UC 14943

UNION CARBIDE

INTERNAL CORRESPONDENCE

PLAINTIFF'S EXHIBIT UC-395

MINING AND METALS DIVISION

P. O. BOX 579, NIAGARA FALLS, NEW YORK 14302

To Name
Division
Location

Mr. J. E. Walsh
UCC Mining and Metals
17 Executive Park Drive
Atlanta, GA 30329

Date: March 26, 1974

Originating Dept.: "Calidria" Asbestos

Answering letter date:

Subject: Use of "Calidria" Asbestos to Partially Replace Cellulosic Thickener in Various Paints

Copy to

Messrs. G. L. Dickson
B. L. Ingalls
J. L. Myers
T. P. Norris
W. C. Thurber
File

Dear Jack:

The available information on the above subject has been assembled in accordance with your request. It isn't riches but there is a reasonable indication that something like 25% of the cellulosic thickener might be replaced by asbestos. Replacement ratio looks like about two pounds asbestos per pound of cellulosic removed.

In case anyone wants to try this out it is suggested that the asbestos be dispersed first into the water in the formulation by strong shearing in a Cowles. At least a portion of the surfactants in the formulation should be added at this point. The asbestos should be followed by the other dry solids. The latex should be added at the end.

I would strongly recommend that you move cautiously with this application at a couple of selected locations before any general introduction. Don't turn Andres loose with it all over Florida before some favorable field results have been obtained.

Regards,

H. B. Rhodes

RECEIVED
MAR 29 1974

HBR:cam
Attachment

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USE OF "CALIDRIA" ASBESTOS TO PARTIALLY REPLACE CELLULOSIC THICKENER IN VARIOUS PAINTS

1. Our experience and experimental work has been mainly directed at using the asbestos to reduce the amount of TiO_2 needed to obtain a given level of hiding power. Removal of the cellulosic thickener was looked at as a secondary benefit.

   This is illustrated in Table 1 of "Calidria Products for Latex Paints" where 20 pounds of HPP asbestos is added to the system and 20 pounds TiO_2 is removed, the cellulosic thickener is only decreased by one pound, i.e., from five pounds to four pounds.

2. Some viscosity data for various combinations of RG-144 and Cellosize QP-52,000 at loadings of 1,2, and 3% in water are shown in Table I and in Figures 1 and 2 . This is only one set of experiments with one grade of Cellosize and should be used with considerable caution. These data suggest that a moderate replacement of Cellosize up to 25-30% may improve the viscosity but beyond that the viscosity drops sharply t 90/10 (asbestos/Cellosize), which is not plotted, there may even be a mutual detraction. Note also that the range of thickener loadings used here is 3-15 times as much as typical in paints.

3. The effect of substitution at a constant loading of 4 pounds /100 gallons in a typical paint is shown in Table II and Figure3. There does not appear to be any "hump" at low substitututions as indicated by the previous water data. Possibly it would be attractive to remove one pound of Cellosize (from a total of 5 pounds) and replace it with 2 pounds of RG-144. The dollar saving would be worthwhile and some "extension" of the Cellosize would be effected.

4. Figure 4 shows some data for the thickening of UCAR Latex 360 with RG-144 and RG-244. Unfortunately data were not obtained for the various grades of Cellosize but possibly you can obtain some from your contacts in our coatings area.

H. B. Rhodes
3/26/74

CALIDRIA ASBESTOS

THE DISCOVERY COMPANY

UNION CARBIDE CORPORATION • MINING & METALS DIVISION • P.O. BOX 579 • NIAGARA FALLS, N.Y. 14302 • TEL: 716-285-3311

CALIDRIA PRODUCTS FOR LATEX PAINTS

IMPROVED PIGMENT EFFICIENCY

"Calidria" High Purity (HP) and CG-135 products provide improved pigment efficiency in aqueous latex systems. The improvement is due to the interaction between the positively charged chrysotile fiber and negatively charged TiO_2 particles which causes the TiO_2 particles to disperse and attach along the fiber. This better dispersion of TiO_2 occurs during the manufacture of CG-135, a coflocculated chrysotile-rutile TiO_2. The same effect is realized in situ with HP during conventional pigment grinding in latex paint manufacture.

"Calidria" can be used in paints with either high or low TiO_2 levels. The dispersing effect of the fibers, for example, permits higher than normal levels of TiO_2 for superior one-coat hide. Dispersion of TiO_2 along the chrysotile fibers also results in less pigment separation during storage.

