirose	12131	4.97	.0224	38	10376	1.49	.0806	38
Light	12147	5.65	.0212	18	10804	1.34	.0896	37
Light	12307	5.57	.0215	16				
Light	D-2903	4.97	.0224	38	PERMANSA ORANGE			
Light	12121	5.30	.0227	21	10369	1.45	.0828	32
Light	12148	5.47	.0219	24	10805	1.45	.0851	28
Medium	12096	5.44	.0220	14				
Medium	12135	5.29	.0227	34	BENZIDINE ORANGE			
Medium	12310	6.02	.0199	10	12193	1.43	.0840	60
Medium	12150	5.82	.0235	18				
Medium	D-2649	5.82	.0235	18	GRAPHIC RED Y			
Medium	D-2805	5.82	.0235	18	CP 272	1.60	.0750	~~49.50~~
					CP 384	1.62	.0741	~~38.50~~
					CP 941	1.60	.0750	~~39.50~~
CHROME ORANGES					BRITONE RED Y			
	12311	6.75	.0177	7.4	CP 817	1.52	.0790	~~55.50~~
	12082	7.29	.0164	5.5	CP 788	1.72	.0698	52
	12084	6.71	.0178	6.5	CP 416	1.58	.0760	50
	12093	6.09	.0197	6.0	CP 423	1.63	.0736	53
	12097	7.52	.0160	5.8	CP 648	1.55	.0774	42
	12051	9.00	.0150	5.5	CP 789	1.62	.0741	50
					CP 991	1.55	.0774	41
					CP 733	1.62	.0741	51
MOLYBDATE ORANGES					GRAPHIC RED M			
	12095	5.32	.0225	16	CP 233	1.74	.0690	40
	12145	5.80	.0207	20	CP 800	1.59	.0755	44
	D-2934	6.10	.0197		CP 835	1.60	.0750	41
	D-2843	5.32	.0225	16	CP 345	1.67	.0719	41
	D-2822	5.32	.0225	16	CP 918	1.69	.0709	46
ZINC YELLOW					CP 940	1.62	.0741	46
	12054	3.62	.0339	28	CP 939	1.47	.0816	48
PERMANSA YELLOWS					CP 816	1.67	.0719	46
10C	12105	1.58	.0759	45	CP 668	1.62	.0741	41
G	12101	1.46	.0822	33	CP 768	1.61	.0746	46
G	12107	1.46	.0822	34	BRITONE RED M			
G	12104	1.33	.0903	58	CP 901	1.58	.0759	46
M	12112	1.39	.0863	29	CP 802	1.58	.0759	48
					CP 974	1.51	.0795	49
LIME FAST YELLOWS					CP 602	1.47	.0816	45
	12111	2.32	.0517	37	CP 804	1.66	.0723	46
BENZIDINE YELLOWS					BRITONE RED M-Y			
	12190	1.37	.0876	64	CP 832	1.55	.0775	43
	12191	1.36	.0883	68	CP 805	1.70	.0706	49
	12192	1.38	.0870	62	CP 813	1.61	.0745	50
	D-2853	1.38	.0870	62				
	D-2840	1.42	.0854	65				
	D-2841	1.36	.0883	54				

