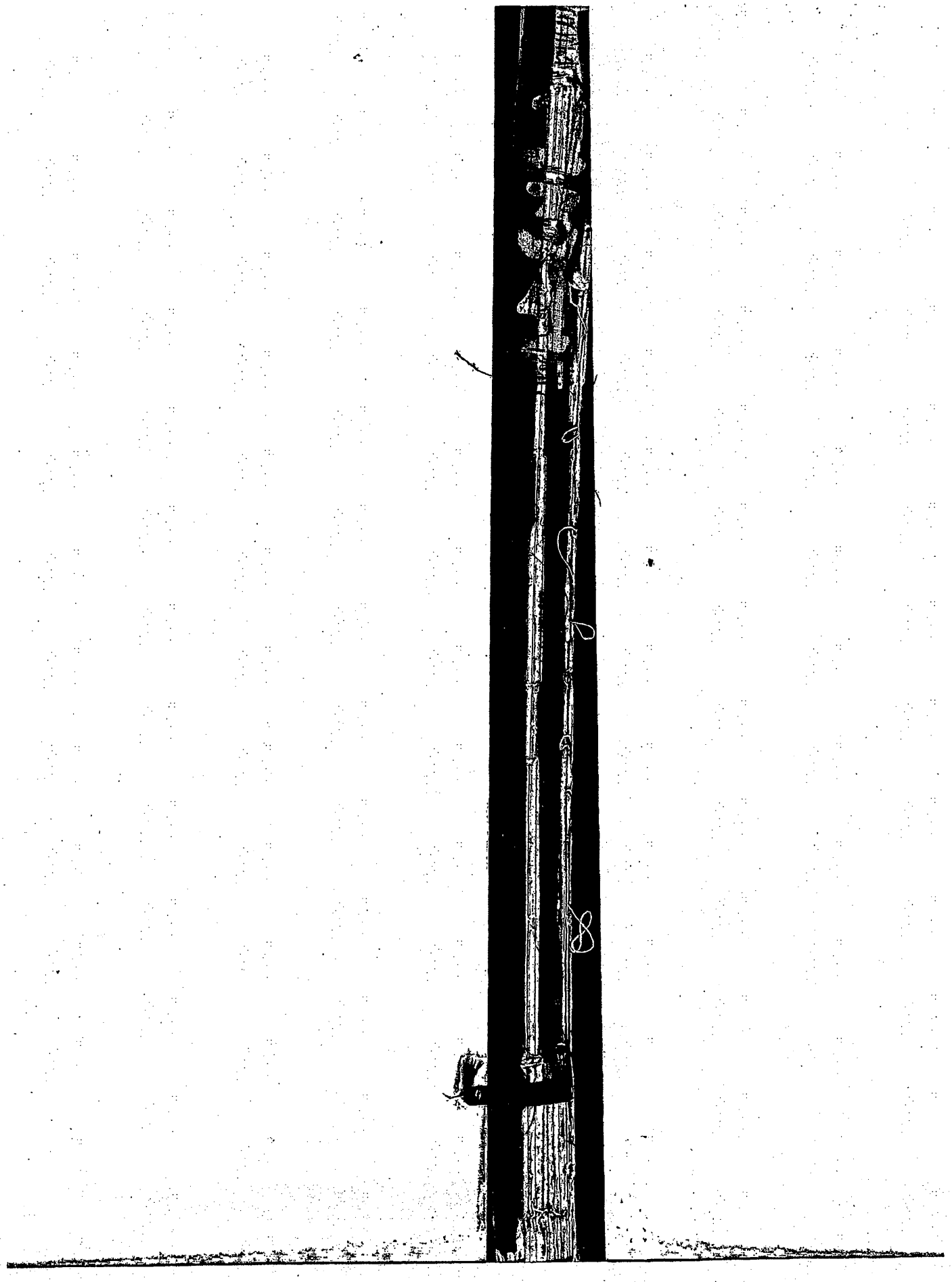
PENGAD 800-631-6989
EXHIBIT
18

LABORATORY NOTEBOOK

GEORGIA-PACIFIC CORPORATION

GYPSUM DIVISION



GP0023687

NOTEBOOK NO. 134

ISSUED TO Jack Sullivan & Wayne G. Ciccarelli

ON July 7 19 75

DEPARTMENT R & D

RETURNED 19

SCIENTIFIC NOTEBOOK CO.
719 WISCONSIN AVE.
OAK PARK, ILL.