Both CG-135 and HP are available in either pelletized (P) or open (O) form.

COST-PERFORMANCE ADVANTAGES

Laboratory data and commercial application results indicate that "Calidria" products can be added to latex paint systems at levels of 20 to 50 pounds/100 gallons to provide cost and/or performance advantages. They serve primarily as pigment extenders or partial pigment substitutes: (1) to improve opacity at similar cost, or (2) to reduce costs while maintaining opacity. Improved viscosity control and rheology have also been experienced.

TEST FORMULATIONS AND RESULTS

Table I (on the reverse side) shows a "standard" paint formulation compared to similar formulations with HPP and CG-135P replacing part of the TiO_2 and cellulosic thickener. These paints were mixed with a Cowles using a 3" blade in a 3-quart can. The ingredients in the "A" bracket were added first and stirred at 2650 rpm until the Cellosize was dissolved. Next the ingredients in the "B" bracket were added quite rapidly, followed by the "Calidria" product. The latter was added in increments interspersed with water, Aerosol OT, and Nopco NXZ as needed to maintain good mixing properties. Any material left over was added at the end. Finally, the entire pigment blend was "ground" for 20 minutes at 2650 rpm and let down with the latex. Tamol 850 and Aerosol OT have been found particularly effective for dispersion in these systems.

Table II summarizes the properties of the three paints from Table I.

TABLE I

INTERIOR LATEX PAINT FORMULATION

(lb./100 gal.)

	Ingredient	Standard	With HPP	With CG-135-P
A	Water	269	269	269
	Cellosize, QP-4400	5	4	4
	Tergitol NPX	3	3	3
	Tamol 850	4	4	4
	Lecithin	1	1	1
	Ethylene Glycol	20	20	20
	Butyl Carbitol Acetate	15	15	15
	Nopco NXZ	1	1	1
B	TiO_2 (Du Pont R-960)	250	230	220
	ASP-170	75	75	75
	Camel-Tex	155	155	155
C	High Purity Pellets	0	20	0
	CG-135 Pellets	0	0	30
	Water	150	150	150
	Aerosol OT	2.3	2.3	2.3
	Nopco NXZ	2	2	2
	UCAR Latex 360	243	243	243

TABLE II

TEST RESULTS OF PAINT FROM TABLE I

Physical Properties	Standard	With HPP	With CG-135-P
TiO_2, lbs./100 gal.	250	230	220
Total Solids, %	53.73	53.87	53.72
Viscosity, KU	91	93	95
Freeze-Thaw	Passed	Passed	Passed
Hegmann Rating	5.0	5.5	5.5
Paint Film Properties			
Reflectance, %	92.0	91.5	91.5
Contrast - Dry	.9670	.9670	.9730
- Wet	.9600	.9657	.9600
- Diff.	.0070	.0013	.0130
Enamel Holdout (60° Gloss)			
Room Temperature	76	75	70
38°F	68	66	53
Scrub, 7-day air dry			
Total Cycles	1000	1000	1000
Initial Wear, Cycles	403	400	256
%Wear	90	50	90
Color Acceptance	Exc.	Exc.	Exc.
Application Properties*			
Foaming	5	8	2
Framing	15	15	15
Lapping	10	10	10
Touch-Up	15	10	15
Brushability	10	10	10
Levelling, Visual	5	10	5
Sheen Uniformity	10	15	10
Burnish Resistance	10	10	10
Wet Crock Resistance	8	10	15
H_2O Spot Resistance	5	10	10
TOTALS	93	108	102

