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PROJECT REPORT

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EVALUATION OF TITANATED CALIDRIA ASBESTOS

PART IV

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SUMMARY

The objective of this study is to reevaluate titanated SG 100 in vinyl asbestos tile and determine if the pilot plant produced sample shows a pigment strength advantage over conventionally pigmented stocks as has been demonstrated for laboratory titanated SG 100. Samples provided for this study were formulated into vinyl asbestos tile at 2, 3, 4 and 5 percent pigment levels (R101 TiO_2) and the appropriate comparisons made using the Color Eye colorimeter for determination of brightness values. As has been done previously, these brightness values were converted to K/S values and plotted vs. pigment concentrations for both the titanated and conventionally pigmented stocks. Least squares linear fits were derived and calculated values used to compute tinting strength of the titanated product. Results obtained do not show a tinctorial advantage for the titanated grade. This is not in accord with the results derived for the laboratory produced titanated equivalent. The laboratory made sample showed a tinting strength of 119 compared to the conventionally pigmented control. No explanation for this discrepancy can be offered at this time other than the possibility of differences due to mode of titanated sample preparation or raw material differences.

A 17242

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EVALUATION OF TITANATED CALIDRIA ASBESTOS

PART IV

INTRODUCTION

Results of previous tinting strengths studies of laboratory titanated Calidria indicated the need to confirm the tinctorial advantage of a pilot plant produced grade. Samples of pilot plant made 30 percent R101 titanated SG 100 and similarly treated standard SG 100 were provided for this purpose.

DISCUSSION

Sample preparation and testing procedures were identical to those described in Reference (1) except for the Banbury operation. Due to poor reproducibility of tile brightness values (YICI) additional mixing control was applied to the Banbury mixing. Adoption of a minimum of 3:00 minutes mixing and a minimum of 250°F stock temperature markedly improved the repeatability of tile brightness values. Brightness values obtained by this procedure average about three percent higher for the standard grade SG 100 than those obtained in Part III of this study. Relative ratings, however, are believed to remain the same so that findings of previous comparisons are not disqualified. Part of the difficulty encountered in this work has been attributed to the excessive hardness of the pilot plant made pellet and part is attributed to initially poor Banbury operation. Tile samples were prepared formulating with SG 100 and R101 as well as the 30 percent R101 titanated grade at effective pigment levels of 2, 3, 4 and 5 percent. Replicates or duplicates were made in most cases and reflectance values (YICI) determined and plotted as the K/S function vs. percent pigment. Computer derived least squares linear fits were developed for both the SG 100 control as well as the titanated grade. Tables I, II, III and IV provide formulations and colorimetric data for all samples. Figure I shows graphically the degree of scatter as well as the least square derived curves. As shown in Table IV, tinting strength of the 30 percent titanated grade is approximately the same as the SG 100 control. Tinting strength of 100 on this scale signifies equivalency. The 97 percent level is probably within experimental error. Explanation for the lack of improved tinctorial strength of the pilot plant made titanated grade cannot be offered now. It is possible that this inconsistency with earlier data relates to the difference in method of titanation or raw material differences. As a result of initial trouble experienced in effecting acceptable reproducibility of tile samples original SG 100 fiber provided as the control was depleted and commercially produced SG 100 fiber was used.

It is recommended that the details of the laboratory and pilot plant titanation methods be reexamined with the hope that the reason for this discrepancy can be resolved.

A 17243

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CONCLUSIONS

(1) The pilot plant made 30 percent R101 titanated SG 100 sample has been rated for pigmentation value.

(2) Visual and colorimetric analyses indicate it offers no pigment savings compared to conventional pigmentation.

(3) The reason for the failure of this pilot plant produced grade to show a tinctorial advantage consistent with previously rated laboratory preparations should be determined.

(4) If the basis for the discrepancy is identified, additional samples should be prepared and evaluated in tile.

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REFERENCE: (1) "Tinctorial Comparison In Vinyl Asbestos Tile of Titanated SG 100 and Standard Grade SG 100 with Externally Added Titaneum Dioxide"

Authors: R. Braddicks, L. F. Riglioni; September 6, 1968, File Number 68-303

Period : April - May, 1969

Notebook Ref: 841-69

Index List
(1) Vinyl Asbestos Tile
(2) Calidria Asbestos

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A17245

Union Carbide trial exhibit UC-152: R. P. Braddicks and L. F. Riglioni, Evaluation of Titanated Calidria Asbestos, Pa...
ACL Doc 15423 · Page 5 of 9

TABLE I

FORMULATIONS 841-69

	A	B	C	D	E	F	G	H
Limestone 40 Mesh	2632	2589	2546	2508	2632	2589	2546	2503
SG 100	507				307	206	106	6
SG 100-70/R101-30					286	430	573	716
VSJD-BL 381	556							
Amoco 18-240	196							
Neolyn 91	51.6							
Mark 140	25.8							
Stearic Acid	5.2							
TiO_2-(R101)	86.0	129	172	215				
FLEXOL® 128	220							
FLEXOL EPO	20.6							
Total	4300							
% R101	2	3	4	5	2	3	4	5
% Binder	25							
PHR Plasticizer	30							

A17246

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TABLE II

COLOR EYE DATA
SG 100 AND 30 PERCENT TITANATED SG 100
NOTEBOOK NUMBER 841-69

Batch	% TiO_2	YICI	K/S
SG 100 Standard			
A	2	64.51	0977
B	3	66.46	0844
	3	66.58	0838
	3	68.01	0753
C	4	68.25	0736
	4	69.17	0685
	4	69.71	0659
D	5	69.32	0680
	5	70.52	0617
	5	70.13	0638
	5	71.04	0592
30 Percent Titanated SG 100			
E	2	64.37	0984
F	3	66.88	0819
	3	67.01	0813
G	4	68.40	0730
	4	68.10	0747
H	5	69.78	0653

