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Marshall Laboratory
March 31, 1964

MARSHALL DEVELOPMENT LABORATORY RELEASE LETTER #2013

CONVERSION OF "DUCO"* SPRAY MAGIC LINE FROM AN
ALKYD VEHICLE TO A NITROCELLULOSE LACQUER VEHICLE

PROPOSAL AND EXTENT OF RELEASE:

This letter proposes the conversion of our "Duco" Spray Magic aerosol enamels to a nitrocellulose lacquer basis. The present quality, with the exception of three acrylic lacquer items (Clear, Gold and Silver) is on an alkyd enamel basis. It also proposes a revision of the line to discontinue Jade Green, Cool Blue and Crystal Pink and to introduce a Copper color.

The base lacquers will be manufactured by Du Pont, but the aerosol packages will be prepared by a contract filler. The same procedure exists now with the alkyd products.

This letter is being issued at the request of the Consumer Products Marketing Section. The extent and programming of the release will be determined by them. They have handled the arrangements with the packager and we have acted as an initial property evaluator only in this program.

MANAGEMENT DECISION REQUESTED:

Management is requested to consider this proposal with the following points in mind:

1. The reported economics favor the proposed line compared to our current Spray Magic. (Marketing should give details).

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2. The nitrocellulose lacquer approach results in a significantly different balance of properties. (See Description of Product).

3. The Marshall Development Laboratory has no background with these formulations except for a very limited (one package each) initial property evaluation. Sprayon Products, Inc. has done the final package formulation and they or any other packager chosen should assume responsibility for stability.

TECHNICAL OPINION:

We believe that this proposal presents some risk primarily in the area of package stability. Based on past experience with Sprayon we have confidence in their technical ability in this field but feel that there is a good possibility that one or more of the compositions will need further adjustment as stability data is collected.

In the event some packager other than Sprayon is chosen, the initial properties evaluation should be repeated. Based on our experience with the proposed packages, we favor only a limited release at this time.

DESCRIPTION OF PRODUCT:

The lacquer aerosols produce a set-to-touch film in 15 minutes whereas the current products dry in 4-5 hours; however, the lacquers are significantly lower in gloss, lack "fullness", and show poorer leveling. The difference in gloss at 60° varies from 2 to 16 units over aluminum and 2 to 39 units over wood depending upon color. The lacquers also show lower hiding and square foot coverage per can than the alkyds. This loss of coverage may be as much as 50% for colors in the yellow/red range. Typical comparisons are as follows:

ITEM	Square Feet Coverage/Can	Passes to Complete Hiding
430 Primrose Yellow - Alkyd	6	5
" " " - Lacquer	4	6
431 Admiralty Blue - Alkyd	13.5	2
" " " - Lacquer	8.5	3
432 Chinese Red - Alkyd	6	6
" " " - Lacquer	3	6
the only exception to this trend was		
434 Hunter Green - Alkyd	8	3
" " " - Lacquer	10	3

(Further details are available - refer Inv. WT-1-64).

The proposed products are freer from solvent popping and undispersed pigment than our present line. The latter factor should reduce the incidence of clogged tubes and valves. The lacquers would be expected to lift old alkyd films; however, our work showed none (except the Copper color) over alkyd films that had been aged for 72 hours. Determinations on either side of this time were not made because of sample limitations. The lacquer adhesion to metal is improved over the alkyd up to 24 hours, however, after the alkyd has dried more thoroughly, the two are about equal in adhesion. We have no data to offer on durability. We would predict the lacquer material to be generally poorer, especially since ester gum is part of the vehicle.

COMPETITIVE SITUATION:

Most of our aerosol competitors are offering fast dry products. One of the largest producers, Krylon, uses acrylic vehicles in some colors and nitrocellulose/alkyd systems in others. Sprayon Products, Inc. offers vinyl toluene modified alkyd in their proprietary line. To our knowledge we are the only major producer offering the slower drying alkyd enamel aerosols. We assume that the Marketing Section is of the opinion that the proposed composition will meet the general quality level of competition.

TABULATION OF COMPOSITIONS:

Since the amount and types of reducing thinners and quantity of "Freon"-12 added to the base paints is unknown to the author package compositions are not shown. However, a typical lacquer base paint (243-84481 #2439 White) and a typical alkyd resin base paint (81-62623 #439 White) are shown below.

81-62623
(Base White for 439 Duco Spray Magic White - Present
Alkyd quality)

<u>Ingredient</u>	<u>Chemical Commercial Name</u>	<u>Lbs./100 Gal.</u>
RC-453	Medium Oil Soya Alkyd	573.5
VM-7790	Anti-settling solution	16.1
H-287	Mineral Spirits	37.7
T-8629	Hydrocarbon blends	37.6
W-43	Titanium dioxide	322.5
H-172	Cobalt Drier Solution	2.8
H-624	Lead Drier Solution	6.0
42-501	Mineral Violet Shading Base	0.4
42-514	Ultra Marine Shading Base	1.3

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81-62623 (Cont'd.)

