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Marshall Laboratory
March 29, 1965

MARSHALL DEVELOPMENT LABORATORY RELEASE LETTER NO. 2042
TRIAL MARKETING OF 310-204 SULFIDE FUME RESISTANT "LUCITE"
HOUSE PAINT WHITE

Related Release Letters: 1925, 1926

COST CODE - 3350

CLASS "C"

PROPOSAL AND EXTENT OF RELEASE:

(1) This letter proposes the trial marketing of 310-204, a mercury-free, fume-resistant replacement for 310-183 #50 White, in the Gulf Coast areas served by the Houston, New Orleans and Jacksonville P.D.W.'s. The exact extent and duration of this trial marketing is to be determined by Consumer Products management who have requested this proposal at this time because of competitive activity in this area with fume-resistant products. Requirements of 310-204 for the rest of 1965 is estimated at 32 thousand gallons.

(2) In addition to the above, the laboratory makes the following additional proposal: that the "B" Program, with "Lucite" house paint used self-primed, be extended to include 310-204 in the proposed area. This will discontinue the use of #49 Blister Resistant Primer which is subject to sulfide staining to an extent that it can affect the topcoat appearance.

MANAGEMENT DECISION REQUESTED:

Management is asked to decide if 310-204 should be released for sale at this time and if proposal (1) or both (1) and (2) should be selected. The following should be considered:

1. The problem of sulfide staining is only partially solved if use of #49 Primer is continued. This will result if proposal (1) only is approved.

2. Approval of proposals (1) and (2) will assure a completely sulfide stain resistant system.

3. An appreciable change in film properties and durability behavior will result from this formulation change. However, the overall balance of properties is expected to provide a desirable improvement. Our laboratory durability background is broad and supports this feeling.

4. Busan 11 M-1, barium metaborate, is required. This is a new raw material subject to Buckman Laboratories licensing agreement. It is available only from this one supplier and we have not thoroughly established its uniformity.

5. Manufacturing reproducibility of 310-204 has not been established but we do not anticipate any serious problems.

6. An increase in mill cost of approximately \$0.12 per gallon is involved.

TECHNICAL OPINION:

We believe that the sale of 310-204 in the proposed Gulf Coast area is technically sound. However, the full advantages of this fume-resistant product will not be obtained either technically or commercially unless the complete paint system is fume-resistant and we urge approval of both proposals (1) and (2).

Not only will this product alleviate a condition which has retarded sales of "Lucite" house paint in this area but it will provide the first opportunity to observe the performance in the field of a paint which uses Busan 11 M-1, barium metaborate, a preservative pigment whose ultimate usefulness has not been completely evaluated in laboratory studies. Its use is also expected to improve resistance to mildew and nail head rusting. Success in this limited sale will provide the confidence in this composition which will allow increased formulating latitude in future developments.

As in previous changes in "Lucite" house paint composition the primary area of concern is performance of 310-204 over old paint with heavy chalk and/or dirt. If used as directed; that is, to wash off heavy dirt and chalk, there should be no problems. If the surface is not washed, we do not know if the paint will stick; so far, in two years on houses in Philadelphia there have been no problems. We believe the technical and commercial advantages to be gained from this release outweigh the consequences of any possible failures of this type and we favor approval.

DESCRIPTION OF PRODUCT:

Because of the use of mercury (phenyl mercury oleate) as preservative and mold inhibitor, 310-183 #50 White discolors in the presence of hydrogen sulfide fumes. These functions of mercury are assumed by barium metaborate in 310-204 thus providing a fume resistant composition.

Barium metaborate is a pigment which has properties similar to those of zinc oxide in oil paints. With its use, at a 1 lb. per gallon concentration, there are a number of other changes in properties that may be evident to users who are familiar with the current #50 White.

(1) To make room for the barium metaborate, all of the mica has been replaced. This results in a lower initial gloss and, after the paint starts to chalk, a lack of the lustre sparkle that is typical of "Lucite" white.

(2) Barium metaborate is a rust inhibitive pigment. This is evident in two ways: there is a marked reduction in can corrosion through two years of storage, and when painting over iron such as bare nailheads, there is a reduced tendency to show rust discoloration. This property plus its white color make it attractive in corrosion resistant primers especially of the emulsion type.

(3) Barium metaborate retards chalking of "Lucite" house paint; thus, in dirty areas there is a longer period of dirt collection prior to clean-up via chalking; however, mildew resistance is improved during this period.

(4) Paint films containing barium metaborate are alkaline when wet and may cause solvation of discoloring materials from previous coats of paint. This happened on a house test in Texas where tetrachlorophenol (normally insoluble in water) was leached from an experimental primer and resulted in a yellow discoloration in 310-204. We do not presently use tetrachlorophenol as an inhibitor and this is not expected to lead to significant field problems. Other film properties, application and viscosity behavior are unchanged.

Stability: Shelf stability of 310-204 (310-W-75261 made for field tests in 1963) has been excellent for two years.

Durability: Acrylic emulsion paints containing barium metaborate have been on exposure for over 4 years and 310-204 (as 310-W-75261) for two years. Except for the change in chalking characteristics, there have been no adverse durability performances and the fume-resistance property has been dramatically demonstrated on the house in Newgulf, Texas.

COMPETITIVE SITUATION:

Competitive products of a fume-resistant nature have not been evaluated.

TABULATION OF COMPOSITIONS:

The following table compares 310-204 with 310-183 and lists the ingredients on a basis of pounds per 100 gallons.

