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Diamond Alkali Co.
Resins General
Trade Sales
Fire-Retardant Paints

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Mr. O. R. Volk, Lab.
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"INDEXED"

Philadelphia Laboratory
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MEMORANDUM REPORT #M-230

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RETURN TO MARSHALL LABORATORY

USE OF CHLOROWAX IN PAINTS

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On 11/18/48 Mr. James R. Holst and Mr. R. Bynum Smith, of the Diamond Alkali Company, called at this laboratory to discuss the uses of Chlorowax in paints, particularly the use of Chlorowax "70" in fire resistant paints. Present for the laboratory were Messrs. O. R. Volk, C. D. Reinecker, E. C. Fitzgerald and P. F. Rosbach.

Diamond Alkali sells two types of Chlorowax: Chlorowax "70" and Chlorowax "40". Both are made by chlorinating paraffin wax under controlled conditions. Chlorowax "70" is a granulated waxy solid containing 70% by weight chlorine ($C_{24}H_{29}Cl_{21}$) and costs 18 cents/pound. Chlorowax "40" is a sticky viscous liquid containing 40% by weight chlorine ($C_{24}H_{43}Cl_7$) and costs 12 1/4 cents/pound.

Diamond Alkali suggests that Chlorowax "70" be evaluated as a modifier and/or substitute also resinous vehicles in orthodox paints. Chlorowax "40" is recommended as a plasticizer for nitro-cellulose, vinyl resins and chlorinated rubber.

Chlorowax "70" has been used in fire resistant linoleum and tile, shingle stains, interior and exterior house paints, chlorinated rubber paints and fire resistant emulsion type paints. Several competitive fire resistant paints including Plicote, Fyrkote and Sears Roebuck's fire-retardant paint, contain Chlorowax "70".

Very little information on the use of Chlorowax "40" is available, since this is a relatively new product.

Chlorowax "70" is compatible with bodied oils and long oil alkyds, and is almost completely soluble in common thinners. The use of Chlorowax "70" in orthodox paint systems is said to improve (1) water resistance, (2) color retention, (3) gloss and (4) brushing. Usually less than 25% of the solid resin need be replaced with Chlorowax "70" to obtain these results.

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In addition, Chlorowax "70" improves the fire resistance of paints when used in sufficient amounts and in combination with antimony oxide, barium sulfate or red iron oxide.

Diamond Alkali claims to have made satisfactory paints with excellent fire resistance by replacing 50% of the solid resin with Chlorowax "70". (Mr. J. R. Holst will send us some typical formulas). Mr. Holst has had no experience using higher percentages of Chlorowax, but suggests that such paints would produce brittle films. To eliminate this condition mixtures of Chlorowax "70" and Chlorowax "40" should be tried.

Chlorowax does not cause yellowing unless exposed to temperatures above 300°C, at which point some decomposition takes place. Neither does Chlorowax "70" tend to cause settling of pigments on aging. Paints containing Chlorowax "70" also have good sealing and adhesion properties and can be applied over, or re-coated with, orthodox paints.

A fire resistant shingle stain has been made using a mixture of Chlorowax "70" and "40" as the only vehicle, and one manufacture is promoting the use of a solvent solution of Chlorowax "70" as a sealer for plaster walls. In chlorinated rubber paints, a little Chlorowax "70" improves the application properties without changing alkali and acid resistance of the film. Data on the durability of house paints containing Chlorowax "70" are not complete as yet, but preliminary results indicate good performance after two years exposure.

Use of Chlorowax "70" involves no known toxicological problems. Films containing Chlorowax "70" when pyrolyzed evolve HCl, but no free chlorine or phosgene. Diamond Alkali has applied for a patent for a fire resistant composition based on use of Ba SO₄ or red iron oxide in conjunction with Chlorowax "70".

We understand that the use of antimony oxide/Chlorowax compositions also has been patented, and the patent section has been asked to check this situation. For additional information on the use of the Chlorowaxes see Paint, Oil & Chemical Review, May 27, 1948, Vol. III No. 11, page 20.

The test for fire resistant paints used by Diamond Alkali consists of burning cedar shingle coated with the experimental paint. The shingle is divided lengthwise, and half of the shingle is painted on both sides with two coats of the test paint. After drying for several weeks, the shingle is ignited by applying a bunsen burner flame for 30 seconds. The shingle is supported in a vertical position for this test, and the flame is applied to the thin edge at the midpoint. In this test, a fire resistant paint stops the fire at the paint line, while with ordinary paints the shingle is almost completely consumed. Diamond Alkali claims that the Sears Roebuck Flat Wall Fire-Retardant paint has shown excellent fire resistance by this test.

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