CARBIDE THE DISCOVERY COMPANY

Calidria ASBESTOS

PLAINTIFF'S EXHIBIT
UC-1043

ULTRASONIC DISPERSION OF "CALIDRIA" RESIN-GRADE 244 ASBESTOS

In Polyester Resins

A07905

A COMPARATIVE EVALUATION OF MIXING, THICKENING, AND THIXOTROPIC CHARACTERISTICS

F-42351

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ULTRASONIC DISPERSION OF "CALIDRIA" RESIN-GRADE 244 ASBESTOS

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Ultrasonic mixing is used to advantage in industry for effective dispersion of fine particulates in polymer systems. The action of ultrasonic dispersers differs from the conventional impeller-type mixers in that dispersion is obtained by cavitational energies rather than hydraulic shearing forces. Consequently, mixing temperatures are lower and air entrapment is minimized.

Conclusions

From tests, conducted by Sonic Engineering, it can be concluded that:

1. Good Resin-Grade 244 dispersion in thixotropic polyesters can be obtained in the range of concentrations normally recommended, with one pass through an Econosonic Disperser, at operating pressures as low as 300 psi.
2. The rheological properties of the Econosonic-mixed samples were superior to those prepared with a Homo-mixer.
3. Operating pressure for Econosonic dispersions of R-G 244 Asbestos appears to be critical; dispersibility at 0.5 per cent concentration decreases at pressures above 300 psi.
4. Based on these tests, it appears that pyrogenic silica requires more work than R-G 244 Asbestos for comparable dispersions and properties.

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Experimental

UNION CARBIDE's CALIDRIA Resin-Grade 244 Asbestos, dispersed ultrasonically, has been found to provide polyester resin mixes with rheological properties superior to those prepared with a Homo-mixer. In addition, R-G 244 Asbestos/polyester resin dispersion was superior to pyrogenic silica/polyester resin dispersion, by either mixing procedure.

An Econosonic, Model 8-B, was used with single-pass tests at 300, 450 and 600 psi. All Homo-mixer tests were standarized at 5,000 rpm for three minutes. Table I compares Econosonic and Homo-mixer dispersions of Resin-Grade 244 Asbestos and pyrogenic silica at 0.5 per cent concentration with a polyester-base laminating resin.(1) The 0.5 per cent concentration is normally recommended for thixotropic polyester laminating resins. Viscosity data were obtained with a Brookfield Viscometer.

(1) Paraplex P-43-Rohm and Haas Corporation

TABLE I

Viscosity (cps) of Polyester Resin at 5 rpm and 26°C.

	Concentration % By Wt.	Econosonic (one pass)			Homo-mixer 3 min. at 5000 rpm
		300 psi	450 psi	600 psi	
R-G 244	0.5	2200	1600	800*	1500
Pyrogenic Silica	0.5	600	900	–	800

* After three passes

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Table II shows that multiple passes through the Econosonic at various pressures has no significant affect on the dispersion of CALIDRIA R-G 244 Asbestos, at 0.5 per cent concentration.

TABLE II

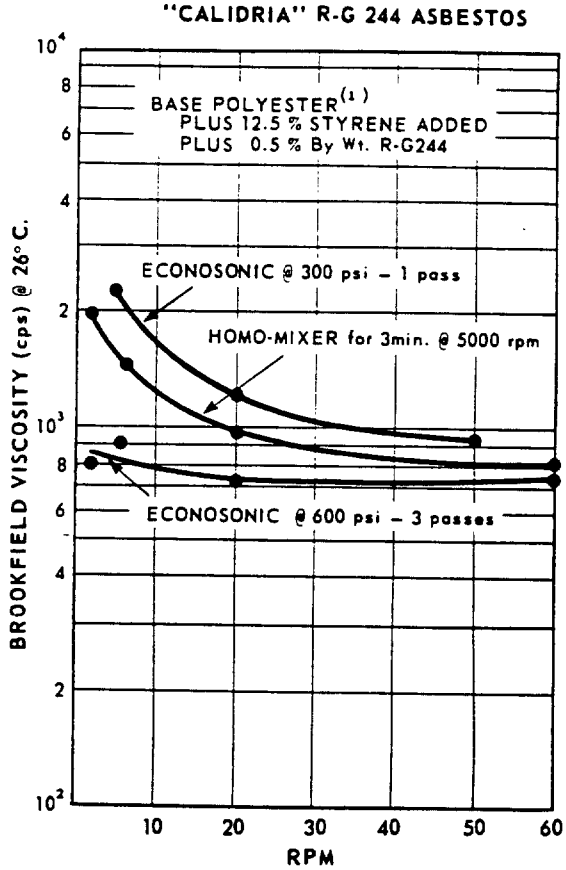
Viscosity (cps) of Polyester Resin at 5 rpm and 26°C.

R-G 244 % By Wt.	Pressure	Econosonic 1 pass	Econosonic 2 passes	Econosonic 3 passes	Thixotropic Index at 5/50 rpm 1 pass	Thixotropic Index at 5/50 rpm 3 passes
0.5	300 psi	2200	2400	2200	2.4	2.3
0.5	450 psi	1600	2000	2200	1.9	2.4
0.5	600 psi	–	–	800	–	1.0

(1) Paraplex P-43-Rohm and Haas Corporation

Figure 1, graphically compares Ultrasonic vs Homo-mixing.

FIGURE 1 – ECONOSONIC VS HOMO-MIXING OF "CALIDRIA" R-G 244 ASBESTOS



Ultrasonic Sonolators

The controlling parameters for sonic equipment are: blade-to-orifice distance, which was held constant for these tests, and outlet pressure which is adjusted by a tuning valve and acoustic meter. Optimum mixing conditions often vary significantly for different materials. Ultrasonic vibration is produced by impinging the resin on a flat blade. Cavitation within the liquid causes extreme pressure changes and high-intensity mixing.

For additional information on Ultrasonic Sonolators, refer to Bulletin 640, Sonic Engineering, Norwalk, Connecticut.

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For complete information on properties, applications and prices, or technical assistance in utilizing

Calidria ASBESTOS

contact the nearest Union Carbide sales office or CALIDRIA Asbestos representative

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