TABLE A. PROPERTIES OF COLOR PIGMENTS

	<u>SPECIFIC GRAVITY</u>	<u>BULKING VALUE</u>	<u>OIL ABSORP.</u>		<u>SPECIAL GRAVITY</u>	<u>BULKING VALUE</u>	<u>OIL ABSORP.</u>
GRAPHIC RED R				PARA REDS			
CP 234	1.65	.0728	34	Light 10355	1.49	.0806	36
CP 564	1.50	.0800	39	Light 10333	1.49	.0806	53
CP 822	1.63	.0736	56	Light 10802	1.43	.0840	47
CP 837	1.48	.0811	47	Dark 10295	1.49	.0806	37
CP 355	1.65	.0729	35	Dark 10109	1.47	.0806	41
CP 614	1.53	.0784	45	Dark 10384	1.47	.0816	57
BRITONE RED R				TOLUIDINE REDS			
CP 318	1.52	.0790	44	Ex. Lt. 10298	1.42	.0854	39
CP 565	1.42	.0840	40	Light 10385	1.38	.0870	52
CP 808	1.42	.0854	49	Light 10450	1.40	.0858	34
CP 979	1.42	.0854	40	Light 10189	1.40	.0858	34
CP 833	1.42	.0854	49	Light 10801	1.41	.0851	30
BRITONE MAROONS				Light 10385	1.38	.0870	52
CP 377	1.20	.1004	37	Medium D-2904	1.42	.0854	35
CP 820	1.42	.0854	58	Dark 10395	1.43	.0840	35
CP 838	1.47	.0816	51	Ex. Dk. D-2914	1.43	.0840	35
CP 834	1.42	.0854	58	Lake 10386	1.99	.0603	25
LAKE RED C				PERMANSA REDS			
CP 470	1.57	.0764	38	10361	1.67	.0719	32
CP 281	1.76	.0682	42	10363	1.56	.0770	28
CP 803	1.66	.0723	46	10800	1.45	.0828	31
CP 836	1.66	.0723	47	SOLFAST RHODAMINES			
CP 328	1.69	.0710	50	Y 10371	2.63	.0456	40
CP 989	1.58	.0760	49	Y D-2717	2.63	.0456	40
RUBANOX REDS				B 10373	2.52	.0476	44
CP 543	1.62	.0741	50	SCARLET LAKE			
CP 368	1.54	.0779	40	10180	2.82	.0425	36
CP 1019	1.56	.0766	59	ARYLIDE REDS AND MAROONS			
CP 762	1.85	.0649	62	Solfast Scarlets			
CP 776	1.60	.0750	64	D-2799	1.36	.0883	55
CP 448	2.12	.0566		10397	1.44	.0833	37
SOLFAST REDS				Solfast Reds			
CP 663	1.70	.0706	43	10398	1.41	.0851	65
CP 967	1.71	.0702	52	10399	1.42	.0854	60
CP 787	1.51	.0795	59	Toluidine Maroons			
CP 780	1.48	.0811	73	10396	1.41	.0851	68
CP 1028	1.57	.0765	59	10393	1.58	.0756	38
CP 831	1.41	.0851	57	Solfast Maroons			
				D-2830	1.44	.0833	
				D-2831	1.46	.0822	

Table A. PROPERTIES OF COLOR PIGMENT

	<u>SPECIFIC</u> <u>GRAVITY</u>	<u>BULKING</u> <u>VALUE</u>	<u>OIL</u> <u>ABSORP.</u>		<u>SPECIFIC</u> <u>GRAVITY</u>	<u>BULKING</u> <u>VALUE</u>	<u>OIL</u> <u>ABSORP.</u>
MAROON TONERS				SERENE GREENS			
CP 429	1.81	.0663	55	D-2832	1.97	.0609	27
CP 779	1.53	.0784	42	D-2833	2.04	.0589	31
ALIZARINE REDS AND MAROONS				SOLFAST SKY BLUES			
10132	1.76	.0682	33	CP 961	1.64	.0732	27
10322	1.76	.0682	33	CP 988	1.45	.0828	42
10352	1.91	.0628	54	~~CP 1020~~	~~2.90~~	~~.0522~~	~~22~~
BORDEAUX MAROONS				IRON BLUES			
10182	2.95	.0407	31	11086	1.79	.0670	55
10340	2.88	.0416	32	11840	1.79	.0670	45
CHROME GREENS				11148	1.84	.0648	58
11825	4.98	.0241	11	11023	1.85	.0648	40
11834	4.50	.0266	13	D-2817	1.79	.0670	55
11837	3.27	.0367	34	D-2875	1.85	.0648	40
11835	2.57	.0467	30	11096	1.85	.0648	57
SOLFAST GREENS				11186	1.81	.0663	46
CP 771	1.97	.0609	38	ALKALI BLUES			
CP 983	1.97	.0609	38	CP 258	1.44	.0833	68
SHAMROCK GREENS				CP 812	1.32	.0909	95
11184	1.79	.0670	23	CP 970	1.18	.1017	
11185	1.67	.0718	23	VICTORIA BLUE			
D-2463	2.57	.0467	13	CP 476	2.32	.0517	38
D-2464	3.50	.0343	14	ROYAL PURPLE			
PERMANSA GREENS				CP 639	1.79	.0671	77
CP 594	1.47	.0816	37	METHYL VIOLET			
CP 986	1.46	.0822	36	CP 490	2.34	.0513	46
SOLFAST GREENS							
11174	2.63	.0456	41				
11182	2.35	.0511	59				

