

FROM (LOCATION)

St. Louis Research Dept.

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SUBJECT

S-1 in Adhesives

REFERENCE

TO

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Adhesives.

Santoset 1 has been evaluated in adhesive formulations for both metal and nylon. The results obtained are tabulated below:

Metal to Metal Adhesive Formulations:

The following formulation was evaluated as an adhesive for steel cleaned with emery paper:

Geon 121	50
DIDP	15
Reactive Plasticizer	as indicated
Whiting	15
Dythal	5
White Lead	5
t-butyl perbenzoate	1% of reactive plasticizer

Reactive Plasticizer Adhesive Strength, ASTM D-1002-53T(Shear)

15 parts DAP	1300 psi (cohesive + adhesive break)
15 parts S-1	500 psi (adhesive break)
30 parts S-1 (no DIDP)	280 psi (" ")

The results indicate that S-1 offered no improvement of adhesive strength in this formulation.

The following formulations were evaluated as adhesives for aluminum cleaned with $K_2Cr_2O_7$ in H_2SO_4 and for steel cleaned in concentrated HCl:

<u>Basic Formulation:</u>	Geon 126	100
	DIDP	110
	HB-40	30
	Surfex MM	130
	VMCH	20
	Dyphos	5

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% of Plasticizer in Basic
Formulation replaced by S-1

	<u>0%</u>	<u>10%</u>	<u>50%</u>
Adhesive Strength psi	Al = 278	Al = 261	
ASTM D-1002-53T (Shear)	Steel= 383	Steel= 408	Steel= 280
Adhesive Strength psi			
ASTM D-1344-57 (cross lap)	Al = 130	Al = 124	

No significant improvement of adhesive strength was noted by the use of S-1 in this system.

Adhesives for Nylon

These adhesives were evaluated with the T-peel test ASTM D-1876-61T.

S-1 was evaluated against Pliabrac P-64 in the following formulations:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
P-1716	100	100	100	100
DIOP	30	30	30	-
P-64	40	-	-	-
S-1	-	40	40	60
Basic Lead Carbonate	8	8	8	-
Dyphos	-	3	-	3
EP-201	-	3	-	3
D-22	-	-	-	2
t-BPB	0.8	0.8	-	-
Di-t-BP	-	-	0.8	0.9
Adhesive Str, lbs/in	23	13	10	15

In these formulations S-1 was not as good as P-64 as an adhesive for nylon.

S-1 was evaluated against DOP in the following formulation:

Geon 121	55
Geon 202	45
Plasticizer	60
White Lead	3
Di-t-BP	1.5% of S-1 in plasticizer

Plasticizer

Adhesive Strength, lbs/inch

DOP	13
DOP + S-1 (1:1)	17
S-1	15

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The results indicate that S-1 is slightly better than DOP in adhesives for nylon.

So far the use of S-1 in adhesives does not appear too promising. However, it has only been evaluated in formulations that are now in use or suggested by others. An attempt could be made to find a competitive formulation containing S-1 for this application if you desire. Such a program would involve studies on the effects of curing conditions, S-1 concentration, stabilizers, etc.

W. M. Rinehart

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