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1'

"Dutch Boy"

PIGMENT E

A New Corrosion Inhibitive Pigment

FOR USE IN PROTECTIVE COATINGS

A Product Development of
NATIONAL LEAD COMPANY

1-56-53

"Dutch Boy"
PIGMENT E

PIGMENT E is a new and improved corrosion inhibitive pigment for general purpose use. It is barium potassium chromate [$BaK_2(CrO_4)_2$] and possesses a desirable combination of properties, most important of which is its ability to release the soluble chromate ion $(CrO_4)=$ in media that ordinarily cause corrosion.

PIGMENT E functions by virtue of its controlled release of the water soluble chromate ion. Because this release is controlled, the available chromate ion will effectively prevent corrosion longer than is the case with other chromate-type inhibitive pigments. Extensive field tests have clearly demonstrated the effectiveness of PIGMENT E in many different metal protective coating materials.

Advantages of "Pigment E"

GREATER EFFECTIVENESS. PIGMENT E yields 20% to 25% more of the readily available soluble chromate than is yielded by other soluble chromate-type pigments. This effective soluble chromate portion has *controlled* solubility, so that after the initial rapid release, which is small, the remainder of the soluble chromate is available over a long period of time.

UNIFORM COMPOSITION. PIGMENT E has a definite chemical composition. It is barium potassium chromate $BaK_2(CrO_4)_2$.

HIGH PURITY. The method of manufacture of PIGMENT E makes it possible to exercise a very complete control of its composition. In addition to its definite uniform chemical composition, PIGMENT E is produced substantially free of detrimental soluble chlorides and sulfates.

COMPATIBILITY. PIGMENT E is compatible with other pigments and is usually used in such combinations for metal protective paints. It is also compatible with all paint vehicles in current use, typical of which are the following:

ALKYDS PHENOLICS POLYMERIZED TERPENES MODIFIED ROSIN
COUMARONE-INDENE NATURAL RESINS CHLORINATED RUBBER

EASY GRINDING. PIGMENT E is a soft-textured pigment comparable to 2 on Moh's scale. This accounts for its ready grindability, which is a distinct advantage in the preparation of paints.

GOOD PACKAGE STABILITY. Because of the stability of PIGMENT E with various vehicles, PIGMENT E paints have exceptional package life.

TINTING STRENGTH. The low tinting strength and low hiding power of PIGMENT E has many advantages. For example when used with pigments of high hiding power their characteristic colors are not appreciably affected. Therefore, coatings of any desired color may be obtained with PIGMENT E.

ECONOMICAL. PIGMENT E is economical to use, which factor will stimulate many new uses for such a paint pigment.

Uses for "Pigment E"

PAINTS

PIGMENT E is suggested for use in metal protective paints including those for the priming of steel and light metal alloys of aluminum and magnesium. Low cost and good performance make it particularly suitable in metal protective paint systems for atmospherically exposed surfaces such as railroad cars, tanks, general metal construction, appliances, and machinery. Paints may also be formulated with combinations of PIGMENT E and red lead as these two pigments are completely compatible.

It is further suggested as a corrosion inhibitive additive to metal leafing paints, such as aluminum paint. Due to its low tinting power, as much as 2.0 pounds of PIGMENT E may be used for each 2.0 pounds of aluminum leaf paste, per gallon of vehicle, in primary coats.

As a combination primer-finish coat, PIGMENT E may be used with aluminum to advantage. In such paints where leafing is most important, one pound of PIGMENT E per gallon is suggested. Where corrosion inhibition rather than brightness of film is most important, more may be used.

Due to its low tinting strength, PIGMENT E can provide a variety of combination primer-finish coats for metal office partitions, metal furniture and other metal products of this general type.

Other Suggested Uses

PIGMENT E is suggested for other end usages where a gradual release of chromate ion is desirable in arresting corrosion.

PIGMENT E is suggested as an additive to oils and greases, for applications in which these lubricants must afford maximum resistance to the corrosive effect of moisture. In this usage, the extreme softness of PIGMENT E (approximately 2 on Moh's scale) is significant, since bearing surfaces will not be affected mechanically by its inclusion.

TABLE OF PROPERTIES

Color	Pale Yellow	Alkali Oxides (calculated to K_2O)	21.0%
Specific Gravity	3.65	Chromium Oxide (calculated to CrO_3)	44.6%
Bulking Value (gallons per pound)	0.0329	Combined Water	None
Weight of one solid gallon (pounds)	30.4	Total Chlorides, as Cl	0.015%
Oil Absorption (grams per 100 grams)	11.6	Water Soluble Chlorides, as Cl	0.004%
Refractive Index	1.9	Total Sulfates, as SO_4	.13%
Barium Oxide (calculated to BaO)	34.2%	Water Soluble Sulphates, as SO_4	0.05%
		pH (water slurry of pigment)	8.0
		Organic colors and lakes	None

Typical Formulations

In order to illustrate the versatility of PIGMENT E, a few typical formulations are given below. This new pigment can be used in many types of metal protective paints. The formulations show a range of drying times and a variety of applications.

General Purpose Primer

Dry to handle and Re-coat – 24 hrs.

