Dow Chemical
Emulsion Paints

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MEMORANDUM REPORT NO. M-270:

DOW LATEX WATER PAINTS

Mr. Peterson and Mr. Martin of the Dow Chemical Company visited this laboratory on November 1st to discuss the use of Dow's Latex 512-O and 529-K (butadiene-styrene emulsions) in water paints. The Dow 512-O differs from 512-K, previously used, in that it has better freeze-thaw stability. The 529-K, a high styrene content polymer, is not a film former but can be used to harden 512-O. This replaces their previously recommended use of 580 Latex (100% styrene) for this purpose. The cost of these emulsions is 26 and 28¢ per lb. of solids for 512-O and 529-K respectively.

Mr. Peterson presented two formulas for paints based on these vehicles, copies of which are attached. In the course of discussion, the function of the various ingredients was discussed.

The tributyl phosphate is used as an anti-foam agent and not as a plasticizer. Although it undoubtedly functions as a plasticizer, it is not necessary for this purpose. The trisodium pyrophosphate acts as a pigment dispersant and as a sequestering agent to protect the emulsion from the effects of metal ions.

They recommend the use of casein rather than Methocel as a protective colloid since it produces better brushing and flow properties. We have obtained similar results with a Methocel/Nopalcol 6-LW mixture. Pine oil is also added to improve brushing properties.

The pigmentation was not extensively discussed except for some comment on the use of lithopone, which they included only to demonstrate its compatibility with this system. No unusual properties are obtained through its use. They also suggested the possible substitution of a coarse particle size clay for mica. The recommended clay is Edgar Bros. ASP-400 (DS-20013).

The paint dries in a short time and exhibits good hold-out odor, and brushing characteristics. Due to the high iodine value (120) of the emulsion, the film will harden on aging.

They have not encountered any peeling difficulties, but admit that it is a possibility. Hardening of the film by increasing the 529-K content would be a means of controlling this tendency.

Their claim for the cleanability of this film is essentially that presented by the Glidden Company for its Spred Satin which is presumably made from this resin. Their favorable moisture impermeability comparisons, and presumably those of Glidden Spred Satin, were drawn against other emulsion flats and not to oil solution paints. (A comparison of Glidden's Vapor Barrier Systems with other types of systems will be found in Memo Report M-267.)

On exterior exposure over masonry, they have had only fair results, the greatest failure being through errosion and chalking, although they do not get the excessive chalk washing experienced with Bondex. No comparisons were made with oil or other emulsion paints.

PHILADELPHIA LABORATORY

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Typical Waterpaint Formulations

Formulation W-1-4-6A (Primer Sealer)

Ti-Pure R-200	22	pts.	by	weight
325 Mesh Waterground Mica	78	"	"	"
Tetrasodium Pyrophosphate	0.5	"	"	"
Water	78	"	"	"
Dow Latex 512-O (45% Solids)	133	"	"	"
Dow Latex 529-K (45% Solids)	89	"	"	"
Pine Oil	2	"	"	"
Tributyl Phosphate	6	"	"	"
Dowicide G, 10% Solution	8	"	"	"
Casein, 15% Aqueous Solution (Cut with 10% NH_4OH based on Casein)	27	"	"	"

% Solids - 46.3 Binder to Pigment Ratio - 100:100

Formulation W-1-9-4 (Topcoat)

Ti-Pure R-200	70	pts.	by	weight
325 Mesh Waterground Mica	10	"	"	"
Permalith W-421	20	"	"	"
Tetrasodium Pyrophosphate	0.5	"	"	"
Water	50	"	"	"
Dow Latex 512-O (45% Solids)	67	"	"	"
Dow Latex 529-K (45% Solids)	67	"	"	"
Pine Oil	1.2	"	"	"
Tributyl Phosphate	3.8	"	"	"
Dowicide G, 10% Solution	5	"	"	"
Casein, 15% Aqueous Solution (Cut with 10% NH_4OH based on Casein)	22	"	"	"

% Solids - 51.9 Binder to Pigment Ratio - 60:100

The pigments, tetrasodium pyrophosphate and water are mixed at a fairly high speed. The pine oil, tributyl phosphate, Dowicide G and casein are then added. The speed is then reduced and the two latices are blended in. Vigorous agitation at this point causes excessive foaming.

Stabilizers other than casein may be found more desirable for individual requirements; these include Methocel, alpha protein, carboxy methylcellulose, etc.