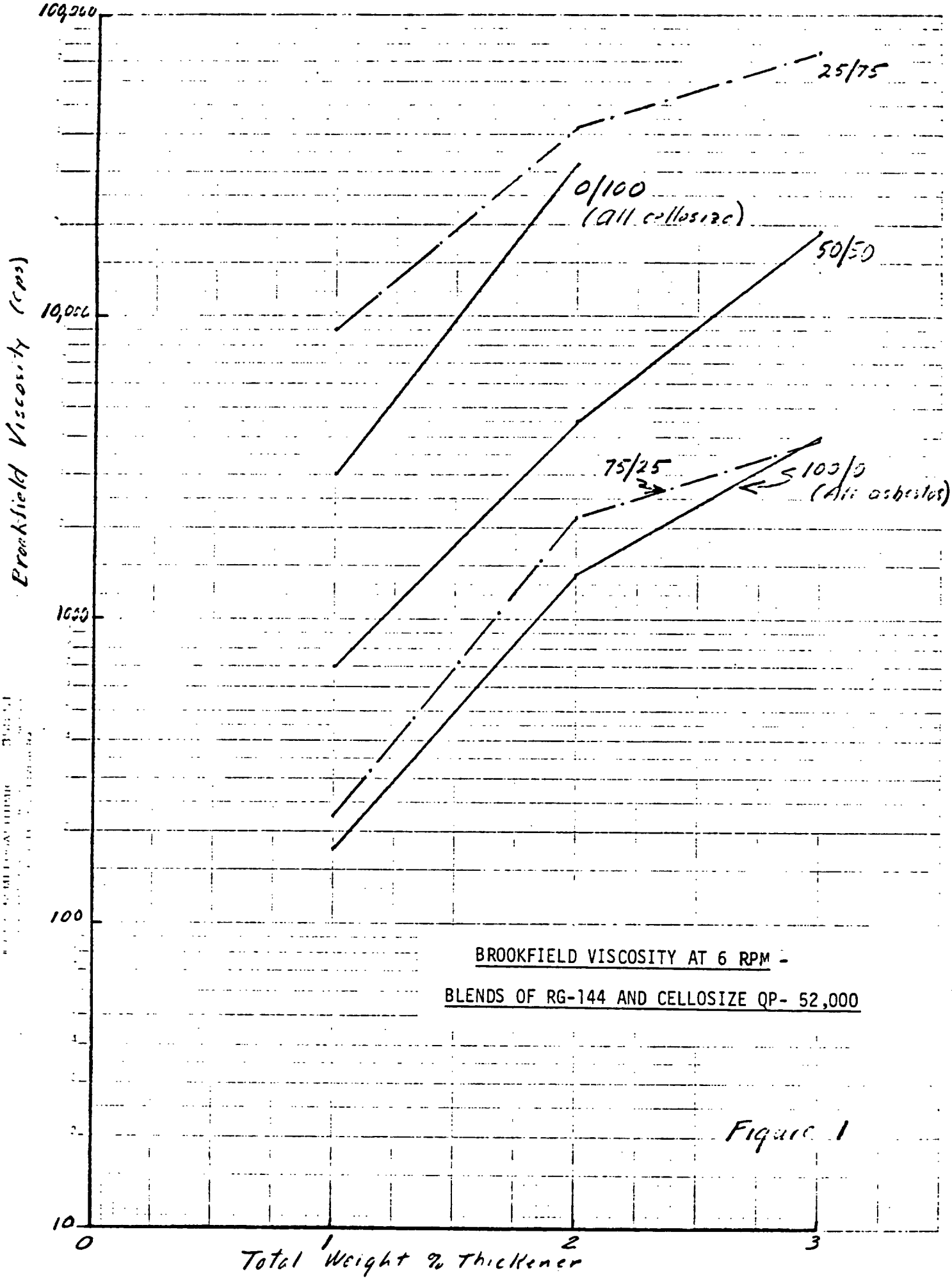
* Rated on 1-20 scale with 20 = excellent

TABLE I

CELLOSIZE-CALIDRIA BLENDS IN H_2O

Sample in H_2O			Brookfield Viscosity, cps		Thix
RG-144	QP-52,000		6 rpm	60 rpm	Index
1	0		175	45	3.9
2	0		1400	120	11.7
3	0		4000	350	11.4
0.9	0.1		175	30	5.8
1.8	0.2	(90-10)	900	190	6.9
2.7	0.3		2300	490	4.7
0.75	0.25		225	65	3.5
1.50	0.5	(75-25)	2150	380	5.7
2.25	0.75		3900	1260	3.1
0.5	0.5		700	300	2.3
1.0	1.0	(50-50)	4500	2150	2.1
1.5	1.5		19,000	7300	2.6
0.25	0.75		9000	4100	2.2
0.5	1.50	(25-75)	42,000	O.S.*	—
0.75	2.25		75,000	O.S.	—
0	1		3000	1900	1.6
0	2		32,000	O.S.	—
0	3		O.S.	O.S.	—