Formula M6685		*Per Cent*	*Pounds*	*Gallons*
56.6% Pigment	"Pigment E"	30.0	223.8	7.46
	Iron Oxide (85% Fe_2O_3)	35.0	260.0	6.99
	Magnesium Silicate	35.0	260.0	10.92
43.4% Vehicle	Raw Linseed Oil	34.0	193.4	25.02
	Alkyd Resin Solution*	48.5	276.0	34.94
	Petroleum Spirits and Driers**	17.5	99.5	14.67
			1312.7	100.00

Weight per gallon 13.1 lbs. PV = 35.0
Per Cent Volatile in the vehicle by weight = 32.0

*Federal Specification TT-R-266, Type II, Class A.

**Driers: 0.5% Lead, 0.05% Cobalt, 0.05% Manganese based on vehicle solids.

Fast Drying Metal Primer

Dry to handle and Re-coat – 18 hrs.

Formula M5478		*Per Cent*	*Pounds*	*Gallons*
47.0% Pigment	"Pigment E"	25.0	138	4.55
	Iron Oxide (85% Fe_2O_3)	45.0	249	6.71
	Zinc Oxide	10.0	55	1.19
	Magnesium Silicate	20.0	111	4.65
53.0% Vehicle	Alkyd Resin Solution*	76.5	476	61.04
	Thinner and Driers**	23.5	147	21.86
			1176	100.00

Weight per gallon 11.7 lbs. PV = 35.0
Per Cent Volatile in the vehicle by weight = 54.1

*Soybean oil glyceryl phthalate alkyd resin 30% phthalic anhydride; 60% solids in mineral spirits.

**Driers: 0.5% Lead, 0.05% Cobalt, based on vehicle solids.

"Pigment E" – Red Lead Primer

Dry to handle and Re-coat – 24 hrs.

Formula M6713		*Per Cent*	*Pounds*	*Gallons*
62.0% Pigment	"Pigment E"	10.0	96.7	3.22
	Red Lead (97% Grade)	40.0	388.5	5.25
	Iron Oxide (85% Fe_2O_3)	30.0	289.3	7.79
	Magnesium Silicate	20.0	194.3	8.16
38.0% Vehicle	Alkyd Resin Solution*	46.1	263.3	33.33
	Raw Linseed Oil	32.3	184.6	23.88
	Thinners and Driers**	21.6	123.6	18.37
			1540.3	100.00

Weight per gallon 15.4 lbs.
Per Cent Volatile in the vehicle by weight = 35.5

*Federal Specification TT-R-266, Type I, Class A.

**Driers: 0.6% Lead, 0.06% Cobalt, based on vehicle solids.

Primer for Light Metal Alloys

Dry to handle – 10 minutes, Re-coat (with lacquers) 1½ hrs.

Formula M3309		*Per Cent*	*Pounds*	*Gallons*
34.2% Pigment	"Pigment E"	73.9	267.0	8.77
	Titanox RA	11.5	41.6	1.19
	Black Iron Oxide	2.8	10.3	0.26
	Magnesium Silicate	10.8	39.0	1.63
	Aluminum Stearate	1.0	3.6	0.42
65.8% Vehicle	Modified Phenolic Resin Solution*	13.1	91.5	11.10
	Modified Alkyd Resin Solution**	62.2	432.3	52.67
	Stabilizer	0.2	1.7	0.22
	Aromatic Petroleum Thinner	22.4	155.5	21.76
	Butyl Alcohol	1.3	9.3	1.40
	Driers	0.8	5.3	0.58
			1057.1	100.00

Weight per gallon 10.6 lbs. PV = 31.0
Per Cent Volatile in the vehicle by weight = 62.1

*Bakelite Dispersion Resin Solution such as BK3962 or XK16700.

**Alkyd Resin Solution 50% solids. The solids analyzing 35% phthalic anhydride and meeting other requirements of Army-Navy Aeronautical Specification AN-TT-P-656b.

Automotive Primer-Surfacer (Baking)

BAKING TIME – 30 minutes at 275°F

Formula M5427F		Per Cent	Pounds	Gallons
52.1% Pigment	"Pigment E"	7.0	45.8	1.50
	Red Iron Oxide (85% Fe_2O_3)	66.0	432.6	11.64
	Zinc Oxide	7.0	45.8	0.98
	Magnesium Silicate	20.0	130.8	5.49
47.9% Vehicle	Alkyd Resin Solution*	62.4	375.4	48.13
	Melamine-Formaldehyde Resin Solution**	11.4	68.4	8.34
	Xylol	2.6	15.7	2.18
	Mineral Spirits	23.6	142.4	21.74
			1256.9	100.00

Weight per gallon 12.6 lbs. PV = 46.0
Per Cent Volatile in the vehicle by weight = 63.2

*Linseed Oil Modified Alkyd, 30% Phthalic Anhydride. Viscosity in mineral spirits (50% solids)—W to Y, Acid No. 3-7.

**Alkyd Modified Melamine Formaldehyde Resin, 50% solids, Viscosity O to T, Acid No. 1-3.

Primer with Water and Chemical Resistance

Dry to handle – 4 hrs. Re-coat – 6 hrs.

