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File: 3320

Marshall Laboratory
July 20, 1966

MARSHALL DEVELOPMENT LABORATORY RELEASE LETTER #2075
67-790 WHITE "DULUX®" PRIMER
P-1906 - NEW PRODUCTS

PROPOSAL AND EXTENT OF RELEASE:

The unsightly appearance of white highway guard rails spot-primed with dark colored primers prompted us to develop a white alkyd primer for this use. This product is 67-790 White "Dulux" Primer and this letter proposes unlimited national release for the initial priming and spot-prime refinishing of non-galvanized steel guard rails. 67-790 will provide improved appearance and better night visibility compared to colored primers during the painting period before the topcoat is applied.

We also propose that I.M. Sales conduct sufficient field applications on other steel structures to determine if 67-790 and one finish coat of a white "Dulux" enamel will provide good appearance and promote customer interest due to the labor-saving feature of fewer coats of paint to provide solid hiding. Based on the results of this field evaluation Sales may expand release of 67-790 as they see fit.

MANAGEMENT DECISION REQUESTED:

1. A new mill base 39-5102 is required. This is anti-simplification.

2. Alignment of the mill base and finished product is incomplete.

3. No field test information is available but replicate exposure panel results show good corrosion resistance performance. No exposure study of systems using 67-790 under I.M. topcoats has been made because we do not consider this necessary. The Busan supplier has extensive field experience with this type composition under commercial topcoats.

4. An annual potential of 1,500,000 gallons is estimated for combined highway uses on guard rails, bridges, culverts and other structures. We do not know what percentage covers guard rails but it is probably a sizeable amount.

DESCRIPTION OF PRODUCT:

67-790 is a white, oil modified "Dulux" type product containing Busan (Barium Metaborate) pigment as the corrosion inhibitor and designed for use as a maintenance coating for areas not requiring chemical protection. This product is characterized by its excellent corrosion resistance over all types of ferrous substrates including hand cleaned rusty scale bearing steel. Its performance is superior to 67-746 Zinc Chromate primer, our largest volume maintenance primer.

It is expected that this product, since it is white and offers corrosion protection, will find use on highway guard rails where spot priming is done extensively. It also may be used as a primer where the typical red primers create a problem when low hiding white topcoats are used.

Application Properties:

Application may be made by hot or cold conventional or airless spray and by brush or roller. If application is by spray 5-10% of #200 "Dulux" Thinner may be required. Brush and roller applications should require no reduction. Approximately 2.0 mils dry film thickness should be applied per coat. Recoat time is 24-48 hours. "Dulux" topcoats may be used without restriction. Other types of topcoats, especially those containing oxygenated solvents, may cause lifting at certain periods of time and should be spot-tested before full scale application is attempted.

Physical Properties:

	67-790	67-746
Gallon Weight	12.98 lbs.	13.83 lbs.
Wt. Solids	86.61%	83.01%
Vol. Solids	75.28%	66.73%
PVC	33.33%	41.37%
P/B	176/100	256/100
Dry Time, Set-to-touch	4-6 hrs.	4-6 hrs.
Dry Time, Tack Free	8-12 hrs.	8-12 hrs.
Dry Time, To Recoat	24-48 hrs.	24-48 hrs.

Durability:

The initial exposure (Series #19535) showed 67-790 to be superior to full alkyd primers 67-738 (red lead) and 67-754 (zinc chromate), and oil modified alkyd primers 373-785 (red lead) and 67-746 (zinc chromate) over hand cleaned rusty mill scale bearing channel irons after 1 year 45°S. in Delaware and Florida. This was confirmed by a subsequent exposure (Series #20583) in which quadruplicate channel irons as described above were prepared. In this series 67-790 was superior to 67-746 and equal to 373-785 after one year 45° South in Florida. 67-738 and 67-754 were not included the second time.

Over sandblasted steel none of the four controls or 67-790 are showing any rusting after 2 years 45° South in Florida and Delaware. 67-790, however, has shown erosion and surface crowsfoot checking in Florida. This occurred sometime between the first and second year of exposure and is not unusual for untopcoted primers.

Since 67-790 is a conventional oil modified alkyd primer similar in physical properties to a number of our I.M. primers we decided that exposures of systems using 67-790 under I.M. topcoats would not be necessary.

Two separate exposures of 1000 hours duration in the salt spray cabinets also showed 67-790 to be superior to the four control primers previously mentioned.

Package Stability:

Thirty-four (34) months shelf stability has been completed satisfactorily. The viscosity has shown an increase but it is not excessive. Drying properties are unaffected after this length of time.

EXHIBITS:

Photographs of the second Florida exposure over the channel irons and the salt spray exposures are attached to appropriate copies of this letter.

COMPETITION SITUATION:

We are not aware of any competitive alkyd type product that is advertised as a white corrosion resistant primer.

TABULATION OF COMPOSITION:

Ingredient	Lbs./100 Gallons 67-746	67-790	
RC-311 Soya Alkyd (60% solids)	265.2	251.5	
H-253 Raw Linseed Oil	158.8	250.4	
W-609 C.P. Zinc Yellow Y-733-D	311.1	-	
W-870 Iron Oxide	240.3	-	
W-98 Talc	265.1	-	
W-185 Titanium Dioxide R-902	-	205.6	
W-178 "Busan" 11 M1	-	290.7	(1)
W-132 Talc	-	152.8	
W-88 Wet Ground Mica	-	35.6	
W-603 Powdered Litharge	-	24.1	(2)
H-601 Hydrocarbon	81.7	39.8	
H-287 Mineral Spirits	33.4	20.7	
H-624 Lead Naphthanate Soln. 24%	16.1	-	
VD-5822 Lead Tallate Soln. 24%	-	17.8	(3)
H-173 Manganese Naphthanate Soln. 6%	6.1	3.4	
VH-7552 Inhibitor Soln. 10%	5.2	5.6	
	1383.0	1298.0	

Explanation of Changes:

(1) "Busan" 11 M1 is the corrosion inhibiting pigment.