*O.S. - Off Scale



BROOKFIELD VISCOSITY AT 6 RPM -

BLENDS OF RG-144 AND CELLOSIZE QP- 52,000

Figure 1

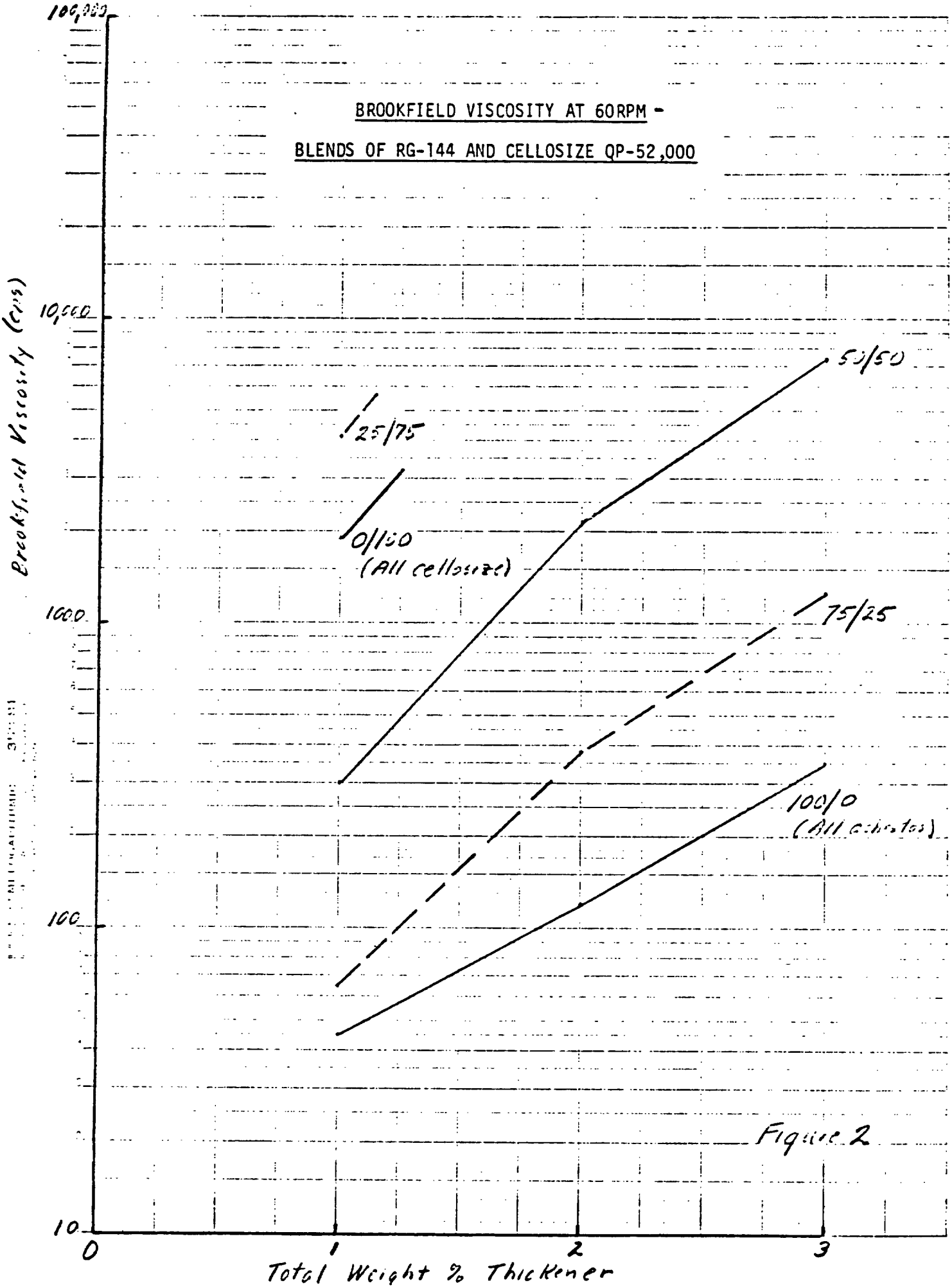


Figure 2

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TABLE II

CALIDRIA-CELLOSIZE BLENDS IN A STANDARD LATEX PAINT

(Added at 0.04 lb./gal.)

