Monsanto

FROM (NAME & LOCATION) T. C. Mathis - St. Louis Organic Research

DATE : June 25, 1970

SUBJECT : NTA Phthalate Opportunity in Air Pollution Control: Accumulated Per Se Volatility Data

Ref: D. L. Mellon/M. D. Farkas, 5/19/70
L. O. Raether/D. L. Mellon, 5/4/70
M. W. Farrar/D. L. Mellon, 5/4/70
D. L. Mellon/E. Muschick, 5/15/70

To: E. Muschick
EMUSC

cc:

M. W. Farrar	Res. 1
J. R. Darby	Res. 1
W. F. Waychoff	WWAYC
J. K. Lilly	JLILL
C. P. Farley/PRG/LOR	CFARL
J. A. Cannon	Res. 3
A. W. M. Coaker	Res. 3
R. H. Mills	Res. 3
N. W. Touchette	Res. 3
E. L. Kaiser	EKAIS
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Background: As discussed in the above references, S-711 and other NTA phthalates are low enough in volatility to present sales opportunity through emphasis on air pollution control.

Summary: A reference copy of accumulated per se volatility data for 350° F and 400° F is attached. The data is arranged in the order of increasing plasticizer volatility. Section A of the tabulation is the more useful data. This data shows that the most volatile of the NTA phthalates, the straight C_7 phthalate, is fully as low as DOP. All other NTA phthalates will be superior to DOP.

Details:

With the increasing emphasis on control of air pollution as exemplified by the above referenced memos relating to VFI activity, we expect to receive an increasing number of inquiries on volatility. We have therefore summarized all of the data we have for per se volatilities of PVC plasticizers in the processing temperature range, that is, the data we have for 1 hour at 350° F and 400° F. The tabulation of averaged results loses us the advantage of direct reference to control plasticizers, but it does provide a fairly accurate over-all picture of volatility relationships. For several plasticizer comparisons we can supply upon request results obtained in the same test set.

As you may know, the 1-hour tests were done initially in work on plasticizers for Kentile. (Kentile did one hour tests at various temperatures.) We have found the 400° F test to be a discriminating test, but believe that at 350° F and lower temperatures longer time periods should be used to make the test adequately discriminating. We therefore emphasize the results we have accumulated for 400° F.

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Test results for butyl nonyl phthalate were omitted from the tabulation due to large differences in per se volatilities obtained. Two variations in proportions of the alcohols (not available at the writing of this memo) produced 400° F volatility results about like S-160, and about like a dihexyl phthalate.

Please try to give us plenty of notice if you want to do volatility studies to fill in any missing data.

T. C. Mathis

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Attachments

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ORDER OF INCREASING PER SE VOLATILITY*

A. 1 HOUR AT 400° F:	AV.[a]	RANGE	NO.
1. DUP (EL-9139)	2.3	—	1
2. S-278	3.1	—	1
3. DIDP (QI-51)	4.3	—	1
4. S-465	4.3	—	1
5. Di C_9 PHTHALATE[b]	5.0	4.8-5.2	2
6. S-262	5.1	—	1
7. DINP (ENJAY)[c]	6.5	—	1
8. REICHHOLD S-370	6.6	5.5-9.4	5
9. S-711 (EL-9317)	7.9	—	1
10. S-261	8.0	6.9-9.4	3
11. Di C_7, C_9 PHTHALATE (OR-154, 563)	10.9	—	1
12. S-266	10.9	—	1
13. XF-136 (S-261/S-160 2:1)	12.4	—	1
14. REICHHOLD 3123	12.7	12.0-13.3	2
15. S-268	14.3	13.7-14.9	2
16. DiisoButyl BENZYL TRIMELLITATE[d]	15.3	15.2-15.3	
17. Di C_7 PHTHALATE[e]	16.6	15.9-17.2	2
18. DOP	17.4	16.6-18.1	6
19. S-160	20.3	19.4-21.3	3
20. Di m-HEXYL PHTHALATE[f]	28.8	27.6-29.9	2
21. DiHEXYL PHTHALATE (ENJAY)	34.1	—	1

B. 1 HOUR AT 350° F. (SAME ORDER AS ABOVE):			
2. S-278	1.0	—	—
4. S-465	1.7	1.6-1.8	2
6. S-262	1.4	—	1
8. REICHHOLD S-370	2.0	1.8-2.1	4

* SEE NEXT PAGE FOR FOOTNOTES.

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(VOLATILITY DATA CONTINUED)

1 HOUR AT 350°F (CONT.):	AV.[a]	RANGE	NO.
10. S-261	2.0	1.8-2.0	1
12. S-266	3.0	—	1
13. XF-136	3.7	—	1
14. REICHHOLD 3123	5.6	5.3-5.8	3
15. S-268	3.4	—	1
16. DiisoButyl BENZyl TRIMELLITATE[d]	8.5	8.4-8.5	2
18. DOP	4.1	3.1-4.7	3
19. S-160	5.5	4.9-6.2	4
20. Di m-HEXyl PHTHALATE[e]	8.3	7.9-8.6	2
21. Di HEXyl PHTHALATE (ENJAY)	7.9	—	1

C. 2 HOURS AT 350°F (A SINGLE TEST SET):

S-278	3.4
S-266	7.7
DOP	8.5
S-160	11.4
BENZOFLEX 9-88	12.9

(a) PERCENT PLASTICIZER LOST.

(b) ME-50 / OR-154525, W.V.

(c) REC'D 4-29-70; CONTAINS ANTIOXIDANT, LIKELY BPA. THIS ANTIOXIDANT CAUSES THE TEST SAMPLE TO YELLOW.

(d) OR-6934o, W.V.

(e) ME-49 / OR-154524, W.V.

(f) ME-26 / OR-41119, M.B.

(G) BOTH ARE OR-41119.

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