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UV-000 #88

SUMMARY REPORT

PLASTICS INTERMEDIATES
POLYESTER RESINS
HIGH PURITY ASBESTOS AS A THIXOTROPE FOR POLYESTERS

Authors: C. W. McGary
P. L. Smith

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SUMMARY High purity asbestos from the Mining and Metals Division can be used as a viscosity modifier and thixotropic aid in polyesters. A concentration of 2.5-3.0 per cent asbestos in a hand lay-up polyester provides thixotropy equivalent to 1.0 per cent Cab-o-sil.

INTRODUCTION Polyester resins (40 per cent styrene) for hand lay-up and spray-up applications customarily are modified by addition of 1.0 per cent Cab-o-sil. Reportedly,(1) viscosity of the resulting polyester, measured using a #2 spindle and a model LVT Brookfield viscometer, is as follows:

Rpm	Viscosity range, cps
6	900-1300
12	750-900
30	600-750
60	400-500

The purpose of this study was to determine whether high purity asbestos (6-8¢/lb.) could be used as a replacement for Cab-o-sil (72-74¢/lb.).

DISCUSSION The polyester used in this study was prepared using 2.0 moles of phthalic anhydride per 1.0 mole of maleic anhydride and a 10 per cent excess of propylene glycol. Viscosity, after dilution to 40 per cent styrene, was 275 cpoise (ref: 149PLS118).

Table I shows the effect of high purity asbestos and Cab-o-sil on viscosity of the polyester at 25°C. It is apparent that between 2.5 and 3.0 per cent asbestos provides thixotropy equivalent to 1.0 per cent Cab-o-sil. All of the samples showed signs of filler settling upon standing 1-2 hours at room temperature. Settling rate of asbestos was slower as the concentration increased.

Research and Development Department
Chemicals Division
Union Carbide Corporation

High purity asbestos, like Cab-o-sil, did not have an adverse effect on shelf life. Paraplex P-43 containing 3.0 per cent asbestos and 0.25 per cent cobalt naphthenate (6% cobalt) has been stored for 100 days at room temperature with no signs of gelation. (Ref: 149PLS72 and 88).

EXPERIMENTAL In order to establish equilibrium conditions rapidly, it was necessary to agitate the polyester-thixotrope mixture vigorously with a mechanical (Lightnin) mixer. Around 60 minutes of agitation was necessary for Cab-o-sil while 30 minutes was sufficient for the asbestos. The procedure used was as follows:

To the polyester was added 0.25 per cent cobalt naphthenate (6% cobalt) and the required amount of thixotrope. After bringing to 50°-55°C., the mixture was vigorously agitated without further heating. Weight of the mixture then was adjusted by addition of styrene to compensate for loss due to volatization and deaeration was effected in a vacuum dissicator. Viscosity at 25°C. then was determined using a #2 spindle (Model LVT Brookfield viscometer) at 6, 12, 30 and 60 rpm.

BIBLIOGRAPHY

(1) Oral communication to C. W. McGary from Charles Ross, Freeman Chemical Corp.

ATTACHMENTS: 1 Table

P. L. Smith

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TABLE I

COMPARISON OF EFFECT OF HIGH PURITY ASBESTOS AND CAB-O-SIL ON VISCOSITY OF A HAND LAY-UP POLYESTER (40% STYRENE)

	Thixotrope			
	HP Asbestos			Cab-o-sil
	2%	2.5%	3.0%	1.0%
Viscosity[1] @ 25°C., cps @				
6 rpm	725	900	1350	1150
12 rpm	663	813	1225	913
30 rpm	588	692	>1000	665
60 rpm	>500	>500	>500	>500

Ref: 149PLS124 and 125

(1) Using a #2 spindle and a model LVT Brookfield viscometer.

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