Monsanto

FROM (NAME—LOCATION—PHONE) M. M. Mattix - Galt Labs - 1730

DATE : February 3, 1984

SUBJECT : PROPOSED ADHESIVES TESTING PROGRAM

REFERENCE :

TO : FILE

cc. M. W. Farrar - 04C
N. W. Touchette - 1730
J. T. Renshaw - 1730
D. H. Paul - E2SG
P. W. May - 1730
M. D. Card - E3SB
R. H. Mills - T2F

This memo documents the PVAc adhesive study which was planned prior to the headcount reduction at Galt. It is intended to provide a starting point for anyone who picks up the work in the future. The planned study had two major objectives:

1. To examine the performance of some newly synthesized plasticizers using our traditional test methods plus some new ones.
2. To examine the performance of Santicizer 160 and other commercial plasticizers using some more advanced testing methods. Bill May has samples of the newly synthesized plasticizers listed in Table 1.

MARKET SITUATION

PVAc emulsions, or white glue adhesives are used mainly in the packaging and construction industries and the white glue market as a whole is expected to have limited growth. The main advantage to a PVAc emulsion system is its low cost, and in most applications performance better than that currently achieved using Santicizer 160 or the Benzoflex products is not needed. However, there are higher growth markets where PVAc systems could be used if there were some improvements in performance. These markets generally include adhesion to more inert substrates such as PET or the plastic sheath on a baby diaper.

Santicizer 160

Santicizer 160 has been losing market share in the PVAc emulsion market. Most of the reasons for this involve environmental concerns, mainly the Priority Pollutant List and the general scare about phthalate esters. There have also been complaints of a minor efficiency advantage for the benzoflex products and their equivalanet. Although we feel that the environmental issues do exist, they are not overriding and if a significant advantage for Santicizer 160 or any other phthalate were found, market share could improve.

Santicizer 8

Santicizer 8 reportedly performed well in certain applications including the adhesion of labels to PET bottles. The price of Santicizer 8 appears to be the major reason why more Santicizer 8 is not sold into that market.

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Santicizer 97

Recent information from our adhesive consultant and from a customer suggest that Santicizer®97 has a place in this market. A customer indicated the Santicizer 97 gives him exceptionally good wet tack. Santicizer 97 should be included in this study.

Test Methods

The current standard procedure at Galt is to run viscosity, wet tack, and open time tests. The wet tack and open time tests are run using Kraft paper as the substrate. This is a good indicator for paper packaging uses, but not where alternate substrates are used. The following guidelines should be useful when designing future tests.

1. Viscosity build and drift over time should be run on all systems. However, viscosity numbers should be used as guidelines not absolutes. We know that different mixing techniques employed by our customers can significantly change viscosity results. Table 2 shows the scatter in viscosity numbers when 10 blind identical samples were tested under the same conditions.
2. Wet tack and open time tests are important for most applications. For general screening the tests should be run on some different substrates i.e. Kraft paper to paper and PET to labels.
3. The adhesive bond should be tested for durability when exposed to water and to high and low temperatures. The most important features of these tests are (1) all samples are prepared and treated in an identical manner and (2) that the samples be subjected to a load during the test. Bill May has a test method he uses for under water tests which would be a good model for the high and low temperature tests.

Performing these tests on the new plasticizers should give us an idea if any of our systems might give a PVAc system the performance it needs to qualify for the higher end use markets. The aim is to give us a starting point idea which we could then take to the adhesives customers. They would then presumably use their own tests to check out the system. I have been unsuccessful in getting adhesives people to share their test methods, it is an extremely secretive industry! The suggestions on screening tests, outlined above, came from Monsanto personnel in Springfield, and an adhesives seminar.

Margaret M. Mattix

MMM/gls
attach.

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TABLE I

A listing of possible plasticizers (old and new) to be included in the study:

Current Monsanto Plasticizers

Santicizer® 160
Santicizer 97
Santicizer 8

Competitive Plasticizers

Benzoflex 9-88
Benzoflex 50

"New" Systems and Blends

Dibutyl maleate
Dioctyl maleate
Texanol/Santicizer 711
Texanol/Santicizer 160

Succinates

Iso-butyl
Methyl-O-ethyl benzyl
Methyl-tri (O-ethyl) benzyl

Mixed AGS benzyl ester (nylonate)
Iso butyl benzyl glutarate
TCH - purified

1-3-6 Hexane Tricarboxylates

Tri-methyl
Tri-butyl
Tri-2EH

Bis 4-Halobutyl Esters

Bis 4 bromobutyl phthalate
Bis 4 bromobutyl adipate
Bis 4 chlorobutyl phthalate
Bis 4 chlorobutyl adipate

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TABLE 2

BLIND VISCOSITY STUDY

	VISCOSITY 30 min.	1 DAY	7 DAYS
1	4900	4600	4800
2	4900	4400	4550
3	4300	4050	3950
4	5300	5100	5000
5	4900	4800	4600
6	4950	5100	4600
7	5400	6300	5450
8	4950	4900	4700
9	4950	5150	5350
10	5350	5250	5450
MEAN	4990	4965	4845
STANDARD DEVIATION	±316	±601	±476

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