	<u>310-183</u>	<u>310-204</u>	<u>Change</u>
W-4 Magnesium Silicate	69.6	69.0	
W-88 Mica	69.6	-	(2)
W-178 Barium Metaborate	-	98.9	(2)
W-16 "Ti-Pure" PP	39.9	40.0	
W-50 "Ti-Pure" R-610	187.5	185.9	
G-756 Rhoplex AC-34	555.0	551.0	
H-454 10% Phenyl Mercury Oleate	20.6	-	(1)
G-718 Potassium Tripolyphosphate	1.1	1.1	
G-747 Anti-foam	3.0	3.8	(3)
G-732 Acrysol A-3, Thickener	3.2	3.2	
G-1111 Methyl Cellulose, Thickener	1.6	2.0	(3)
H-609 Triton X-100, Surfactant	0.4	-	(4)
H-727 Tamol 850, Surfactant	-	3.0	(4)
H-284 Ammonia	3.0	1.5	(5)
H-514 Ethylene Glycol	17.3	16.4	
H-506 Water	153.2	170.2	(6)
Total	1125.0	1146.0	(7)
Gal. Wt.	11.25	11.46	(7)
PVC	30	30	
Solids, Vol.	40	40	
Solids, Wt.	56	57	

Explanation of Changes:

- (1) Mercury is removed to make the product resistant to sulfide fumes.
- (2) Functions of PMO, can preservation and mildew inhibition, taken over by non-staining barium metaborate pigment which displaces W-88 mica in the pigmentation.

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- (3) With removal of mineral spirits with the mercury, more anti-foam and more thickener are required.
- (4) Triton X-100 is replaced by Tamol 850 as a necessary stabilizer when barium metaborate is used.
- (5) Less ammonia is required because barium metaborate is alkaline and buffers the paint in the 9.5-10 pH range.
- (6) Added water is used to make up for volume losses resulting from above changes.
- (7) Higher density is result of using higher density barium metaborate in place of W-88 mica.

REPRODUCIBILITY:

Production of 310-204 is limited to two semi-works batches made two years ago on the code 310-W-75261. Both batches were made on formula but the first batch exhibited an undesirable amount of undispersed pigment grit. A change in the order of addition and adjustment of liquid content in the grind of the second batch resulted in a completely satisfactory batch.

Uniformity of Busan 11M-1 has not been established.

CONTINUING LABORATORY WORK:

- (1) Modernization of the mill base to increase pigment loading and reduce mill cost should be effected during alignment.
- (2) Test houses will continue to be inspected for any unusual properties.
- (3) Exposure studies of reduced concentrations of barium metaborate for further economies are already in progress.

COST INFORMATION:

Mill cost of 310-204 in one's is estimated at 12¢/gal. more than 310-183 #50 White. Part of this difference is due to the processing of a larger amount of mill base and part contributed by cost of barium metaborate. Alignment adjustments and purchase of barium metaborate in larger amounts could reduce this difference as much as 5¢/gal.

Actual costs should be obtained from the Cost Department.

MANUFACTURING PROBLEMS:

310-204 is manufactured in existing equipment and by usual techniques; no difficulties are anticipated in its manufacture.

Barium metaborate, W-178, is available from only one supplier, Buckman Laboratories, Inc. in Memphis, as Busan 11 M-1. Although this pigment has been under investigation for a number of years, this will be the first extensive use of this material. In addition to its utility as a mildew inhibitive pigment, it has corrosion resistant properties and is being actively investigated in this area.

TOXICITY OR OTHER HAZARDS:

310-204 is somewhat less toxic than 310-183 both in its manufacture and in its use with the effect due to the use of barium metaborate and elimination of mercury. W-178 has an S-1 Classification, an irritating dust; whereas H-454, phenyl mercury oleate, has an S-3 Classification. The low toxicity of the finished product is evidenced by an FDA clearance for use of coatings products with Busan 11 M-1 in food processing areas.

LABEL INFORMATION:

A new label analysis will be required. New label directions may also be required depending on the finishing system selected for sale.

SIMPLIFICATION:

This release will have an adverse effect on simplification in that one new dispersion and one new finished product will be added as well as a new raw material W-178, barium metaborate.

PATENT INFORMATION:

No patent complications are currently known to be involved in the manufacture and sale of the proposed acrylic latex paint formulated with AC-34 acrylic latex purchased from Rohm and Haas. Inasmuch as the latex and the paint formulated therefrom are apparently covered by U. S. Patent 2,795,564, issued to Rohm and Haas and licensed to Du Pont, the label should be patent marked with this patent number. However, since the latex is purchased from the patent owner, the paint product is not subject to royalty payment. In the event that an alternate composition is shown on the formula card specifying a Du Pont produced latex processed according to the teachings of the licensed patent, the resulting alternate paint product is subject to royalty payment and is to be labeled with the patent marking.

Use of barium metaborate (W-178) in certain paint vehicles is covered by U. S. Patent 2,818,344, issued to Buckman Laboratories, Inc., and licensed to Du Pont on a graduated schedule of royalty payments. The patent does not apply to the use of barium metaborate in an acrylic copolymer vehicle such as specified in the proposed composition and, therefore, the proposed acrylic latex paint composition is not subject to royalty payment under U.S. Patent 2,818,344.

CONFIDENTIAL INFORMATION:

There are no unusually confidential disclosures in this release letter.

FORMULA CARDS:

Formulas for 310-204 and its base are attached to copies of this letter for Research and Production personnel.

MARSHALL DEVELOPMENT LABORATORY

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APPROVED: *W. J. L. L. L.*

DATE

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