Blend Composition, Parts per hundred		Stormer Viscosity, ku	Relative Cost, cents/ku*
RG-144	QP-52,000		
0	100	95	0.296
25	75	85	0.272
50	50	73	0.227
75	25	64	0.158
90	10	59	0.105

* QP-52,000 @ 74¢/lb.
CG-120 @ 9¢/lb.

10 X 10 TO THE INCH 46 0780
KEUFFEL & ESSER CO.

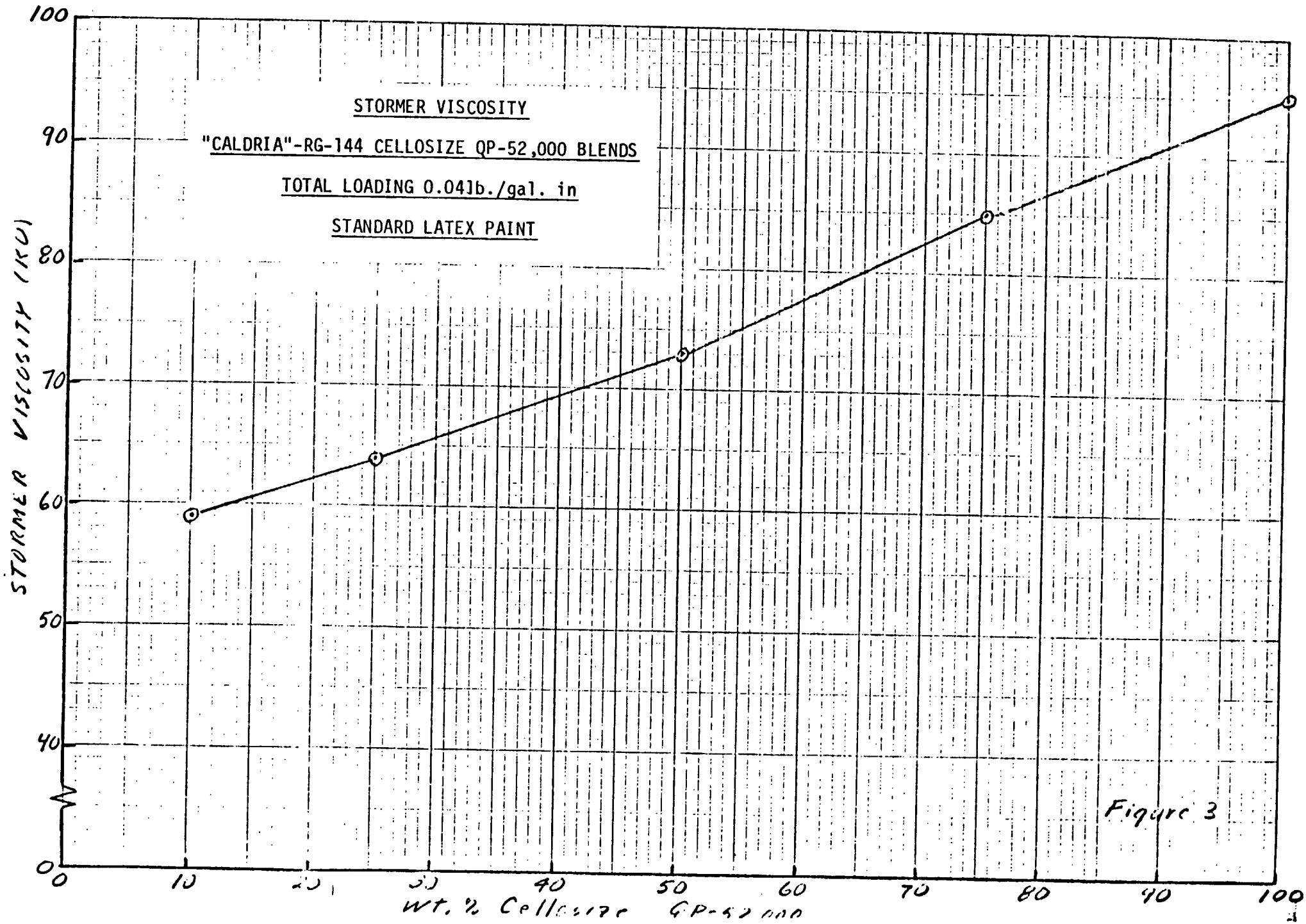
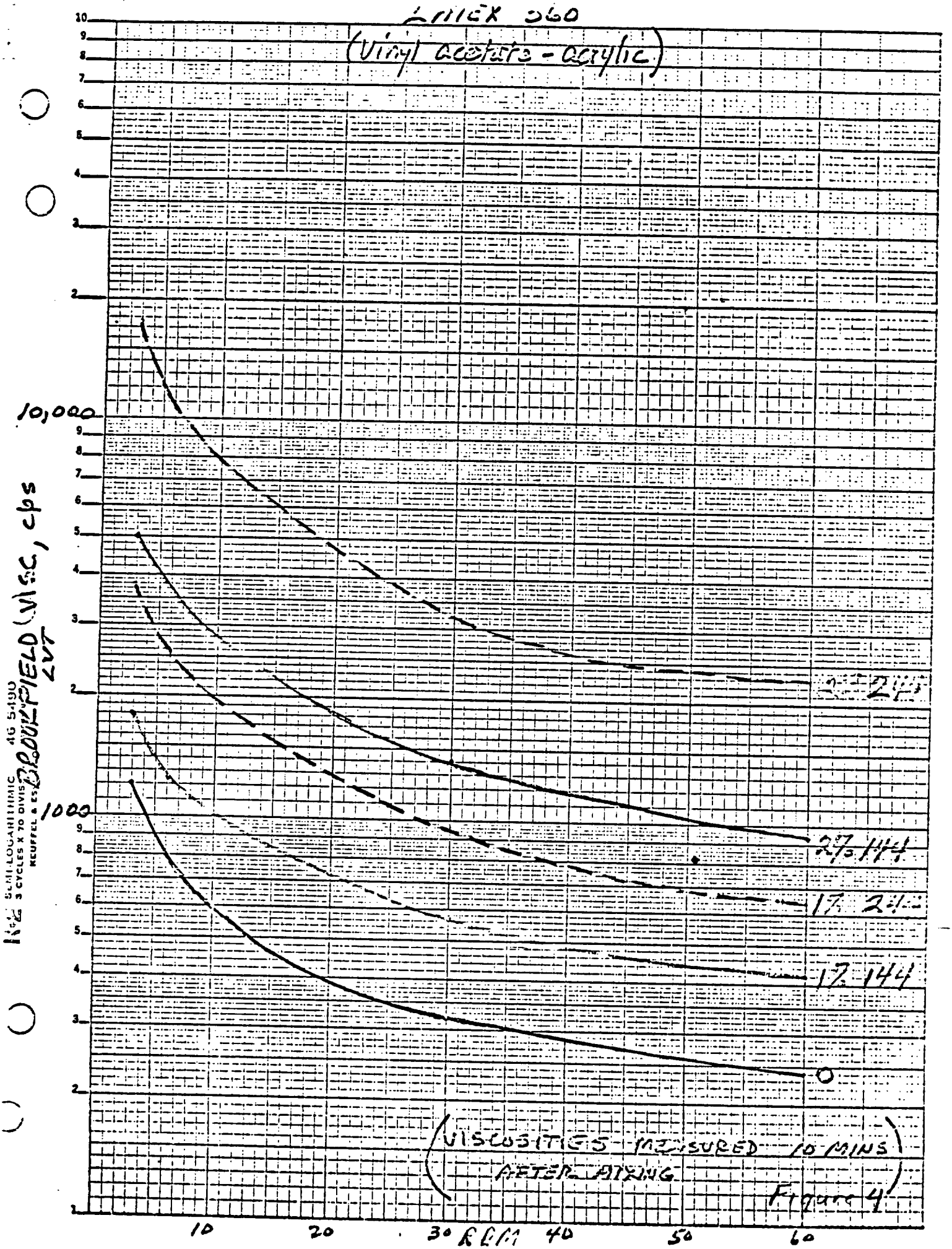


Figure 3

Union Carbide trial exhibit UC-395: H. B. Rhodes to J. E. Walsh on Using Calidria Asbestos to Partially Replace Cel...
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ARTEX 060
(Vinyl acetate - acrylic)
10,000
1000
BROOKFIELD (Visc, cps
LVT
46 5490
SEMI-LOGARITHMIC
3 CYCLES X 70 DIVIS
KEUFFEL & ES
2% 144
1% 144
1% 144
(VISCOSITIES MEASURED 10 MINS
AFTER MIXING
Figure 4)
10
20
30 RPM
40
50
60