CROSS REFERENCE:

Gloss Emulsion Paints
Speed Easy

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AP 16'58

Philadelphia Laboratory
May 18, 1948

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MEMORANDUM REPORT #M-197:

AMMONIUM POLYMETHACRYLATE:USE IN EMULSION PAINTS

Re: Dyestuffs Report #22458, 12/14/46
Ltr. Shiels to Green, ICI 3/12/48

This report covers a spot evaluation of ammonium polymethacrylate which was believed to be a possible substitute for casein in emulsion paints. Although the reference report gives complete details on the method of manufacturing the product, it has very little information concerning the properties or possible usage of ammonium polymethacrylate except that it is "of interest as a thickener for synthetic latices".

Ammonium polymethacrylate was found unsuitable as a casein substitute in gloss emulsions because of its detrimental effect upon gloss, application properties and stability. However, it is of continuing interest, as such, in the Speed-Easy type formula where improvement in ease of application and lapping was noted.

As obtained from ICI Dyestuffs Division, the 13% aqueous solution is clear and quite viscous (150 Stormer), resembling solutions of CMC or Methyl Cellulose. On a drawdown, the solution dries within one hour to a clear, hard and brittle film. It has poor adhesion to glass and flakes off after a period of one day. This dried film is readily redissolved in water.

Ammonium polymethacrylate is found to be unsatisfactory as an emulsifying agent when used to replace the Protovae (modified casein) solution, wholly or in part, in the standard Semi-Gloss Emulsion formula. It has a flatting effect on the gloss and its high viscosity results in very low solids at a brushing consistency. The following table gives a comparison of these paints with control formula, P-100-R-15243.

	Wt.APM / Wt.Protovae	Per cent Solids, wt.	Stormer Viscosity	ASTM Gloss
P-100-R-15226	50/50	30.1	96	Flat
P-100-R-15227	25/75	37.0	79	42
P-100-R-15243 (Control)	0/100	43.7	70	50
P-100-R-15247	100/0	(W/O type emulsion)		

Application properties of these paints are likewise inferior to standard. As might be expected, they have very poor build. P-100-R-15226, owing to its extremely low solids, has very good spreading, but P-100-R-15227, with only slightly higher solids has considerably more drag on the brush than control, which has even higher solids.

After aging for one month in the can, the ammonium polymethacrylate separates out; however, it is readily remixed into the emulsion.

When used in place of casein in the Speed-Easy formula, ammonium polymethacrylate forms a stable product which requires an extreme reduction to obtain a brushable viscosity. For a viscosity of 65 Stormer, a reduction of 5/12.5 (5 parts paste to 12.5 parts water) is required, whereas the Speed-Easy control requires only a 5/3 reduction. This paint is characterized by low solids, low hiding, poor color, very good spreading and practically no lap drag nor lap marks when brushed out over a porous surface. This ease of application is very interesting, and for this property, ammonium polymethacrylate should be examined further when a reformulation of an improved Speed-Easy is undertaken.

This paint is not easily washed from the brush and its wet erosion resistance, after aging two weeks, is only one-fourth that of the control.

Details will be found in Book 3443, Expts. 77, 81, 91 and 95.

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