

RETURN TO MARSHALL LABORATORY LIBRARY

C-1
Philadelphia Laboratory
January 30, 1946

MEMORANDUM REPORT #M-24:

REFERENCE COPY

NOT FOR CIRCULATION
EVALUATION OF FOUR PROTEIN FREE
EMULSION-TYPE PAINTS

"INDEXED"
Je 10'58

Ref: (1) "Continuous Film Producing Emulsion Paints"
by F. B. Stieg, Paint & Varnish Production
Manager - Sept. 1945.

(2) Notebook #2981, Pg. 72-80.

In the above paper the author states that present day emulsion type paints are deficient in two major respects: (1) their failure to lay down a satisfactory film, and (2) the specialized equipment and number of ingredients necessary for their manufacture. In a few paragraphs the author treats the other various problems involved in emulsion paint formulation with a marked tendency to over-simplification. The subjects covered include; protective colloids, emulsifying agents, optimum pigmentation, and optimum oils or resins.

The four typical paints described are of the borderline O/W type, for which the author claims superior wet erosion resistance. They contain no protein (except for Type I, which contains a small amount of casein) and are similar in composition to the T-1279 products. For these typical formulations the following claims are made: (1) washable films after overnight dry, (2) no paint odor, (3) stability of emulsion even after thinning, (4) emulsion stability to the freeze test, (5) a non-putrefiable protective colloids, (6) effective sealing of porous surfaces, (7) no flaking with successive coats, and (8) brushes cleaned easily.

When formulated as closely as possible from the materials indicated, these paints have been found to possess generally unsatisfactory brushing properties, varying from fair to the impossible. And furthermore, it appears that the hiding power of these paints (except for Type 3) is inferior to our standard Speed-Easy. The best of these four paints has a wet erosion resistance approximately equal to that of our split phase Speed-Easy after three weeks dry.

Type I

Emulsion very unstable when reduced to brushing viscosity; breaks down with brushing. Has a strong sweetish odor of turkey red oil. Unreduced emulsion still stable after three weeks.

Type II

This was the best of the four paints. Fair brush and lap. Dries in 24 hours. Very flat finish. Yellowing of film noticeable

after three weeks. Wet erosion resistance 285 strokes after three weeks. Reduces with some difficulty, tending to form clumps with addition of water. These clumps are difficult to disperse, but seem to remain fairly well stabilized once dispersion is effected. Unreduced emulsion still stable after three weeks.

Type III

Forms a very unstable emulsion apparently of the W/O type, for it cannot be reduced with water. In contrast to the other three paints, this type is very thin; having a viscosity similar to orthodox oil paints. The other three types form pastes with viscosities similar to that of the Speed-Easy paste.

Brushing properties for Type III are poor, even when slightly reduced with mineral spirits. The color is a rather dirty tan instead of white. Has a very strong paint odor. Forms a glossy film, but the film dries very slowly, being still tacky after 72 hours and soft after three weeks. Brush is very difficult to clean.

Type IV

Fair brush, poor leveling and poor lap. Film yellows badly after three weeks. Very flat finish. Brush cleans very easily. Good emulsion stability and easily reduced. Drying time about four days. Rather poor hiding.

Type I

Pigments used: DS-15427 (TiO₂ - LOCR) and W-4
Resin/Oil: G-43 & H-19
Driers: VD-1450 & VD-5087
Emulsifying agents: H-522 & Casein (K-2770)
Other materials: Methyl Cellulose, NaOH solution and water.

Type II

Pigments used: W-54 & W-53
Resin/Oil: G-43 & H-19
Driers: VD-1450 & VD-5087
Emulsifying agents: H-522, H-87, Starch, and Polyethylene glycol (Mol. Wt. 300)
Other materials: NaOH solution and water.

Type III

Pigments used: W-54, W-28 & W-53
Resin/Oil: G-43, H-572, H-241 & H-255
Driers: VD-1450 & VD-5087
Emulsifying agents: H-522, H-87 and Polyethylene glycol (Mol. Wt. 300)
Other Materials: Methyl Cellulose, NaOH solution, and water.

Type IV

Pigments used: DS-15427 (TiO₂ - LOCR) and W-4
Resin/Oil : G-43, H-259 & G-12
Driers: VD-1450 & VD-5087
Emulsifying agent: H-522
Other materials: NaOH solution.

N.B. Although this last formula contains no water it was found necessary to incorporate a small amount of water into the paste to effect thorough mixing.

PHILADELPHIA LABORATORY

P. F. Rosebach. —

P. F. ROSEBACH

PFR:IWB