



TECHNICAL SERVICE REPORT

by

G. L. Dickson

THE EVALUATION OF ASBESTOS T-135
AS A REPLACEMENT PIGMENT
FOR TITANIUM DIOXIDE

for

Brown Company
Kalamazoo, Michigan

May 31, 1968

Group Manager - R. G. Woolery

Project No. 443-N11

UNION CARBIDE CORPORATION
Chemicals and Plastics
Research and Development Department
Niagara Falls, N.Y.

June 13, 1968

A17128

SUBJECT

This report covers the analytical data obtained on wet-end samples taken during the mill trial on May 31, 1968 by Brown Company. The object of this trial was to evaluate Asbestos T-135 as a replacement for titanium dioxide in a white cylinder board furnish. The results demonstrated that a complete substitution on a pound-for-pound basis is practical with no loss of brightness in the final product. The replacement of 50 lb. of T-135 per 3000 lb. of fiber for the same amount of titanium dioxide reflects a saving of \$3.50 per pulper, or approximately \$2.33 per ton of furnish. No operational problems were encountered and it is indicated that T-135 should be used on a continuous basis in all board furnishes normally containing titanium dioxide.

ANALYTICAL RESULTS

Three sets of wet-end samples were taken during the pre-trial control period and the same number during the trial proper. The sampling points selected were as follows: (1) stuff box, (2) No. 7 vat, and (3) white water. These samples were subsequently analyzed at this laboratory for consistency, % ash, % titanium dioxide, and % Asbestos T-135. The obtained data, although mainly of academic interest, are presented in Table I. Table II contains calculated retention values for TiO_2 and T-135 based on headbox and tray water relationships. One set of reel "scab" samples (top and bottom liner) was also submitted for testing and analyzed as follows:

<u>2:30 p.m.</u>	<u>% Ash</u>	<u>% TiO_2</u>	<u>% T-135</u>
Top Liner	16.31	0.18	0.99
Bottom Liner	16.96	0.24	1.05

Based on these results and the analyses of the 2:05 p.m. vat samples, the following retention values can be calculated: (Reel/Vat x 100)

<u>Retention</u>	<u>% Ash</u>	<u>% TiO_2</u>	<u>% T-135</u>
Top Liner	87.87	40.90	89.18
Bottom Liner	91.37	54.54	94.59

This method is usually considered the most convenient for calculating wire retention but, unfortunately, in this case, there is not enough information available to make a comparison between pre-trial and trial conditions.

The analyses of stuff box samples indicate that only about 1.1% Asbestos T-135 was present in the furnish during the trial. This is

somewhat less than the 1.66% (50 lb. T-135 per 3000 lb. of fiber) which had been anticipated. Thus, the total T-135 and titanium dioxide content of the furnish during the trial averaged 1.43% as opposed to an average of 1.56% titanium dioxide during the pre-trial control period. Based on the values presented in Table II, the retention of titanium dioxide in the furnish appears to have been significantly increased by the addition of T-135 (from an average of 50% during the control to about 63% during the trial). However, the retention of T-135 averaged only 36%, which is unusually low for our material. At this time, we can offer no explanation for the latter as the reel vs. vat relationship previously noted in this report indicates extremely good T-135 retention.

