

BUSINESS CONFIDENTIAL

MONTHLY REPORT

MEMORAN DUM

TO: Dr. C. K. Fink
FROM: W. H. Bauer
DATE: August 31, 1967
SUBJECT: Vinyl Resin and Plasticizer Summary - Tarrytown Technical Center,
August, 1967

CALENDERING, FLOORING & RECORDS

RESINS FOR C.F. & R (333 A 90)

1. MODIFIED PROCESS-7 RESINS

The dry-blend performance of Process-7 suspension poly (vinyl chloride) has been considered marginal for many applications and has restricted sales in such areas. It has been demonstrated that the inclusion of small amounts of ethylene (0.3% to 0.5%) significantly improves this property. To assess the full effect of this modification, Dean Richardson's group prepared six resins in the 600 gallon autoclave in Texas City with the following results:

	<u>Type</u>	<u>Inherent Viscosity</u>	<u>Per Cent Ethylene</u>	<u>Dry-Blend (Min/T)</u>
QEX - 1287	QYTQ - 7	0.95	---	5.7/85°
QEX - 1302	QYTQ - 7	0.98	0.4	4.5/81°
QEX - 1303	QYSC - 7	1.15	---	8.9/85°
QEX - 1304	QYSC - 7	1.15	0.6	7.3/85°
QEX - 1301	QYSL - 7	1.34	---	10.6/87°
QEX - 1299	QYSL - 7	1.31	0.6	7.1/88°

In the evaluation at Tarrytown the apparent melt viscosity of each sample was determined at 20, 40 and 60 PHR with FLEXOL® DOP. In the cases of the QYTQ - 7 and QYSC - 7 couples, results at each concentration were within the limits of experimental error. The constant variation of about 100 m-gms torque in the QYSL - 7 couple, the ethylene modified version being lower, is attributable more to the difference in inherent viscosity than to the presence of the comonomer. The processibility of the low ethylene polymer should be, therefore, indistinguishable from the conventional homopolymer.

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The six resins were also evaluated for plate-out tendency using the Ford test procedure. In the cases of QYSC - 7 and QYSL - 7, plate-out resistance was improved by the inclusion of ethylene; in the case of QYTQ - 7, equivalent performance was observed. It was concluded that the ethylene has no detrimental effect on plate-out. The limited data preclude judgment that a beneficial effect is manifested in all cases.

There appears no reason, on a performance basis in vinyl compounds, not to consider the introduction of low ethylene PVC's as a direct replacement for conventional homopolymer.

(W. H. Bauer, A. W. Conkling)

2. PLATE-OUT, FORD MOTOR COMPANY (QYTQ - 7)

A practical solution to the plate-out problem still eludes us. The chemical compound in the degraded sample of Ferro 1212A was suspected to be diphenyl phosphite (no thanks to Ferro who has ignored our request for assistance). The addition of 0.25 PHR of this material to the vinyl compound resulted in reduction of plate-out to an almost non-existent level. As determined by high speed mill tests, however, adverse effects on heat stability precluded use at this concentration. At 0.1 PHR, there was no effect on heat stability, but only a slight improvement in plate-out, enough however, to pass the Ford test. Dean Richardson was asked to prepare a sample of QYTQ - 7 incorporating 0.1 per cent diphenyl phosphite in the polymerization recipe. The bomb run went normally and a five pound sample was sent to Tarrytown. No beneficial effect on plate-out was noted. The significance of this result is being studied.

Conventional homopolymer QYTQ - 7 continues to fail plate-out at Ford. Blend 306, while excellent in other resin properties, was slightly poorer in plate-out than the new Ford standard. To calibrate our program, Ford's Mt. Clemens laboratory checked Blend 306; it failed. The only immediate hope is that the addition of 0.3 - 0.5 per cent ethylene to QYTQ - 7 in the production autoclaves will produce the effect noted for QYSC - 7 and QYSL - 7 prepared in the pilot plant if we are to secure approval of TQ - 7 at customer by the end of September.

(W. H. Bauer, W. B. Drozdowski)

FILM AND SHEETING (333 B 50)

1. HAARTZ AUTO FABRICS, NEWTON, MASSACHUSETTS

Assistance is being provided this customer in their changeover from plastisol to dry-blend extrusion. Limited laboratory back-up is being provided to assure that QYSC - 7 is the optimum compromise between processibility and heat

sealing performance. The new resin potential here is estimated at 1 - 1.5 MM #/year.

A second problem at Haartz relates to adhesion of Landau tops. Water wicking between top and metal roof is causing rusting and delamination. Edge sealing in manufacture is one solution. Customer is interested in adding a small amount of a high migrating plasticizer which will go into rubber and then into adhesive layer. FLEXOL 10-A and/or EP-8 have been suggested.

(W. H. Bauer)

2. HARTE AND COMPANY, BROOKLYN, NEW YORK

Analysis of a competitive (to Harte) sample of vinyl film used in electrical tape revealed that the plasticizer was solely a sebacic acid polyester. Harte & Company requested the analysis after being rejected as a supplier on the grounds of poor low temperature flexibility.

(E.B. Harris)

FLOORING PLASTICIZERS (333 D 50)

1. ACETOXYETHYL, 2-ETHYLHEXYL PHTHALATE

Performance characteristics of plasticizer AEOP have been determined in vinyl asbestos tile. Technical Service Reports are being prepared for the introduction of the experimental plasticizer to selected tile producers.

