

Monsanto

FROM (NAME & LOCATION)

A. W. Morgan - St. Louis Organic Research

DATE

June 11, 1970

CC:

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Res. 3

SUBJECT

AROCLOR REPLACEMENTS
IN POLYSULFIDES

REFERENCE

TO

N. W. Touchette
Res. 3

A series of chlorinated terphenyls and chloro/bromo biphenyls have been evaluated in polysulfide rubber. The formula used was:

Resin

LP-32 Polysulfide	100	
Statex R Carbon Black	30	} 100
Plasticizer	25	

Catalyst

Lead Dioxide	50	
Stearic Acid	5	} 15
Santicizer 160	45	

The following materials were screened:

1.	Aroclor 5430	(CaO Distilled)					
2.	Aroclor 5420	"					
3.	Aroclor 5425	"					
4.	Aroclor 5025	(Crude)					
5.	Aroclor 5020	"					
6.	Aroclor 5030	"					
7.	Aroclor 1254	(Control)					
8.	Aroclor 5460/Santicizer 160 (1:1)	(Control)					
9.	OR 116153	(Aroclor equivalent 1256, degree of bromination - 1)					Isomerized
10.	OR 16855	(" " 1262, " ")				3	✓
11.	OR 116154	(" " 1248, " ")				2	?
12.	OR 116156	(" " 1254, " ")				1.5	
13.	OR 116175	(" " 1242, " ")				0.5	✓
14.	OR 16832B	(" " 1245, " ")				1.0	✓
15.	OR 16835	(" " 1248, " ")				0.5	✓
16.	OR 116166	(" " 1264, " ")				2	
17.	OR 16854	(" " 1268, " ")				4	✓

Results of basic screening are shown in the attached tables.

Conclusions and Recommendations:

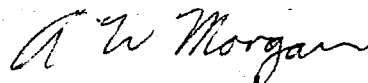
1. The chlorinated terphenyls evaluated showed good promise in polysulfide rubber testing. Physical properties approximated those of Aroclor 1254.

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2. Arobroms and bromocloros tested suffered from high volatility when isomerized. Those materials believed to be biodegradable in general, had higher volatility and were unsatisfactory in mix properties. Higher halogen content gave satisfactory physical performance but the material is not biodegradable.
3. It is recommended that the new chlorinated terphenyls be further screened for polysulfide usage but that work on Arobroms or bromocloros in polysulfides be terminated pending receipt of non-isomerized material.
4. Despite their lack of utility in polysulfides, it is recommended that biodegradable arobroms or bromocloros be intensively screened in alternate applications such as flame resistant extender oils in carpet underlay. It is felt that plasticizer applications are available for materials currently under development by fluids and that continued research cooperation between fluids and plasticizers will be mutually profitable.


A. W. Morgan

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Attachment

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Polysulfide Screening

Sample	100% Modulus (PSI)	Tensile (PSI)	Elongation (%)	Shore "A" Hardness
1	81.5	288	682	29.5
2	82.4	285	670	30.0
3	75.4	269	667	27.8
4	78.5	311	732	28.7
5	84.3	306	720	31.0
6	75.3	255	671	26.8
7	80.6	299	746	27.5
8	76.5	290	743	27.5
9	94.3	416	793	33.2
10	101.3	429	753	34.1
11	86.9	365	717	31.5
12	75.1	327	716	29.9
13	85.6	337	688	29.6
14	88.7	354	686	30.6
15	87.4	346	697	30.1
16	72.0	275	734	26.6
17	99.6	392	720	33.1

	Volatility (%)	Water Sensitivity -	% Solids lost /	% H ₂ O Absorbed
1	3.6 (24 hr Charred) @ 60°C		.34	2.15
2	6.3		.25	2.14
3	5.0		.35	2.11
4	4.1		.39	2.43
5	5.8		.39	2.26
6	3.6		.42	2.49
7	7.9		.43	2.21
8	2.4		.39	2.39
9	11.9 (51 hr Charred) @ 60°C		.27	2.10
10	12.1		.27	2.04
11	14.9		.38	2.01
12	12.6		.38	2.11
13	21.1		.70	2.20
14	15.6		.60	2.38
15	14.2		.37	2.04
16	6.9		.45	2.01
17	6.1		.43	1.74
18 (accelerated 1254) (9.6% at 51 hrs)			.38	1.97

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