G. L. Dickson/bsn
Attach.

TABLE I
Sample Analyses
Brown Company
Kalamazoo, Michigan
May 31, 1968

<u>Time</u> <u>Sampled</u>	<u>%</u> <u>Consistency</u>	<u>%</u> <u>Ash</u>	<u>%</u> <u>TiO₂</u>	<u>%</u> <u>T-135</u>
<u>Stuff Box</u>				
11:30 a.m.	3.38	11.24	1.60	-
12:30 p.m.	3.03	12.65	1.66	-
1:05 "	3.24	13.58	1.43	-
2:05 p.m.	3.88	16.81	0.38	1.05
3:05 "	3.94	19.27	0.34	1.11
4:05 "	3.76	19.84	0.31	1.11
<u>No. 7 Vat</u>				
11:30 a.m.	0.408	14.07	1.73	-
12:30 p.m.	0.364	16.51	1.78	-
1:05 "	0.394	16.02	1.78	-
2:05 p.m.	0.508	18.56	0.44	1.11
3:05 "	0.534	21.08	0.40	1.23
4:05 "	0.571	22.20	0.33	1.23
<u>White Water</u>				
11:30 a.m.	0.0670	36.99	4.26	-
12:30 p.m.	0.0817	39.97	4.99	-
1:05 "	0.0854	40.47	4.30	-
2:05 p.m.	0.0777	43.87	1.52	2.65
3:05 "	0.0974	45.96	1.30	2.40
4:05 "	0.1123	47.67	1.28	2.22

A17131

TABLE II
Calculated Wire Retention
Brown Company
Kalamazoo, Michigan
May 31, 1968

<u>Time</u>	<u>% Ash</u>	<u>% TiO₂</u>	<u>% T-135</u>
11:30 a.m.	43.17	40.43	-
12:30 p.m.	54.33	56.62	-
1:05 p.m.	54.76	52.36	-
2:05 p.m.	36.15	52.84	36.52
3:05 p.m.	39.77	59.28	35.59
4:05 p.m.	42.23	76.28	35.50

Note: Wire retention values, based on vat and tray water concentrations, were calculated as follows:

$$[1 - (\text{Concentration}_{\text{Tray water}} / \text{Concentration}_{\text{Headbox}})] \times 100$$

A17132

UNION CARBIDE CORPORATION
MINING & METALS DIVISION
MILL TRIAL DATA SHEET

- I. COMPANY LOCATION AND DATE OF TRIAL Brown Co., Kalamazoo, Mich. May 31, 196
- II. COMPANY REPRESENTATIVES AND TITLES Stan Martin: Mill Technical Service,
Walt F. Redmond: Mill Supt., Ken Christian and Bill Torp: Staff
Assistants to Mill Supt.
- III. UCC REPRESENTATIVES Roger Scott
- IV. TRIAL OBJECTIVES (In order of importance) Complete replacement of titanium dioxide
with U.C.C. Asbestos T-135
- V. PRODUCT IDENTIFICATION
- Type of Product 16-point cylinder board Coated Yes/No
- Grade Name Pail and Dish
- Basis Weight 198 lb.
- Daily Production 85 tons lb./hour 7,000
- Total Daily Production of Mill -
- (Tissue and Board) No. of Plys 7
- VI. MACHINE DESCRIPTION
- Type of Machine Cylinder
- Machine No. 1 (Cylinder) No. of Cylinders 7
- Machine Speed _____ (Tissue) Reel Speed _____
- (Tissue) % Crepe _____ Wire Mesh _____
- Wire Width 100 inches Machine Trim _____
- Size Press No Calenders Yes

VII. AUXILIARY EQUIPMENT

Refiners	Type	Location	Loading (amp.)
	<u>Jordans</u>	_____	_____
	_____	_____	_____
	_____	_____	_____

Saveall (Type) No Flow Rate --

VIII. STOCK PREPARATION - Continuous or Batch

Type Beater and Capacity Hollander

No. of Beater Chests and Capacity _____

Machine Chest Capacity _____

Stock Freeness (Mach. Chest and Stuff Box) _____

Headbox Consistency 0.5%

Makeup pH _____ Machine pH _____

IX. FURNISH MAKEUP* Basis (lb./ton, etc.) per 3,000 lb. of fiber

Furnish Constituent	%	Pounds
<u>Bleached kraft</u>	<u>75</u>	<u>2,250</u>
<u>Coated broke</u>	<u>25</u>	<u>750</u>
<u>Clay</u>	_____	<u>100</u>
<u>Alum</u>	_____	<u>24 (gal)</u>
<u>Size</u>	_____	<u>50</u>
<u>Pearl starch</u>	_____	<u>100</u>
<u>Titanium Dioxide (Japanese)</u>	_____	<u>50</u>
<u>Asbestos T-135</u>	_____	<u>50 (substituted for TiO₂)</u>
<u>Blue dye</u>	_____	<u>4 oz.</u>
_____	_____	_____

* For board systems include furnish for each medium - top liner, underliner, filler, and backliner.