Table B. COMPETITIVE COLOR PIGMENTS

	IMPERIAL	DUPONT	CALCO	REICHOLD	KENTUCKY	SHERWIN- HARMON WILLIAMS
CHROME YELLOWS:						
Primrose	X-1937	Y-488	40-1450	1010	2000	12074
Primrose			40-2450			12074
Light	X-1899	Y-434	40-3350	1070		12147
Light		Y-405	40-1460			12147
Light	A-2886			1075	153H	12307
Medium	X-1809					12135
Medium					57M	12310
Medium		Y-468	40-4511	1085		12150
Medium	X-2025	Y-472	40-4495		A314	12150
Medium	X-1810	Y-469	40-4480	1080		12150
			40-4495			12150
CHROME ORANGES:						
Light		YO-263				12311
Light	X-819	YO-422	40-5460	2010		12311
Medium		YO-260	40-6500	2020		12082
Dark	A-4337	YO-34	40-7450	2040		12084
Extra Dark		YO-38	40-7600	2221		12093
MOLYBDATE ORANGES:						
Light	A-4403	YO-421	40-8250	2060	2509	12095
Light		YO-421	40-8300			D-2843
Dark			40-8300	2262	2510	12145
Dark			40-8250			D-2822
ZINC YELLOW:	X-883			1415	2813	12054
PERMANSA YELLOWS:						
10G			45-9108	1550		YH-4 12105
G		YT-445	45-2450	1555		YH-1 12101
BENZIDINE YELLOWS:						
		YT-459				12190
X-1934		YT-553	45-2650			12191
			45-2555		YB-2	D-2853
PERMANENT ORANGE:						
	X-1481		45-9060	2520		10376
PERMANSA ORANGE:						
		YT-419	45-3015	2540		10369
BENZIDINE ORANGE:						
					YB-3	12193
SOLFAST ORANGE:						
	Madras				Y-25	D-2911
GRAPHIC RED Y:						
	X-1214			5012		CP 272
BRITONE RED Y:						
	X-1469					CP 817

100-100-100
 100-100-100
 100-100-100

Table B. COMPETITIVE COLOR PIGMENTS

	IMPERIAL	DUPONT	REICHOLD	SUCO	HILTON-DAVIS	SHERWIN-WILLIAMS
GRAPHIC RED M:	X-1001	RT-321		CR2744	120A	CP 233
	X-1096	RT-463	5003	CR2165		CP 800
			5015	CR2300		CP 800
				CR2512		CP 835
	X-1477	RT-364		CR2122		CP 918
	X-1095					CP 918
			5006	CR2367	10F100	CP 668
						CP 774
BRITONE RED M:	X-1398			CR2950		CP 901
	X-1583	RT-283		CR2535		CP 802
		RT-242		CR2505	119S	CP 804
	X-1152			CR2200	114	CP 602
BRITONE RED M-Y:	X-1723	RT-299		CR2985		CP 805
	X-1729	RT-482		CR2705	151H	CP 805
	X-1233					CP 813
	X-1151				25F102	CP 813
GRAPHIC RED R:					15F101	CP 234
	X-1148					CP 564
	X-957	RT-425				CP 822
		RT-464				CP 822
			5018	CR2166	127	CP 614
BRITONE RED R:		RT-265				CP 318
		RT-387				CP 318
	X-1666	RT-431				CP 565
	X-957					CP 808
	X-1329		6025	CR2629		CP 808
BRITONE MAROONS:		RT-284		CR2350		CP 377
	X-1779					CP 820
	X-1307	RT-432		CR2344	173	CP 820
LAKE RED C:					106	CP 470
		RT-313				CP 281
		RT-308		CR2320		CP 281
		RT-507		CR5011	172	CP 803
		RT-331		CR5250		CP 328
RUEANOX REDS:	X-1153	RT-281				CP 543
	X-1180	RT-443				CP 368
	X-1700					CP 1019
		RT-443		CR6500		CP 762
				CR6550		CP 776
SOLFAST REDS:	X-1778	RT-428				CP 663
				CR6510		CP 780
PIGMENT RUEINE:		RT-359				CP 1030

