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MEMORANDUM

EVALUATION OF EXPERIMENTAL LOWER COST LATEX REPLACEMENTS FOR UCAR® LATEX 131 IN TAPE JOINT CEMENTS

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SUMMARY

Experimental polyvinyl acetate latices that offer a potential raw material savings of 2.5¢/wet pound show performance properties in asbestos-free tape joint cements equivalent to and often superior to UCAR 131. These latices are prepared by a two-stage reaction; the first stage giving a stabilizer which replaces the CELLOSIZE and TERGITOL NPX in the normal UCAR Latex 130 process and a second stage using the UCAR monomer feed process.

INTRODUCTION

UCAR Latex 131, a polyvinyl acetate latex, is currently the dominant latex binder in the ready-mix tape joint cement (TJC) market. This favorable market position, however, is threatened by competitive binders. Competitive binders include starch, lower cost polyvinyl acetate latices, ethylene-vinyl acetate copolymer latices, and styrene-butadiene co-polymer latices.(1) Since the tape joint business is highly cost-conscious, we should be able to strengthen our latex position by finding ways to lower the cost and/or improve the performance of our latices in asbestos-free TJC compositions.

The major raw material costs in ready-mix TJC are the latex binders, cellulosic thickeners, and various additives. Since UCAR 131 resin contains 4.7 percent CELLOSIZE, much attention has been directed toward lowering the CELLOSIZE concentration.(1) These approaches, though successful in some cases, have at best yielded only marginal advantages.

The work described herein reports the evaluation of experimental polyvinyl acetate latices containing no CELLOSIZE. These latices provide two economic advantages:

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- They can be made at significantly lower raw material cost than UCAR 131.
- They can be made in existing production facilities.

RESULTS AND DISCUSSION

Three experimental polyvinyl acetate latices prepared by Dr. R. L. Zollars were compared with UCAR 131 in TJC formulations (Table I). These latices were prepared by a two-stage reaction; the first stage giving a stabilizer which replaces the CELLOSIZE and TERGITOL NPX in the normal UCAR 130 process and a second stage using the UCAR 130 monomer feed process.(2)

The TJC compositions are formulated to approximately 5% latex solids by weight on filler solids and are adjusted to a viscosity range of 540-570 Brabender units. At this binder level all the formulations show good room temperature adhesion. However, cold room adhesion recovery (40°F, 90% R.H.) shows that 3RLZ12 imparts the best bonding properties to the tape joint cement.

Since UCAR 131 resin is externally plasticized with dibutyl phthalate, the plasticizer offers a potential site for cost reduction. Accordingly, 3RLZ12 and 3RLZ17 were plasticized with Monsanto Santicizer 160 and their performance in TJC formulations were evaluated (Table II). Again, 3RLZ12 shows the best cold room adhesion recovery.

Minimum film-forming temperature measurements show dibutyl phthalate to be a more efficient plasticizer than Santicizer 160 on a equal weight basis. However, comparing the evaluation in Tables I and II shows the different plasticizers confer little performance differences in the TJC formulations. Further work in this area is under way.

CONCLUSIONS AND PLANS

The experimental latices evaluated herein provide performance properties in asbestos-free tape joint cements equivalent to and often superior to UCAR 131. Evaluation results in a commercial asbestos-free TJC mix also support this conclusion.(3)

Initial cost calculations show that these latices can be made by a two-stage process at a net savings of approximately 2.5¢/wet lb.(2)

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A polyvinyl acetate latex prepared by this process has been sampled to U.S. Gypsum in Des Plaines, Illinois. Additional samples are being prepared and will be sampled to National Gypsum in Buffalo, N.Y.

William D. Massey

William D. Massey

Attachments: 2 Tables

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BIBLIOGRAPHY

(1) F. P. Del Giudice, Letter to H. Mayfield, May 20, 1976.

(2) R. L. Zollars, Letter to T. L. Dawson, Lower Cost Replacement for UCAR 130, April 1, 1977.

(3) W. D. Massey, Comparative Evaluation of Various Latexes in an Asbestos-Free Tape Joint Cement Mix, R & D Dept., Project Report, March 18, 1977.

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TABLE I

TJC FORMULATIONS FROM
LOWR COST POLYVINYL ACETATE
LATEX BINDERS

Notebook No. Latex No.	2WDM29 UCAR 131	2WDM75 3RLZ8	2WDM76 3RLZ12	2WDM77 3RLZ17
Water	424	441	438	443
Latex*	88	98	100	100
Daxad 30	10			
Ethylene Glycol	15			
TJC-500	5			
Dowicil 75	1			
Limestone #9 NCS	780			
Mica P-80-F	175			
ASP-400	80			
Attagel 40	10			
Properties				
Viscosity	8	6	8	7
Workability	100	100	100	96
% R.T. Adhesion	70	30	90	28
% L.T. Adhesion	79	91	80	74
% Crack Resistance				

*All latices plasticized with dibutyl phthalate.

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TABLE II

TJC FORMULATIONS FROM LATEX BINDERS PLASTICIZED WITH SANTICIZER 160

Notebook No.	2WDM103	2WDM104
Latex No.	3RLZ12	3RLZ17
Water	416	425
Latex	100	100
Daxad 30	10	
Ethylene Glycol	15	
TJC-500	5	
Dowicil 75	1	
Limestone #9 NCS	780	
Mica P-80-F	175	
ASP-400	80	
Attagel 40	10	
Properties		
Viscosity	570	560
Workability	9	7
% R.T. Adhesion	100	100
% L.T. Adhesion	87	22
% Crack Resistance	78	88

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