A17134

X. ASBESTOS ADDITION - Pellet Repulper (Type) None

Asbestos Grade T-135 pellets Lot No. _____

Point of Addition Morden stockmaker

Pounds of Asbestos Added _____ per ton BDF 50 per beater
_____ per hour

Per cent asbestos addition on BDF 1.66

XI. SUPPLEMENTARY INFORMATION

Quality Control Data Record

Stock Prep. Log

Sampling (in order of importance)

Pitch & Retention Trials

Board Trials

Tissue and Towel

Reel

#Tray Water

Stuff box

Stuff box

#Vat

Reel

Headbox

#Stuff box

Headbox

Tray

#Reel

Saveall effluent

Saveall effluent

Saveall influent

Saveall influent

Identify samples by name, date, time

Wet samples should approximate 500 ml. (400 ml. samples)

Weight of BD filter pad is required for all vat, tray, and saveall samples.

XII. TRIAL LOG (Comments including changes in furnish and operating conditions)

<u>Time</u>	<u>Comments</u>
Pre-trial	Wet end samples obtained at 11:30 a.m., 12:30 p.m., and 1:05 p.m.
T-135 Trial	Samples taken at 2:05 p.m., 3:05 p.m., and 4:05 p.m.

Recorded by Roger T. Scott Date 5/31/68

Witnessed and Understood by G. L. Dickson Date June 14, 1968

DISTRIBUTION LIST

Messrs. B. K. Barton	Chicago
L. D. Berger	New York
W. L. Carrick	Bound Brook
F. D. Dexter/	New York
N. J. Setter	New York
G. L. Dickson	Niagara Falls
B. D. Dobbs	Cincinnati
T. Dougherty	New York
T. J. Hall	Brussels, Belgium
P. G. Horecka	Chicago
G. E. Kuehn	Detroit
R. T. Larkin	Seattle
J. K. Marshall	Charlotte
J. S. McReynolds	Houston
R. A. Miller	Atlanta
G. J. Norberg	Charlotte
E. J. O'Keefe	Dallas
T. R. Orme	Los Angeles
A. E. Pufahl (2)	New York
J. A. Riddle	King City
R. T. Scott	Detroit
J. Sidlovsky	New York
J. H. Stevens	New York
F. H. Thompson	Niagara Falls
R. M. Tong	New York
J. F. Voit	New York
F. J. Welch	S. Charleston
R. G. Woolery	Niagara Falls
Miss. J. Ulrey	Bound Brook

A17137

Mr. R. T. Scott(3)
1815 Skyler Drive
Kalamazoo, Mich. 49001

June 14, 1968

See attached distribution

Brown Company
Kalamazoo, Michigan
Analyses of Asbestos
T-135 Trial Samples

The attached report covers the analytical data obtained on the wet-end samples taken during the Asbestos T-135 trial at subject mill on May 31, 1968. As the evaluation of our material in this case depended mainly on their quality control test results, these data are mostly of academic interest. It appears that the expected 1.66% Asbestos T addition level was never realized but as this was on a pound-for-pound replacement basis, it is not worthy of consideration.



G. L. Dickson

GLD/bsn
Attach.

RECEIVED
JUN 16 1968
U.S. CHEM. & PLASTICS
INDUSTRY

DISTRIBUTION

J. A. Riddle	☐
L. F. Crow	☐
R. O. Marsten	☐
W. E. Holsapple	☐
A. A. Andrade	☐
G. C. Brice	☐
Shifters	☐
J. L. Myers	☐
K. A. Wood	☐
D. S. Kamens	☐
G. Vessels	☐
K. West	☐
File	☐

A17127