Table B. COMPETITIVE COLOR PIGMENTS

	IMPERIAL	DUPONT	CALCO	REICHHOLD	KENTUCKY	HARMON	SHERWIN-WILLIAMS
PARA REDS:							
Light	A-4329						10355
Light	B-1439	RT-435	20-1350	5055			10333
Light	X-1022						10902
Dark	A-1757	RT-442	20-2020	5065			10109
Dark			20-2514				10109
Dark	B-3292						10384
TOLUIDINE REDS:							
Extra Light		RT-232		5030			10451
Light	A-2989	RT-386	20-3300	5035			10298
Light	A-2990		20-3920	5040			10395
Medium	A-2990		20-3785				D-2904
Extra Dark		RT-505			1078		D-2914
PERMANSA RED:							
			20-7013	5410			10361
SOLFAST RHODAMINES:							
Y	X-1143	RT-357	20-7425				10371
B	X-1127	RT-330	20-7490				10373
ARYLIDE REDS AND MAROONS:							
Solfast Scarlet		RT-531					D-2799
Solfast Red		RT-537					10398
Solfast Red		RT-539					10399
Toluidine Maroon		RT-530				MT-5	10393
MAROON TONER	X-1455	RT-2470 = CP 1032			943F		CP 429
ALIZARINE RED	A-4200	RT-332	25-9240				10132
CHROME GREENS:		RT-2230					10352
Light	A-4463	G-551	10-8100	3004			11834
Medium	A-4464		10-8400				11837
Dark			10-8863				11835
Dark	A-4365	G-553	10-8516				11835
SOLFAST GREEN:		GT-486					CP 771
PERMANSA GREENS:	X-1291				288C		CP 594
		GT-646					CP 986
SOLFAST BRILLIANT GREEN:							11174
	A-4381	GT-347	15-2315				
SOLFAST SKY BLUES:		BT-172					CPX 483
		BP-173					CP 988
IRON BLUES:		BT-172-D (100% 1/1)					CP 1137
Milori		B-2160	50-1750	4010			11086
Milori				4206			11086
Milori	A-4406	B-197	50-1750				11840
Chinese		B-63	50-4070	4035			11023
Prussian	A-4429	B-140					11096

NOTE: Because of the great number of standards of Alkali Blues, Solfast Victoria Blues, Methyl Violets, and Solfast Blues available in ink form, it is not practical to list competitive standards.

3005 (10%) 11291-50% } Collins #1
 3015 (27%) 11292-50% }
 3020 (35%) 11293-50% } Collins #10
 3030 (45.8%) 11294-50% }
 11835 - Collins #250

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TABLE C. PAINT INDUSTRY USES FOR COLOR PIGMENTS

	YELLOWS	ORANGES	REDS	MAROONS	GREENS	BLUES
CHROME						
ZINC						
PERMANSA						
BENZIDINE						
(Light Fast)						
CHROME						
MOLYBDATE						
PERMANSA						
PERMAYENT						
GRAPHIC Y						
GRAPHIC M						
GRAPHIC R						
RUBANOX						
SOLFAST-C.P.						
PARA						
TOLUIDINE						
(Regular)						
TOLUIDINE						
(Non-Bronze)						
PERMANSA						
RHODAMINE						
ALIZARINE						
TOLUIDINE						
MAROONS						
VAROON						
TONERS						
CHROME						
SOLFAST-C.P.						
SHAMROCK						
PERMANSA						
SOLFAST-PTA						
SOLFAST						
IRON						
ALKALI						
VICTORIA						