(2) Litharge is used to improve the drying properties.
NOTE: The pigment composition ratios are those suggested by the manufacturer of "Busan".

(3) Lead Tallate is a direct substitution for Lead Naphthanate as a drier.

REPRODUCIBILITY:

No production batches of this product have been made so large scale reproducibility information is not available.

Laboratory batches have shown larger than normal variation in initial viscosity. It is believed that this is caused at least partially by the batch-to-batch variation in the oil absorption of the "Busan" pigment. Since grinding and other solvent losses are magnified in laboratory production we feel this problem of viscosity variation should be rectified during the alignment batches in full scale or semi-works equipment. Possible solutions are to widen the viscosity limits and/or tighten the specifications on the "Busan" pigment.

Other than viscosity no problems should occur since this is a standard "Dulux" type product.

CONTINUING LABORATORY WORK:

The exposure over sandblasted steel is still active and is being followed. The laboratory will work with the alignment group during the initial production period to arrive at a solution to the initial viscosity problem.

Initial field applications will be followed.

67-790 is expected to be mildew resistant due to the use of Busan and additional exposures will be made to determine if 67-790 will up-grade the mildew resistance of our alkyd tank white system.

COST INFORMATION:

The unofficial mill cost of 67-790 is $3.25 per gallon. This compares favorably on a square foot cost basis with 67-746 which has an unofficial mill cost of $3.13 per gallon. Official costs may be obtained from the cost department. Mill costs per square foot at 1.0 mil dry film thickness are shown below. Since 67-790 is subject to a royalty of 4¢ per gallon a third figure adding the royalty to the mill cost is shown.

	Mill Cost/Sq. Ft. at 1.0 mil DFT
67-746	0.293 cents
67-790	0.269 cents
67-790 Royalty Added	0.272 cents

MANUFACTURING PROBLEMS:

No manufacturing problems other than outlined under reproducibility are anticipated.

No new raw materials are involved.

No new processes are involved and no new equipment is required. The dispersion requires a "47 Process" grind.

No unusual control tests are necessary.

Special containers are not required.

TOXICITY OR OTHER HAZARDS:

No unusual toxicity problems are present.

LABEL INFORMATION:

Standard "Dulux" labels may be used. However, the labels will require a lead warning notice.

SIMPLIFICATION:

This release will not affect manufacturing procedures. One new dispersion base is required which will be classified as C-restricted to existing products.

PATENT INFORMATION:

No patent complications are currently known to be involved in the manufacture and sale of the proposed primer 67-790.

Use of "Busan"-11 barium borate pigment in this formulation, the film forming vehicle of which consists essentially of soya oil modified alkyd resin and raw linseed oil, is according to the teachings of U.S. Patent 2,818,344 assigned to Buckman Laboratories, Inc. and licensed to Du Pont with a graduated schedule of royalty payment, the highest rate being 4 cents per gallon.

The license agreement does not include a requirement of patent marking under U.S. Patent 2,818,344.

CONFIDENTIAL INFORMATION:

No unusually confidential information is contained in this release.

FORMULA CARDS:

Formulas for 67-790 and its base 39-5102 are attached to the Research and Production copies of this letter.

MARSHALL DEVELOPMENT LABORATORY

D. C. Burkhart

D. C. BURKHART

DCB:jzs
7/19/66

APPROVED: R. L. Saunders DATE: 7/20/66
APPROVED: _____ DATE: _____

203 | END USE | | | [illegible] | COLOR | WHITE
204 | FORM. | D C BURKHART/J | | | S.S.G.F. | 8299-174
205 | REVISER | D C BURKHART/CCA | | | PLANT | PHILA/S/
206 | PREV. F. | T-4-20-66-P | V.C. REV. | | APPR. | WPC/KCL/WFG
307 | R.P.I. | USE CHLORIDE PROCESS TIO2 IN BASE.
208 | S.T.P. | | QUAL. STD. | 57-790-P | COL. STD. | W-67-790-P

TESTING INFORMATION

309 DRY TIME TM-219-A TACK FREE 8-12 HRS //
310 FILM PROPS TM-340-A = STD //
311 BRUSH TM-365 APPLY OVER CRS TEST FOR ALL PROPS //

320 | VOL. SOL. | 753 % | PIG. VOL. | 353 % | WT. SOL. | 866 %

OTHER INFO.

321 NOT TO BE USED FOR OTHER THAN EXPERIMENTAL PURPOSES
322 UNTIL RELEASE LETTER IS APPROVED //

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529 | CODE | 67 | 790 | NAME | WHITE "DULUX" PRIMER | DATE | 72056
530 | PAT. MAR. | | VISC. | 10C 50-70" | FINE. |
531 | CONT. | REGULAR | GAL. WT. | 1298.0 | ACC. INFO. | 4150

INGREDIENTS AMOUNTS AND MANUFACTURING DIRECTIONS

	INGREDIENT		#	SC	ALT. #1		ALT. #2
632	DO NOT CONTAMINATE WITH OTHER PRODUCTS //						
734	39	5102			1148	8	
735	RC	311			105	6	
736	VH	7552		S2	5	6	
737	VD	5822		S2	17	8	
738	H	173			3	4	
639							ADD MIX 30 MINS. TAKE VISC.
740	H	601			16	8	
641							THIN TO VISC
742		TOTAL			1298	0	
644	SUBJECT TO ROYALTY - BUCKMAN AGREEMENT //						

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