

PLASTICIZERS
SALES
DEPARTMENT

THIS INFORMATION SHOULD BE USED WITH DISCRETION,
SINCE IT HAS NOT BEEN COMPLETELY EVALUATED FOR
SUCH CONSIDERATIONS AS TOXICITY AND PATENT CON-
FLICT, EXCEPT AS SPECIFICALLY STATED.

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TO: 1700 S. 2nd St.
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1760 C

DATE: August 12, 1971

SUBJECT: PLASTICIZERS FOR
POLYSULFIDE SEALANTS

In December 1970, we learned that Thiokol Chemical Corp. was seriously considering a product called ZP-680 as a replacement in polysulfide sealants for Monsanto's discontinued Aroclor® 1254.

We ran a comparison of ZP-680 against Aroclor 1254 and Santicizer® 335 and Santicizer 336. It turned out that ZP-680 was incompatible.

I have since been told by some customers that Thiokol is no longer promoting ZP-680. It is good to have confirmation that our laboratory data is reliable in a case like this in which the leading experts in polysulfide technology were, for a while, apparently unaware of the deficiencies of ZP-680.

One interesting situation where the change from Aroclor 1254 has produced increased customer satisfaction is Products Research, Burbank, Calif., where their Formulations Group Leader, Mel Young, indicated that Aroclor 5432 is doing a superior job for them compared to Aroclor 1254. Using standard formulating methods, he has had no difficulty achieving excellent viscosity control in the desired range with Aroclor 5432 and he has observed the crucial advantages of greatly improved (reduced) volatile loss from his sealants and better adhesion to a broad range of substrates with Aroclor 5432.

The data we got on ZP-680 versus Aroclor 1254 and Santicizers 335 and 336 were as follows:

Formulations

<u>Resin</u>	Thiokol's LP-32	100)	100
	Statex R Black	30)	
	Plasticizer	25)	
<u>Catalyst</u>	Pb O ₂	50)	15
	Stearic acid	5)	
	Plasticizer	45)	
TOTAL			115

The catalyst system was given 3 passes through a paint mill and allowed to stand 120 hours before use. No separation was observed in any of the formulas.

Plasticizer

<u>Property</u>	Aroclor [®] 1254	ZP-680	Santicizer [®] 335	Santicizer [®] 336
Compatibility	C	Tacky	C	C
Cure Rate (4 hrs.+)	OK	OK	OK	OK
Carbon Volatility				
% plas. lost in 24 hrs. @ 86°C.	8.14	5.39	1.46	4.47
Tensile Properties				
% elong. at failure	1270	1605	1270	1335
% Modulus, psi	1085	710	845	865
Ultimate Tensile Strength, psi	3920	3300	3110	3350
Water Sensitivity				
% H ₂ O Absorbed	2.07	2.72	2.32	2.12
% Soluble Matter lost	0.49	0.92	0.68	0.68

From the above data, it appears that Santicizers 335 and 336 are more efficient flexibilizers for polysulfides than Aroclor 1254 (100% modulus data), while Santicizer 335 is very much less volatile and Santicizer 336 runs at about one half the volatility of Aroclor 1254.

Water sensitivities are in the same general range with a small advantage for the discontinued Aroclor 1254. I do not anticipate trouble from the water sensitivity of Santicizers 335 and 336 as I believe they compare favorably with likely competitors in terms of this property.

Bill

A. W. M. Coaker

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