1. TRADE SALES-INTERIOR:

- A. FLAT WALL PAINT
- B. SEMI-GLOSS ENAMEL
- C. GLOSS ENAMEL

2. TRADE SALES-EXTERIOR:

- A. HOUSE PAINT
- B. TRIM & TRELLIS
- C. BARN PAINT

3. INDUSTRIAL ENAMELS:

- A. AIR DRY-INTERIOR
- B. AIR DRY-EXTERIOR
- C. LOW BAKE-INTERIOR
- D. LOW BAKE-EXTERIOR
- E. MED. BAKE-INTERIOR
- F. MED. BAKE-EXTERIOR
- G. HIGH BAKE-INTERIOR
- H. HIGH BAKE-EXTERIOR
- I. APPLIANCE ENAMEL

4. LAQUERS:

- A. AUTOMOTIVE
- B. INTERIOR

EXPLANATION:
 S - Suitable
 P - Used as Primer
 X - Used for Shading
 F - Full Shade only
 T - Tints only

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Table D. CHARACTERISTICS OF DYAL VEHICLES

Dyal	% N.V.M.	% & Type Solvent	Viscosity	Color	Acid Value Solids	% & Type Oil	% P.A.	Lbs./gal	% N.V.M. & E-G Visc.
XAC 1	50	50 M.S.	W-Y	10-11	10-12	56 S-L	30	7.58	40
XAC 47	70	30 M.S.	Z-Z ₂	8-10	3-5	63-S	25	7.98	50
XAC 80	50	50 M.S.	Z ₂ -Z ₄	6-9	6-10	54-S	36	7.65	34
XAC 83	70	30 M.S.	Y-Z ₁	6-8	3-5	65-S	25	7.97	54
XAC 93	70	30 M.S.	Y-Z ₁	6-9	3-5	62-S	26	8.00	50
XAC 99	50	50 M.S.	X-Y	7-9	15-20	56-S	32	7.58	40
XAC C20	50	50 M.S.	Z ₁ -Z ₂	6-9	8 MAX	50-S	31	7.59	33
XAC C21	50	50 M.S.	V-X	8 MAX	8 MAX	57-S	30	7.54	34
XAD 37	50	50 M.S.	Z ₂ -Z ₃	9-11	9-11	50-L	35	7.34	33
XMD 6	50	50 M.S.	S-U	9-12	20-25	48-S	0	7.50	42
XAC 9	50	50 XYLOL	Z ₁ -Z ₂	7 MAX	6-9	37-DC	43	8.29	34
XAC 66	60	40 XYLOL	Z ₁ -Z ₃	10-11	25-30	44-DC	38	8.40	39
XAC 74	50	50 XYLOL	Z ₂ -Z ₄	8 MAX	30-40	37-DC	45	8.28	33
XAC C19	50	25-XYLOL 25-VM & P	X-Z	4-6	8 MAX	42-S	40	7.99	40
XAD 1	50	50-XYLOL	Y-Z	11 MAX	10-13	38-L	41	8.24	
XAN 78	50	50-XYLOL	U-W	4-6	7-10	30-C	42	8.36	42
XAR 62	50	XYLOL VM & P	T-V	10-14	7-9	52-S-T	30	7.83	42
XAR C8	50	50-XYLOL	N	12 MAX	14-20	34-L	28	8.12	-
XAR C9	50	-	X-Z	12 MAX	20-25	28	32	8.25	-

CODE FOR "TYPE OIL":
 C - Coconut
 DC - Dehydrated Castor
 L - Linseed
 S - Soya
 T - Tung