(L. G. Krauskopf)

2. AMERICAN BILTRITE RUBBER COMPANY, TRENTON, NEW JERSEY

This customer requested a chemical analysis of a solid/liquid mixture which had been collected from the underside of resilient vinyl tile installed over concrete, below grade. The liquid portion of the sample was found to be 72 per cent by weight water and 28 per cent soap of acids in the $C_9 - C_{16}$ range. No plasticizers or plasticizer components were found in the liquid. It appears that the failure of tile installation is not a result of decomposition of components in the vinyl tile.

(L. G. Krauskopf)

MOLDING & EXTRUSION (211 E 50)1. W. R. GRACE COMPANY, CHICAGO, ILLINOIS

The failure of BAKELITE® Resin QSAP - 7 to replace "Geon" 101 EP F-12 in the dry-blend extrusion of water stop remains under investigation. It appears that the cause of the problem lies in the bulk density characteristics of the dry-blend prepared in the intensive mixer, which cannot be predicted either from the bulk density of the resin per se or from the bulk density of a dry-blend prepared in a low speed mixer.

Our immediate objective is to select a blend of QSAP - 7 that will duplicate the performance of "Geon" 101 EP F-12 in the intensive mixing cycle.

(L. G. Krauskopf)

2. GENERAL ELECTRIC COMPANY, LOUISVILLE, KENTUCKY

Suggested starting formulations for the dry-blend production of vinyl components for appliances have been forwarded to this company.

(L. G. Krauskopf)

3. TAYTEC CORPORATION, COLUMBUS, OHIO

Laboratory effort on the comparison of a FLEXOL plasticizer blend vs. a Monsanto blend in vinyl weatherstrip has been curtailed due to the failure of the customer's control material to meet the application requirements. It is expected that a renewed effort will be initiated following a change in assignment of sales personnel.

(L. G. Krauskopf)

4. POLYMERS, INC., MIDDLEBURY, VERMONT

At our request, pilot plant personnel at Texas City made a 600 gallon autoclave run of QXAG - 10 (QEX - 1298) as a possible replacement for "Geon" 106 at subject customer. The polymer is high in apparent density (40.3 #/ft³) and excellent dry resin flow (2.1 minutes/400 cc). Fines level was at one per cent. Torque-rheometer study indicated exceptionally uniform fusion characteristics. A 100 pound sample has been forwarded to customer for his evaluation. The sales potential at this account is projected at 6 MM #/year.

(W. H. Bauer, A. W. Conkling)

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WIRE AND CABLE (223 C 50)1. CHLORINATED POLYETHYLENE

No conclusive results were obtained in the evaluation of this polymer as a plasticizing agent for PVC due to difficulties encountered in the extrusion of samples. Due to the low priority status of this program, rerun will be postponed indefinitely.

(E. B. Harris)

2. COMPETITIVE RESIN EVALUATION

Work is proceeding at full speed to complete the evaluation of the nine samples received. Others will be handled as they arrive. The results on insulation resistance and volume resistivity tests will also be used to correlate testing at Tarrytown and Texas City.

(E. B. Harris)

3. FLEXOL 63

Evaluation of the oil resistance of insulation containing this plasticizer is in progress.

(E. B. Harris)

4. THW WIRE, 10-10/EPO BLENDS

Work on defining the moisture sensitivity of this plasticizer blend, using the UL S.I.C. test, is in progress.

(E. B. Harris)

PLASTISOLS (343 G 50)1. PYROLAC CORPORATION, HAWTHORNE, NEW JERSEY

A foam plastisol formulation was suggested to this customer for curtain coating Chevrolet auto bumpers. Additional work will be done to compare the performance of the suggested formulation to an approved, competitive plastisol, to establish interchangeability on the Chevrolet packaging line.

(E. B. Harris)

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2. ASSOCIATED RUBBER AND PLASTICS, BRONX, NEW YORK

A sample of FLEXOL DOP was analyzed for the subject customer, and found to contain approximately 50 per cent by volume of a motor or diesel oil. These results support the customer's claim that the heating oil company filled the wrong tank.

(E. B. Harris)

3. SPI - PER CENT SOLIDS ROUND-ROBIN

This laboratory's commitment to the Vinyl Dispersions Division of the Society of the Plastics Industry to participate in the per cent solids round-robin has been fulfilled.

(E. B. Harris)

GENERAL PROGRAMS

1. FLEXOL R3M

A) A recheck into the heat stability of FLEXOL R3M, comparing it to Paraplex G-54, Plastolein 9765 and Santicizer 409, confirmed previous results. All four plasticizers behaved similarly in a formulation using a barium-cadmium-zinc type stabilizer. In formulations employing a lead type stabilizer, the R3M system was not as stable as the others (the other three were nearly equal) but did represent an improvement over the 2-ethylhexanoic acid capped R3M.

B) A performance-in-vinyl recheck is nearly complete on lauric acid-capped R3M.

C) R3M will be checked in 105° wire insulation for critical physical and electrical properties. All reevaluation studies on R3M are expected to be completed September 15, 1967.

(E. B. Harris)

WHBauer:ccb

H. W. Bauer

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