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Marshall Laboratory
March 3, 1954MEMORANDUM REPORT NO. M-684PREPARED BY: William C. JohnsonEFFECT OF ACID NUMBER ON PRODUCTION OF HOUSE PAINTS

House paints show batch to batch nonuniformity of solids and have run consistently high at times and then have changed and run consistently low. Although we have no direct evidence to show that an acid number change of 1 unit will affect solids, it is suggested that the acid number specifications for H-19 linseed varnish oil be tightened from 1.5 max. to limits of 1.0 to 1.5 or that a study be undertaken in the plant to establish by direct evidence the exact effect of one acid number unit. Previous studies of the solids of 301-916 are reported in Memorandum report #M-601.

ACID NUMBER SPECIFICATIONS:

During 1953 H-19 Varnish grade linseed oil received at Philadelphia has come from 5 different suppliers and has varied from .2 to 1.64 in acid number as shown in Table II. All 73 tank cars received from A.D.M., Cargill and Spencer Kellogg were above 1.0 acid number and were quite close to their average as shown by the low probability limit attached to the averages in Table I. With the exception of one lot, the acid numbers of H-19 received from Pittsburgh Plate Glass and Minnesota Linseed Oil Co. have below 1. ADM, Cargill or Spencer Kellogg would probably be willing to supply H-19 with A.N. limits of 1.0 to 1.5 since that is essentially what they are doing. PPG, Minnesota Linseed and other approved suppliers may be willing to supply within the narrow limits of 1.0 to 1.5 without increasing the price they bid. This will have to be determined by contact with the suppliers.

STUDIES TO ESTABLISH THE EFFECT OF ACID NUMBER:

The calculated acid number of the vehicle in 301-916 is 1.25

N35490

when an H-19 of 0.4 A.N. is used and is 2.1 when an H-19 of 1.3 A.N. is used. The low acid number vehicle has an acid number only 60% of the higher acid number vehicle and in a flocculated paint where zinc soaps contribute to the flocculation it is conceivable that we may find a difference in solids or other properties.

However laboratory batches using oils having acid numbers 1 unit apart did not show the expected difference in solids nor did they develop differences on standing or on heating for several hours. Nevertheless, because some variables effecting the solids of plant production of housepaints are illusive and all variables have not been identified it would be wise to determine under plant conditions the solids resulting from low and high acid number H-19. This could easily be done by establishing a 1-1-1/2 acid number H-19 in our tanks and using H-572 as our low acid number oil or by ordering drum lots of special oils for these tests.

SALES DEVELOPMENT

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3/2/54

TABLE I AVERAGE ACID NUMBER OF H-19 VARNISH LINSEED OIL

<u>Supplier</u>	<u># of Batches</u>	<u>Average A#</u>	<u>95% Probability Limits of acid #</u>
A.D.M.	49	1.28	± 0.22
Cargill	21	1.35	± 0.21
Spencer Kellogg	3	1.41	(at)
Pittsburgh Plate Glass	23	*0.41	*+ 0.30
"		*0.45	*+ 0.50
Minnesota Linseed Oil Co.	1	0.45	(at)

* One shipment of Pittsburgh Plate Glass H-19 was way out of line at 1.4 A. N.. The first figures do not include this but the second set of figures do include this figure.

(at) Not enough data to make a calculation meaningful.

TABLE II-RECEIPTS OF H-19 VARNISH LINSEED OIL

<u>RS#</u>	<u>Acid #</u>	<u>Supplier</u>	<u>Date Received</u>
9234	1.37	ADM	1/3/53
9263	1.21	"	1/6/53
9390	1.32	"	1/14/53
9409	1.20	"	1/15/53
9422	1.30	"	1/16/53
9480	1.29	"	1/20/53
9576	1.34	"	1/27/53
9593	1.51	"	1/28/53
9625	1.39	"	1/30/53
9658	1.40	"	2/3/53
10051	1.41	"	2/10/53
10114	1.42	"	2/13/53
10154	1.30	"	2/17/53
10156	1.35	"	2/18/53
10323	1.40	"	3/3/53
10427	1.20	"	3/10/53
10444	1.40	"	3/11/53
10460	1.30	"	3/12/53
10485	1.23	"	3/13/53
10510	1.30	"	3/16/53
10534	1.24	"	3/17/53
10553	1.30	"	3/18/53
10592	1.30	"	3/20/53
10626	1.20	"	3/24/53
10732	1.35	"	3/31/53
10826	1.10	"	4/6/53
10927	1.22	"	4/10/53
10926	1.18	"	4/10/53
10951	1.20	ADM	4/13/53
10981	1.40	"	4/15/53
11104	1.40	"	4/24/53
11128	1.40	"	4/27/53
11140	1.20	"	4/28/53
11193	1.25	"	4/30/53
11214	1.42	"	5/4/53
11244	1.36	Cargill, Inc.	5/5/53
11260	1.64	"	5/6/53
11354	1.43	"	5/12/53
11377	1.30	"	5/13/53
11403	1.28	"	5/15/53
11421	1.20	"	5/18/53
11541	1.24	"	5/22/53
11591	1.34	"	5/27/53
11592	1.32	"	5/27/53
11695	1.20	"	6/4/53
11730	1.37	"	6/5/53
11729	1.50	"	6/5/53
11907	1.40	"	6/10/53
11939	1.24	"	6/12/53
11967	1.24	"	6/16/53
11996	1.45	"	6/18/53
12013	1.38	"	6/19/53
12174	1.45	"	7/3/53

TABLE-II-RECEIPTS OF H-19 VARNISH LINSEED OIL (Cont'd)

<u>RS#</u>	<u>Acid #</u>	<u>Supplier</u>	<u>Date Received</u>
12196	1.42	Cargill, Inc.	7/7/53
12308	1.40	ADM	7/14/53
12395	1.30	Cargill, Inc.	7/21/53
12394	1.30	"	7/21/53
12467	1.21	ADM	7/22/53
13011	0.34	P.P.G.	7/27/53
13012	0.27	"	7/27/53
13089	0.38	"	8/5/53
13127	1.4	"	8/7/53
13284	0.45	"	8/17/53
13291	0.54	"	8/18/53
13292	0.717	"	8/18/53
13332	0.52	"	8/20/53
13389	0.41	"	8/26/53
13484	0.24	"	
12512	0.45	Minnesota	9/8/53
12541	0.51	P.P.G.	9/10/53
12559	0.50	"	9/11/53
12590	1.38	ADM	9/15/53
12645	0.21	P.P.G.	9/18/53
12673	0.20	"	9/22/53
12802	1.50	Spencer Kellogg	9/28/53
12882	0.21	P.P.G.	10/2/53
12905	0.21	"	10/5/53
12924	1.30	Spencer Kellogg	10/6/53
12949	0.45	P.P.G.	10/7/53
12953	0.42	P.P.G.	10/7/53
13773	1.42	Spencer Kellogg	10/3/53
13791	0.81	P.P.G.	10/14/53
13853	0.46	P.P.G.	10/20/53
13921	0.36	"	10/27/53
13936	0.41	"	10/28/53
13552	1.22	A.D.M.	11/5/53
13612	1.00	"	11/10/53
13747	0.33	P.P.G.	11/18/53
14523	1.11	A.D.M.	11/20/53
14545	1.22	"	11/23/53
14579	1.23	"	11/25/53
14663	1.14	"	11/31/53
14678	1.20	"	12/4/53
14711	1.25	"	12/7/53
14863	1.05	"	12/16/53
14872	1.19	"	12/17/53
14912	1.14	"	12/21/53