GP0023688

INSTRUCTIONS

1. The primary purpose of this notebook is to protect your and the Company's Patent-Rights by keeping records of all original work in a form acceptable as evidence if any legal conflict arises.

2. When starting a page, enter the title, project number, and book number. Use ink for permanence—no pencil. Record your work as you progress, including any spur-of-the-moment ideas which may be developed later. Do not make notes on loose paper to be recopied. Use the blank lefthand page for calculations so they will be available if you want to recheck them. Record your work in such a manner that a co-worker can continue from where you stop. You might be ill and to protect your priority it could be urgent that the work continue while you are absent.

3. Give a complete account of your experiments and the results, both positive and negative, including your observations. Record all diagrams, layouts, plans, procedures, new ideas, or anything pertinent to your work including the details of any discussions with suppliers, or other people outside the Company. Do not try to erase any incorrect entries; draw lines deleting them, note the corrections, sign and date the changes. This extra care is worthwhile because of the necessity of original data to prove priority of new discoveries.

4. After entering your data, sign and date the entries. Explain your work to at least two witnesses who are not co-inventors, and have them sign and date the pages in the place provided. Record the names of operators and witnesses present during any demonstration and have at least two witnesses sign the page. If no witnesses are present during an experiment of importance, repeat it in the presence of two witnesses.

5. This notebook and its contents are the exclusive property of the Company. It is confidential and the contents are not to be disclosed to anyone unless authorized by the Company. You must return it when completed, upon request, or upon termination of employment. It should be kept in a protected place. If loss occurs notify your supervisor immediately, and make a written report describing the circumstances of the loss.

Form 468

GP0023689

Table of Contents	Page
Screening Tests for Fire-Rated Door Edge Banding	1-3
Competitive Board Survey (10-75)	4-9
Chicago Ready Mix (Cover Coat)	10-20
Screening Tests for Fire-Rated Door Edge Banding	21
Elvace E-9347-14 and Airflex 456 Emulsion Evaluation-3M Glass Bubbles Evaluation	22
Staley I13-103 and J14-142 Starch Evaluation	23
Pyrax ABB Pyrophyllite Evaluation - Complaint Investigations	24
Fibre-Free Wall Texture	25-27
Akron Asbestos Free Ready Mix	28-31
Acme Asbestos Free Ready Mix	32-33
Chicago Asbestos Free "Cover Coat"	34-39
Vinyl Pre-Dec Adhesive	40-46
Competitive ½" Wallboard Survey	47-50
Laminated Gypsum Fire Door Edge Banding	51-

GP0023690

TESTS #1-#24 FROM METAL SIDE

GP0023691

TITLE Screening tests for Fire-Rated Door Edge Banding

Project No. 295
Book No. 134

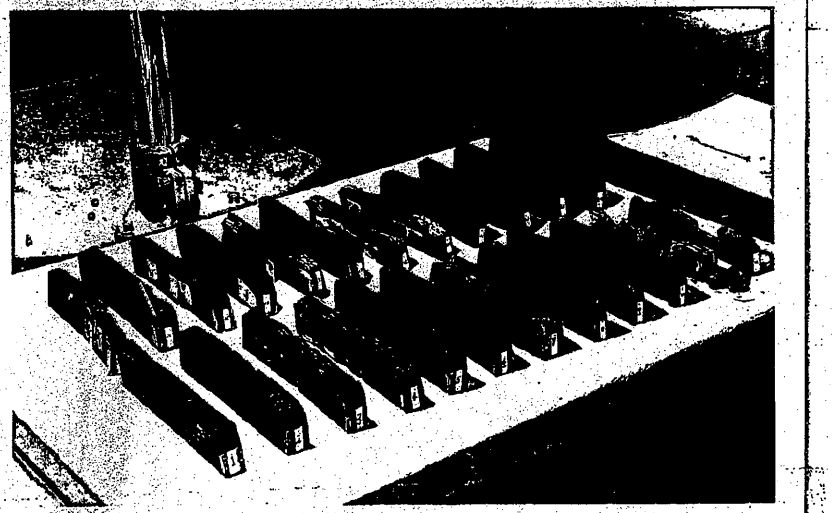
The purpose in performing the tests described below is to test the effectiveness of experimental types of laminated door edge banding in retarding the rate of fire deterioration. It is hoped that an effective combination can be found which would not require a grooved cut-out for tongue-and-groove attachment to the door core and yet perform better at retarding fire than the presently used treated soft maple edge banding.