Table E. COMPATIBILITY OF DYAL VEHICLES

	XAC 1	XAC 47	XAC 30	XAC 83	XAC 93	XAC 99	XAC C20	XAC C21	XAD 26	XAD 37	XMD 6	XAC 9	XAC 66	XAC 74	XAC C19	XAD 1	XAN 78	XAR 62
XAC 1	.	C	C	C	C	C	C	C	C	C	C	I	I	I	C	I	I	C
XAC 47	C	.	C	C	C	C	C	C	C	C	C	I	I	I	C	I	I	C
XAC 80	C	C	.	C	C	C	C	C	C	C	C	I	I	I	C	I	I	C
XAC 83	C	C	C	.	C	C	C	C	C	C	C	I	I	I	C	I	I	C
XAC 93	C	C	C	C	.	C	C	C	C	C	C	I	I	I	C	I	I	C
XAC 99	C	C	C	C	C	.	C	C	C	C	C	I	I	I	C	I	I	C
XAC C20	C	C	C	C	C	C	.	C	C	C	C	I	I	I	C	I	I	C
XAC C21	C	C	C	C	C	C	C	.	C	C	C	I	I	I	C	I	I	C
XAD 26	C	C	C	C	C	C	C	C	.	C	C	S	C	C	C	C	C	C
XAD 37	C	C	C	C	C	C	C	C	C	.	I	S	C	C	C	C	C	C
XMD 6	C	C	S	C	C	C	C	C	C	I	.	I	I	I	S	I	I	S
XAC 9	I	I	I	I	I	I	I	I	S	S	I	.	C	C	C	C	C	I
XAC 66	I	I	C	I	C	C	C	C	C	C	I	C	.	C	C	C	C	C
XAC 74	I	I	C	I	S	I	S	I	C	C	I	C	C	.	C	C	C	C
XAC C19	C	C	C	C	C	C	C	C	C	C	S	C	C	C	.	C	C	C
XAD 1	I	I	C	I	C	I	C	C	C	C	I	C	C	C	C	.	C	C
XAN 78	I	I	C	I	S	I	C	I	C	C	I	C	C	C	C	C	.	C
XAR 62	C	C	C	C	C	C	C	C	C	C	S	I	C	C	C	C	C	.

EXPLANATION: C - Compatible
S - Slightly Compatible
I - Incompatible

Table F. PAINT INDUSTRY USES FOR DYAL VEHICLES

1. WHEN SOLVENT IS MINERAL SPIRITS

	XAC 1	XAC 47	XAC 80	XAC 83	XAC 93	XAC 99	XAC C20	XAC C21	XAD 26	XAD 37	XAD 6
Appliance Whites											
Anti-Rust Primers										S	
Architectural Whites	QHND	MQGN	SQW	SQW	SDQW	SQW	SQCN	SQCN			SC
Architectural Colors	MQHND	SCG	SQ	SQ	SBQ	SDQ	SQC	SQC			SC
Automotive Chassis											SC
Automotive Clears	SEQ							SQD			
" Enamels-Air Dry	SDQCV								SQCN	SQCN	
" -Laking	SQC						SQC		SQD	SQD	
" Lacquers											SC
" Undercoaters											
Awning Paints		SCD	SQF	SQD	SCDC	SQD	SQF	MQDC			
Bulletin Colors					MBQ			SQDC			
Cabinets-Metal	SQDN					SQCN	SQDN			MQD	SC
" -Wood	SQDN					SQCN	SQDN			SQC	
Drums	SQD							SCD			MC
Enamels-Air Dry-Brush	MQDFW	SQGN	SQW	SQW	SQDN	SQDN	MQDN	SQDN	SQD	MQFD	SC
" -Air Dry-Spray	SQDFW		MSQDN			SQDN	SQDN			SQD	SC
" Lo Bake-Dip	SQDN		MQDN			SQDN	MQDN	SQDN		SQD	
" Lo Bake-Spray	SQDN		MQDN			SQDN	MQDN	SQDN		SQD	SC
" Hi Bake-Dip			SQD			SQD	SQD				
" Hi Bake-Spray			SQD			SQD	SQC			SQD	
" Maintenance	MQDN		SQDN			SQDN	MQDNC		MQD	MQD	
Engine Enamels			SQD				MQD		SQD	MQD	
Farm Machinery	SQDE		SQD				MQD	SQDC	SQD	SQD	MQ
Freight Cars	SQD	SQD	SQDC	SQD	SQD	SQD	SQDC		SQD	SQD	MQ
Furniture-Clears	SQD						SQD			SQD	SC
" Enamels - Metal	MQDN		MQDN			SQDN	MQDN		SQD	MQD	SC
" Enamels - Wood	MQDN		MQDN			SQDN	MQDN		SQC	MQD	SC
Grinding Vehicles	SQDN		SQDN				SQDN		MQD		
Household Enamels-White	MQDF	SQDG	SQD			MQDC	SQD	MQDNC			
" Enamels - Color	MQDF	SQDG	SQD				SQ	MQDNC			
Lacquer Modifiers											
Marine Finishes	SQCN	MQDGN	MQDN	SQDN	MQDWE	SQDN				SQDN	
Mill Whites	SQD	SQDG	SQD	SQD	MQDWE	SQD		SQD			
Paints-Trim & Trellis		SQDGN			MQDWE			SQDN			
Pumps-Brushing	SQDN	SQDN	SQDN			MQDN		SQDN	SQDN	MQD	
Railway Cars	MQDN	SQDN	SQDN				SQDN	SQDN		MQDNC	
Signs-Metal	SQDN		SQDN							SQD	
Signs-Wood	SQDN	MQGN				SQDN				SQD	SC
Silk Screen Paste				MQGN	MQGN			SQGN			
Tank Cars									SQD	MQDF	SC
Toys						SQD					SC
Trucks	SQDN		SQDN				SQDN				
Urea Modification			SQDN				SQDN				
Varnish Fortification	S	S	S	S	S	S	S	S	S	S	S

