UNION CARBIDE

PLAINTIFF'S EXHIBIT
UC-1051

Calidria

Resin-Grade 244 Asbestos

- Effective thixotrope for polyester spray-up, hand lay-up laminating resins, and gel coats

- Effective thickener for plastisols and organosols used in adhesives, coatings, mastics, and sealants

KMX 02034

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Calidria Resin-Grade 244 Asbestos

. . . new, modified asbestos fiber from UNION CARBIDE . . . developed for maximum thickening efficiency and thixotropy in polyester spray-up and hand lay-up laminating resins . . . also an effective thickener for plastisols and organosols used in a broad variety of adhesives, coatings, mastics, and sealants. In many systems, CALIDRIA Resin-Grade 244 Asbestos will not contribute color or opacity—a characteristic that makes it particularly attractive in polyester gel coats.

Though CALIDRIA Resin-Grade 244 Asbestos is designed for use in stir-in mixers, optimum efficiency and lowest cost are obtained through use of high-shear mixers; such as, "Cowles" Dissolvers, sonic dispersers, and homogenizers.

Other desirable features of CALIDRIA Resin-Grade 244 Asbestos include:

- Ease of incorporation
- Reduced dust
- Clear, colorless products at low loadings
- Long term shelf life

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Typical physical properties

Specific Gravity	2.45
Moisture Content, % by wt.	2.0, maximum
Nature of Surface Charge	Neutral
Refractive Index, n_D25°C.	1.54 to 1.56
Bulking Value, gallons per 100 lb.	4.8
Dry Bulk Density, lb. per cubic foot	1.0
Standard Package Weight, lb.	10
% Magnetite	0.3
Oil Absorption, lb. DOP/(100 lb. Asbestos)	300-350
Screen Size, Typical; % plus 325 Mesh	Nil
Surface Area, sq. meters per gram	60
Fiber Diameter, microns	0.025
Length/Diameter, microns	200 avg. (1000 maximum)

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Typical applications

Figure 1 COMPARISON OF THICKENING EFFICIENCY OF *CALIDRIA* RESIN-GRADE 244 ASBESTOS WITH THAT OF PYROGENIC SILICA IN POLYESTER RESIN