Formula M5725		Per Cent	Pounds	Gallons
43.6% Pigment	"Pigment E"	39.3	200	6.58
	Titanox RA	6.0	30.8	0.88
	Black Iron Oxide*	1.9	9.6	0.24
	Magnesium Silicate	26.4	134	5.63
	Zinc Oxide	26.4	134	2.87
56.4% Vehicle	Alkyd Resin Solution**	48.0	315	39.87
	20 cps Chlorinated Rubber	7.0	46	3.40
	Hi-Flash Naphtha	43.6	286	39.45
	Driers***	1.4	9.5	1.08
			1164.9	100.00

Weight per gallon 11.6 lbs. PV = 36.1
Per Cent Volatile in the vehicle by weight = 59.5

*This quantity of black iron oxide produces a dark gray-green color. By reducing the oxide, lighter olive green to yellow greens can be produced.

**Conforming to Federal Specification TT-R-266, Type I, Class A.

***Driers: 0.8% Lead, 0.09% Cobalt, based on alkyd resin solids.

Economical Primer for Industrial Equipment

Dry to handle and Re-coat – 18 hrs.

Formula M6421		Per Cent	Pounds	Gallons
44.8% Pigment	"Pigment E"	8.1	41.0	1.37
	Zinc Oxide	10.9	55.6	1.18
	Magnesium Silicate	19.4	98.9	4.15
	Iron Oxide (85% Fe_2O_3)	61.6	313.4	8.44
55.2% Vehicle	Alkyd Resin Solution*	67.3	421.6	54.05
	Petroleum Spirits and Driers**	32.7	204.5	30.81
			1135.0	100.00

Weight per gallon 11.3 lbs. = 35.0
Per Cent Volatile in the vehicle by weight = 59.6

*Soybean oil glyceryl phthalate alkyd resin, 30% phthalic anhydride; 60% solids in petroleum spirits.

**Driers: 0.5% Lead; 0.05% Cobalt; 0.03% Manganese, based on vehicle solids.

Marine Atmospheric Primer

Dry to handle and Re-coat — 6 hrs.

Formula M6419

		Per Cent	Pounds	Gallons
47.9% Pigment	"Pigment E"	34.8	190.2	6.34
	Zinc Oxide	13.6	74.3	1.59
	Titanox RA	11.3	62.0	1.77
	Magnesium Silicate	38.7	211.4	8.88
	Tinting Pigments	1.0	5.3	0.17
	Litharge	0.6	3.5	0.04
52.1% Vehicle	Alkyd Resin Solution*	58.9	350.1	44.31
	Petroleum Spirits and Driers**	41.1	244.3	36.90
			1141.1	100.00

Weight per gallon 11.4 lbs. PV = 40.0

Per Cent Volatile in the vehicle by weight = 58.8

*Federal Specification TT-R-266, Type II, Class A.

**Driers: 0.50% Lead, 0.05% Cobalt, 0.05% Manganese, based on vehicle solids.

This is a modified formula based on U. S. Maritime Commission Specification 52-MC-29 in which the corrosion inhibitive pigment has been replaced by a reduced amount of PIGMENT E.

"Pigment E" — Aluminum Paint

Formula M6631

	Per Cent	Pounds	Gallons
"Pigment E"	10.1	1.0	0.03
Varnish*	74.7	7.4	1.00
Aluminum Paste**	15.2	1.5	0.12
		9.9	1.15

Weight per gallon 8.6 lbs.

*Conforms to Federal Specification TT-V-81a, Type II, Class B.

**Conforms to Federal Specification TT-A-468, Type II, Class A.

Paints based on the above formulation may be used as undercoats in multiple aluminum coatings systems or as a combination primer-finish coat in single coat applications. In the latter application, where leafing is important, 0.5-1.0 lbs. PIGMENT E per gallon is suggested. In applications where maximum corrosion inhibition is desired, larger concentrations of PIGMENT E may be used.

Architectural Gray Primer

Dry to handle and Re-coat — 18 hrs.

		Per Cent	Pounds	Gallons
48.0% Pigment	"Pigment E"	8.9	49.6	1.65
	Titanox RA	43.2	240.1	6.86
	Zinc Oxide	5.7	31.7	0.66
	Magnesium Silicate	42.0	233.5	9.81
	Lampblack	0.2	1.0	0.07
52.0% Vehicle	Alkyd Resin Solution*	68.2	410.0	51.92
	Petroleum Spirits and Driers**	31.8	191.4	29.03
			1157.3	100.00

Weight per gallon 11.6 lbs. PV = 36.6

Per Cent Volatile in the vehicle by weight = 52.3

*Federal Specification TT-R-266, Type I, Class A.

**Driers: 0.1% Calcium, 0.05% Cobalt, 0.05% Manganese based on vehicle solids.

In order to obtain a satisfactory brushing paint, some change in petroleum spirits may be necessary due to the type of magnesium silicate used.

(*Important Notice:* The suggestions for use of our products are based upon tests believed to be reliable, however, we do not guarantee the results since the many variables encountered in its use are beyond our control.)

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