CODE:

M--Most Suitable
S--Suitable
B-Unusual Ease of Brushing

C--Low Cost
D--Best Durability
F--Fastest Dry

G--Highest Gloss
H--Hardest Film
Q--Quality of Highest Order
W--Suitable for Whites

Table F. PAINT INDUSTRY USES FOR DYAL VEHICLES
2. WHEN SOLVENT IS AROMATIC AND/OR V.M. & P. NAPHTHA

	XAC 9	XAC 66	XAC 74	XAC C19	XAD 1	XAN 78	XAN 62	XAR C8	XAR C9
Appliance Whites	MQD		S	SQC		SQ			
Anti-Rust Primers		SQD	S	SW	S	SW		SQD	MFH
Architectural Whites									
Colors								SQ	MQF
Automotive Chassis		SQ	SQD		SQ				H
Clears				SQD					
Enamels-Air Dry				SQDW			MDQG	SQDG	SQFH
-baking							MDQG	MDQG	SQFH
Lacquers		SQ				MQ			
Undercoaters		SQD			SQD		SQD	MQD	MFHDC
Awning Paints									
Bulletin Colors									
Cabinets - Metal	MQDGN	SQDN	SQDN	SQDN	SQD	SQD		SQDG	SQFH
- Wood		SQDN	SQDN	SQDN				SQDG	SQFHD
Drums									
Enamels-Air Dry - Brush									
Enamels-Air Dry - Spray		SQDN	SQDN	SQDN	SQD		SQDG	SQDG	SQFHD
Lo Bake-Dip		SQDN		SQDN	SQD				SQFH
Lo Bake - Spray	SQDN	SQDN	SQDN	SQDN	SQD		SQDG	SQDG	SQFHD
Hi Bake - Dip	MQDHN	SQD	SQD	SQDN	SQD			SQDG	SQFHD
Hi Bake - Spray	MQDHN	SQD	SQD		SQD	SQDN		SQDG	SQFHD
Maintenance	SQD	SQD	SQD	SQD					
Engine Enamels								SQDGH	MQFHD
Farm Machinery		SQD						SQD	MQFHD
Freight Cars		SQD	SQD		SQD			SQDQ	MQFHD
Furniture-Clears			SQD		SQD				MQFHD
Enamels - Metal	SQDN	SQDN		SQDN	SQD			SQDG	MQFHD
- Wood			SQDN		SQD			SQDG	MQFHD
Grinding Vehicles				SQDN	MQD				
Household Enamels - White									
Enamels - Colors									
Lacquer Modifiers						MQD			
Marine Finishes									
Mill Whites									
Paints - Trim & Trellis									
Pumps - Brushing									
Railway Cars		SQDN		SQDN	SQD			SQDG	MQFHL
Signs - Metal	SQDN	SQD		SQDN	SQD			SQDG	SQFHI
Signs - Wood									
Silk Screen Pastes									
Tank Cars					SQD		MQDG		
Toys	SQDN	SQDN		SQDN	MQDN				MQDF
Trucks								SQD	
Urea Modification	MDHWF	SQDN	S	MQDN	SQD	MQDN			
Varnish Fortification	S								

CODE:

M--Most Suitable
S--Suitable
B--Unusual Ease of Brushing

C--Low Cost
D--Best Durability
F--Fastest Dry

G--Highest Gloss
H--Hardest Film
Q--Quality of Highest Order
W--Suitable for Whites