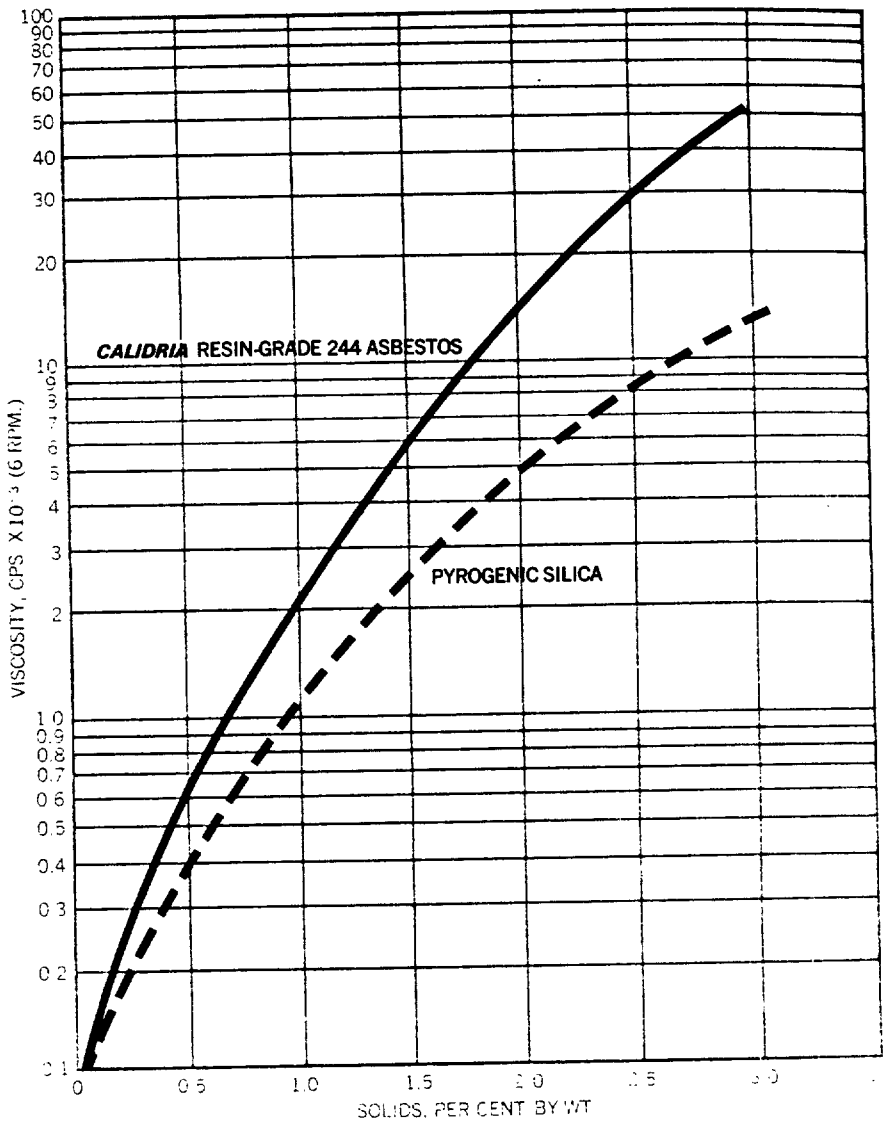


Figure 1 shows the thickening efficiency of CALIDRIA Resin-Grade 244 Asbestos in a typical polyester. Comparison is made with a pyrogenic silica additive. Viscosity data are given in Table 1.

Figure 2 THIXOTROPIC CHARACTERISTICS IN POLYESTER RESINS

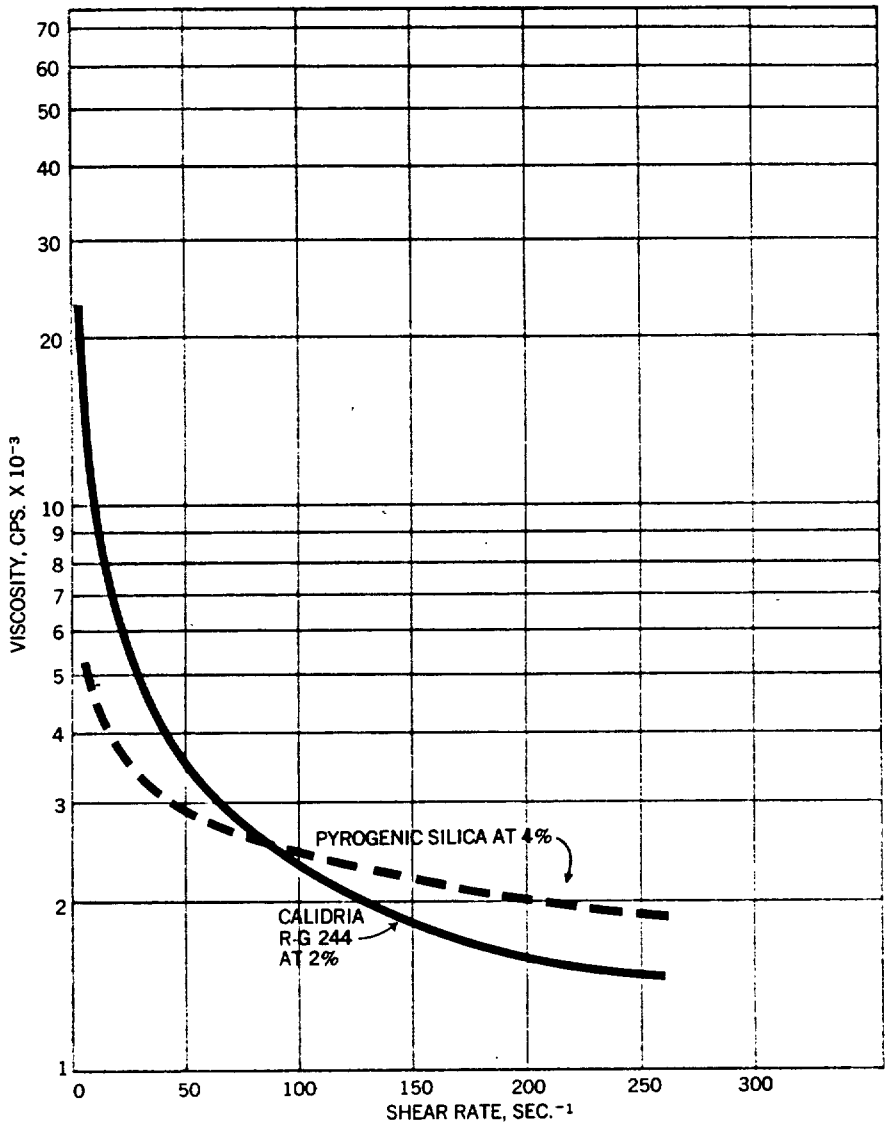


Figure 2 shows the viscosity profile of CALIDRIA Resin-Grade 244 —polyester systems as compared to a system containing pyrogenic silica. Better flow at high shear rates, during pumping and spray-up, and better anti-sag properties when at rest are illustrated.