A 17247

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TABLE III

LEAST SQUARES LINEAR FIT
K/S VS PERCENT PIGMENT PLOT

SG 100 Standard
Equation: Y = K/S, X = % Pigment

Y = .1135 - .01039X *Index = 0.8648

X Actual	Y Actual	Y Calculated	Percent Difference
2	.0977	.0927	+5.3
3	.0844	.0823	+2.4
3	.0838	.0823	+1.7
3	.0753	.0823	-8.5
4	.0736	.0719	+2.2
4	.0685	.0719	-4.8
4	.0659	.0719	-8.4
5	.0680	.0616	+10.4
5	.0617	.0616	+0.2
5	.0638	.0616	+3.6
5	.0592	.0616	-3.8

30 Percent Titanated SG 100 Y = .1156 - 01044X Index 0.9476

2	.0984	.0948	+3.8
3	.0819	.0843	-2.8
3	.0813	.0843	-3.5
4	.0730	.0739	-1.1
4	.0747	.0739	+1.1
5	.0653	.0634	+2.9

A17248

TABLE IV

CALCULATED TINTING STRENGTH

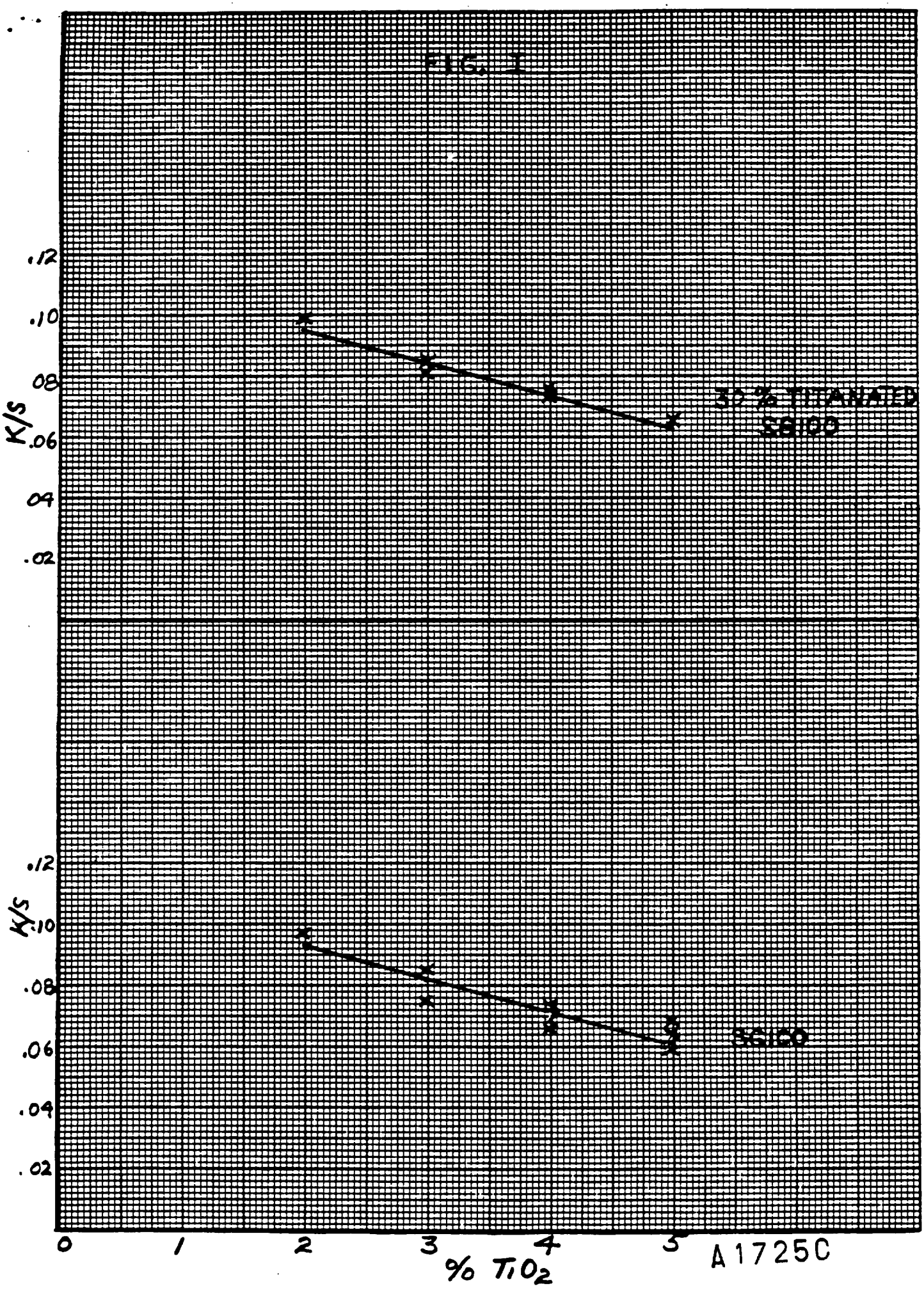
30 Percent Titanated SG 100

Percent Pigment	K/S Std.	K/S Unk.	*T.S.
2	.0927	.0948	97.8
3	.0823	.0843	97.6
4	.0719	.0739	97.3
5	.0616	.0634	97.2

*T.S. Tinting Strength = $K/S_{(Std)}/K/S$ Unk X 100

A17249

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FIG. 1
.12
.10
.08
K/S
.06
.04
.02
30% TITANATED
SB100
.12
K/S
.10
.08
.06
.04
.02
SB100
0
1
2
3
4
5
% TiO2
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