Table 6. BEST DYAL VEHICLES FOR PAINT INDUSTRY USES

ORDER OF PREFERENCE	1st	2nd	3rd	4th	OTHERS
Appliance Whites	XAC 9	XAC C9	XAC C19	XAN 78	
Anti-Rust Primers	XAR C9	XAC 66	XAC C19	XAC C9	
Architectural Whites	XAC 47	XAC 83	XAC 93		
Architectural Colors	XAC 1	XAC 47	XAC 93		
Automotive Chassis	XAR C9	XAR C8	XAD 37		
Automotive Clears	XAC 1	XAD 26	XAC C20		
Automotive Enamels - Air Dry	XAT 62	XAR C6	XAR C8		
Automotive Enamels - Bake	XAR 62	XAR C6	XAR C9		
Automotive Lacquers	XAN 78	XAN 84	XAC 76		
Automotive Undercoaters	XAR C9	XAR C8	XAC 66	XAC C9	
Awning Paints	XAC C21	XAC 93	XAC 47		
Bulletin Colors	XAC 93	XAD C7	XAD 11		
Cabinets - Metal	XAC 9	XAC C20	XAC C19		
Cabinets - Wood	XAC 1	XAC 99	XAC C20		
Drums	XMD 6	XMD C11	XMD 165	XMD C12	
Enamels Air Dry - Brush	XAC 1	XAD 37	XAC C20		
Enamels Air Dry - Spray	XAC 80	XAD 37	XAR C9	XAR 7	
Enamels Lo Bake - Dip	XAC 9	XAC C20	XAD 1	XAR 7	
Enamels Lo Bake - Spray	XAC 80	XAC C20	XAD 1		
Enamels Hi Bake - Dip	XAC 9	XAC C9	XAC C19	XAN 78	
Enamels Hi Bake - Spray	XAC 9	XAC C9	XAC 19	XAN 78	
Enamels Maintenance	XAD 37	XAC C20	XAD 26		
Emulsion Vehicles	XRE 156	XRE 137	XRE C12		
Engine Enamels	XAC C20	XAD 37	XAR C9	XAD 1	
Farm Machinery	XAC C20	XMD 6	XAC C21		
Freight Cars	XMD 6	XMD C1	XMD 165	XMD C12	
Furniture - Clears	XAC 1	XMD 6	XAR C9		
Furniture Enamels - Metal	XAC 1	XAC 80	XAC C20	XAD 37	
Furniture Enamels - Wood	XAC 1	XAC 80	XAC C20	XAD 37	
Grinding Vehicles	XAD 26	XAR C 3	XLV C9		
Household Enamels - White	XAC C21	XAC 1	XAC 99	XAC C20	
Household Enamels - Colors	XAC C21	XAC 1	XAC 99	XAC C20	
Lacquer Modifiers	XAN 78	XAN 84	XAN C1	XAN C2	
Marine Finishes	XAC 93	XOR C14	XAC 47		
Mill Whites	XAC 53	XAC 47	XAC 2		
Overprint Varnishes	XAC C6	XAC C21			
Paints - Trim & Trellis	XAC 47	XAC 93	XMD C12		
Pumps - Brushing	XAD 37	XAC 99	XMD 6		
Railway Cars	XAD 37	XAC C19	XAC 1		
Signs - Metal	XAC 1	XAC C19	XAC 80		
Signs - Wood	XAC 47	XAC C21	XMD 6		
Silk Screen Pastes	XAC 93	XAC 83	XLV C9		
Syndicate Vehicles	XMD 165	XMD 6	XAC 1		
Tank Cars	XAD 1	XAD 37	XAR 62		
Tin Decorating	XLV 89	XLV 10	XLV 38		
Toys	XAD 1	XAD 37	XMD 6	XMD 165	
Trucks	XAR 62	XAR C6	XAR C8	XAR C9	
Urea Modification	XAC 9	XAC C9	XAC C19	XAN 78	
Varnish Fortification	Most Medium and Short Oil Alkyds				
Wrinkle Finishes	XAR 7	XAR 19	XOR C2		