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Use of CALIDRIA Resin-Grade 244 in promoted polyester resins

Accelerators normally used in promoted resins may cause abnormally low viscosity and thixotropy when mineral thickeners are used. These properties may be enhanced in CALIDRIA R-G 244 systems by adding a small concentration of polyhydroxyl compounds, i.e. about 0.3 per cent by weight of ethylene glycol. In addition to higher viscosity and thixotropic index, viscosity stability is also improved.

Ultrasonic dispersion of CALIDRIA Resin-Grade 244

Good dispersion of CALIDRIA R-G 244 in polyester laminating resins can be obtained with an "Econosonic" Disperser operating at a pressure of 300 psi. Pressures above 300 psi. tend to reduce viscosities obtainable. In general, CALIDRIA R-G 244 requires less energy for adequate dispersion than comparable concentrations of pyrogenic silica.

A "Cowles" Dissolver may be used to incorporate CALIDRIA R-G 244 at 3500 rpm., with a 3-inch impeller and a 3-quart sample container, in 5-10 minutes. At 1 per cent loading, mixing time can extend for one hour without degrading; and at 2 per cent loading, up to 30 minutes. Longer mixing periods or properly scaled-up equipment should adequately mix larger batches.

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Table 1

VISCOSITY DATA AT VARIOUS SOLIDS CONCENTRATIONS OF *CALIDRIA* RESIN-GRADE 244 ASBESTOS IN A TYPICAL POLYESTER FORMULATION

CALIDRIA RESIN-GRADE 244 ASBESTOS, % BY WT.	BROOKFIELD VISCOSITY AT 25°C., CPS.; MODEL LVF, NO. 4 SPINDLE				THIXOTROPIC INDEX 2/20
	RPM.				
	2	6	20	60	
0	100	100	100	100	1.0
0.5	1,400	730	390	270	3.6
1.0	3,600	2,000	890	630	4.0
1.5	11,000	5,600	2,300	1,600	4.8
2.0	26,000	15,000	5,200	3,500	5.1
2.5	58,000	30,000	11,000	6,200	5.3
3.0	100,000	54,000	20,000	OFF SCALE	5.0

CALIDRIA Resin-Grade 244 Asbestos is recommended as a heat stable anti-sag agent in plastisol automotive sealer formulations. It may be used as a direct replacement for colloidal silica or similar thixotropes. There is no adverse effect on adhesion to steel.

As an effective thixotrope in typical heat-curable vinyl sealants, CALIDRIA Resin-Grade 244 Asbestos imparts a high degree of anti-sag and promotes adhesion.

Typical heat-curable vinyl sealant formulation

A suggested heat-curable vinyl sealant formulation[a] is the following:

INGREDIENT	PER CENT BY WEIGHT
BAKELITE Vinyl Dispersion Resin QYLF-2	24.54
BAKELITE Vinyl Solution Resin VMCC	3.92
"Elvacite" 2044[b]	0.98
"Hycar" 1411[c]	0.37
"Camel White"[d]	29.20
FLEXOL Plasticizer 10-10	29.20
FLEXOL Plasticizer TCP	2.70
"Monomer X-970"[e]	4.91
"Mark" LL[f]	0.49
CALIDRIA Resin-Grade 244 Asbestos	3.68
"Dicup" R[g]	0.01
	100.00

Dissolve BAKELITE Vinyl Resin Solution VMCC in FLEXOL Plasticizer 10-10 at about 100°C. Dissolve "Elvacite" 2044 in FLEXOL Plasticizer TCP at 100°C. Mix the two solutions and all the other ingredients together in a pony, "Hobart", or similar mixer.

(a) D. K. Sausaman, *et al*, "Special Report XP-75"; Union Carbide, Chemicals and Plastics, Bound Brook, New Jersey.

(b) Acrylic resin; Du Pont, Wilmington, Delaware

(c) Powdered rubber; B. F. Goodrich, Akron, Ohio

(d) Calcium carbonate; H. T. Campbell and Son's Corporation, Baltimore, Maryland

(e) Polymerizable monomer; Rohm and Haas, Philadelphia, Pennsylvania

(f) Stabilizer; Argus Chemical Corporation, Brooklyn, New York

(g) Catalyst; Hercules, Wilmington, Delaware

UNION CARBIDE

THE DISCOVERY COMPANY

UNION CARBIDE CORPORATION
ASBESTOS
270 PARK AVENUE, NEW YORK, N. Y. 10017

Sales Offices

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