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PROGRESS REPORT
ORGANIC CHEMICALS DIVISION
RESEARCH DEPT. - ST. LOUIS, MO.

POLYSULFIDE SEALANTS

REPORTED BY	FOR	DETAILS	REPORT NO.	PROJECT
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	JOB NOS. 2-02-760.01-0455127			

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PROJECT TITLE

EXPLORATORY AND FUNDAMENTAL STUDIES ON PLASTICIZERS

PROJECT OBJECTIVE

To develop plasticizers low in volatility and water sensitivity for calcium carbonate filled Thiokol polysulfide rubber sealant formulations.

Summary

Calcium carbonate filled polysulfide rubber formulations suffer from severe water sensitivity problems. A series of Monsanto commercial and experimental plasticizers were tested in a typical formulation to determine if any significant performance variations could be isolated. From the data obtained it appears that no plasticizer tested totally eliminated the problem but Santicizer 278 was generally the best material screened.

Plasticizers tested were:

Santicizer 278
Santicizer 261
Santicizer 160
Santicizer 902
Aroclor 1260
Aroclor 1254
Chlorowax 500
HB 40
Bis(4-chlorobutyl) adipate
Bis(4-chlorobutyl) phthalate

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The general formulation used was:

		PHR	Formulation
Resin	Thiokol LP-32	100	100
	Plasticizer	15 and 40	
	Non-coated $CaCO_3$	40	
Catalyst	Lead Dioxide	50	15
	Stearic Acid	5	
	S160 or S902	45	
	Sulfur		0.1

The following points may be emphasized:

1. No system showed exceptional water resistance but Santicizer 278 and Chlorowax 500 were the best. Chlorowax 500 is incompatible in the Thiokol miscibility test.

2. When the samples are immersed in water, elongation and tensile increase but modulus decreases.

3. The Thiokol volatility specification is quite mild when run by their test method. If this specification is kept Aroclors now used should have little difficulty in meeting volatility requirements. Fogging is still an issue, however.

4. Probably the best method for attacking this problem would be by studying plasticizer/particle adsorption. If a plasticizer is found which selectively coats $CaCO_3$ to protect it from water, the problem could be greatly reduced.

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