<u>Ingredient</u>	<u>Chemical Commercial Name</u>	<u>Lbs./100 Gals.</u>
45-1224	Carbon Black Shading Base	2.9
42-630	Yellow Iron Oxide Shading Base	0.3
VH-7552	Inhibitor Solution	2.5
T-8632	Hydrocarbon Blend	32.4
		<u>1036.0</u>

243-84481

(Base White for Proposed "Duco" Spray Magic White -
Lacquer Quality)

<u>Ingredient</u>	<u>Chemical or Trade Name</u>	<u>Lbs./100 Gals.</u>
H-49	Redistilled Toluene	114.4
RL-233	Medium Oil Coconut Alkyd	146.4
G-608	Ester Gum	67.7
PX-7420	1/2 sec. Nitrocellulose	36.6
PX-7400	1/4 sec. Nitrocellulose	60.4
W-123	Titanium Dioxide	165.6
W-10	Fine particle size zinc oxide	8.2
H-6	Butyl Acetate	116.2
H-35	Methyl Ethyl Ketone	118.9
H-44	Methyl Isobutyl Ketone	47.6
H-79	Cellosolve Acetate	19.2
G-697	Phosphoric Acid	0.9
VH-5379	Silicone solution	9.2
243-0514	Ultra Marine Shading Base	3.7
253-0222	Carbon Black Shading Base	Trace
		<u>915.0</u>

REPRODUCIBILITY:

Production to date consists of one batch of each color of base paint. No reproducibility data are available. Since the formulae are typical nitrocellulose lacquer compositions we do not anticipate any reproducibility difficulties.

CONTINUING LABORATORY WORK:

The Marshall Development Laboratory will follow stability of retains submitted by the loader to insure that the packages are still satisfactory for use after prolonged storage periods. It is assumed that the contract with the selected packager will require submission to DuPont of two packages from each batch. The arrangement has been included in past contracts with Sprayon.

COST INFORMATION:

Although we do not have access to finished package cost figures, the following mill costs of the white base paints should serve as a guide. (More exact cost data can be obtained through official channels).

<u>Code</u>	<u>Mill cost per gal. (max. batch size filled in drums)</u>
81-62623 (current quality white alkyd)	\$2.40
243-84481 (lacquer quality white lacquer)	\$2.14

Costs of finished packages as loaded by Sprayon Products, Inc. will be available in the Marketing Section of the Consumer Products Division.

MANUFACTURING PROBLEMS:

We are not aware of any manufacturing problems associated with this proposal. The base lacquer paints are prepared by normal lacquer techniques. No new raw materials, intermediates, or equipment will be required.

TOXICITY OR OTHER HAZARDS:

Each of these lacquer aerosols has been tested by the Freon Products Laboratory and found to be "Extremely Flammable" by their interpretation of the New York City Fire Department Regulation. In this respect they are no different than our current Spray Magic Line.

Under the Federal Hazardous Substances Labeling Act all of these products will require special labeling due to the solvents present. It is also noted that 243-84480 (#2432 Chinese Red), 243-84482 (#2430 Primrose Yellow), and 243-84485 (#2434 Hunter Green) are formulated with lead-containing pigments.

Contents of the aerosol packages are under pressure and, therefore, the container should be kept away from heat or prolonged

exposure to sun light. In addition, the containers should not be punctured or discarded in incinerators.

LABEL INFORMATION:

Toxicity, skin corrosion, flash point, storage, and disposal precautions are of no greater risk than with our current Spray Magic Line. Therefore, precautionary data on labels will not require revision.

Since the compositions have been changed new label analysis will be required.

Labels should meet requirements of New York City Fire Department Regulations since products have been classified as "Extremely Flammable".

Lead Warning notices will be required on 243-84480 (#2432 Chinese Red), 243-84482 (#2430 Primrose Yellow), and 243-84485 (#2434 Hunter Green).

SIMPLIFICATION:

Twelve finished product codes will be replaced with nine new lacquer codes plus a new Copper color for a net result of two less codes. Also several bases required for the present line will be eliminated.

PATENT INFORMATION:

No patent complications are currently known to be involved in the proposed action to replace the current drying oil modified alkyd vehicle with a nitrocellulose/non-drying oil modified alkyd lacquer vehicle as the formulating basis for coating compositions to be aerosol packaged under the "Duco" Spray Magic label.

CONFIDENTIAL INFORMATION:

No unusual or confidential information is contained in this Release.

FORMULA CARDS:

Supply and package formulas are in file. A list of the new colors and their formula codes are shown below:

<u>Product No.</u>	<u>Supply Code</u>	<u>Package Code</u>
#2439 Appliance White	243-84481	243-84491
#2432 Chinese Red	243-84480	243-84490
#2441 Semi-Gloss Black	243-84488	243-84498
#2444 Flat White	243-84487	243-84497

<u>Product No.</u>	<u>Supply Code</u>	<u>Package Code</u>
#2440 Gloss Black	243-84486	243-84496
#2434 Hunter Green	243-84485	243-84495
#2431 Admiralty Blue	243-84484	243-84494
#2435 Horizon Gray	243-84483	243-84493
#2430 Primrose Yellow	243-84482	243-84492
#2445 Copper	- *	890-63525

MARSHALL DEVELOPMENT LABORATORY

W. T. Clark
W. T. CLARK

WTC/McD

3/24/64

*Sprayon will supply base paint for this color.

APPROVED: *W. T. Clark* DATE: 4/3/64

APPROVED: _____ DATE: _____