The test consists of placing the sample piece above a bunsen burner for 30 minutes. The test pieces of edge banding are constructed from laminations of various materials which are layered together using GP-X-1091 adhesive with GP-4531 catalyst in a ratio by weight of 20 parts catalyst to 100 parts adhesive. The test pieces are then cut to a size of 6 inches by 1½ inches. To simulate the door core being alongside the test piece as would be the case in an actual door, a section of treated soft maple also 6 inches by 1½ inches is cut to size and placed alongside the test piece. These two pieces of wood are then clamped between two metal plates of steel which are of the test size (6 inches by 1½ inches). It is hoped that the metal on the outside of the test piece of edge banding will reasonably simulate the door jam in an actual door construction. It is noted however that the air flow between edge banding and metal as would be present in an actual door has been omitted in this test proceedure. This clamped construction is then placed on a tripod suspending the test material 1¼ inches above a bunsen burner flame. The bunsen burner is of the type that the base of the flame is 1½ inches in diameter. The flame is adjusted to about 5 inches in height (3¾ inches above the tripod). The test piece is left over the flame for 30 minutes after which time the flame is extinguished. After the test piece has been unclamped and cooled, observations are made.

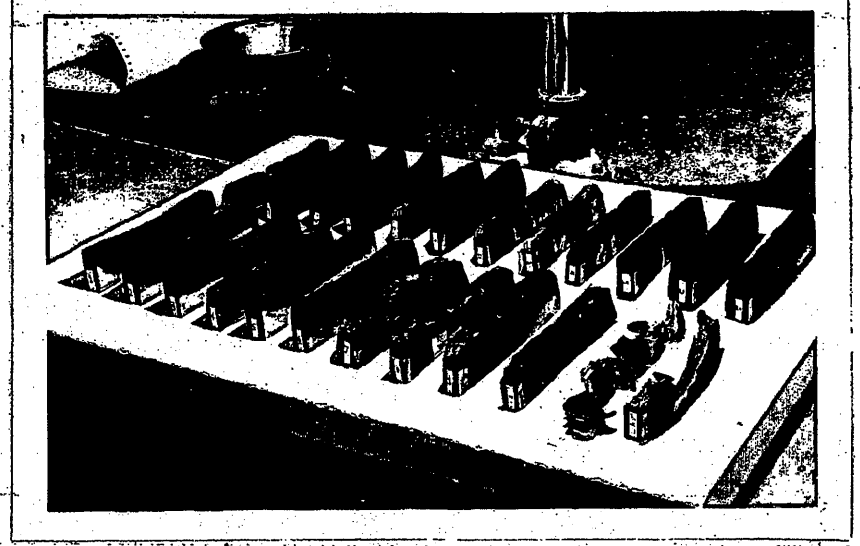
A table indicating the observed results is shown on the next page. Pictures of the burned pieces are also shown.

Witnessed & Understood by me,	Date	Invented by	Date
R W Henkel	8-18-75	Jack L. Sullivan	7/31/75

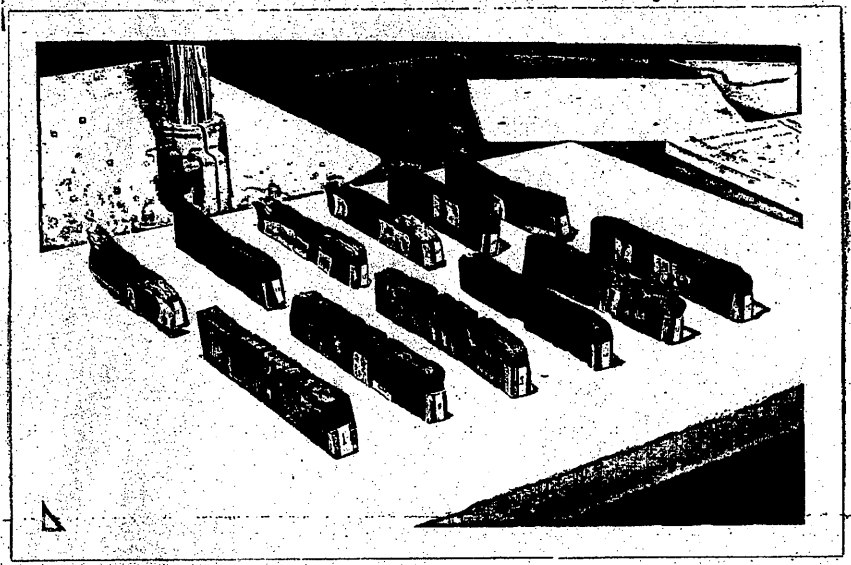
GP0023692



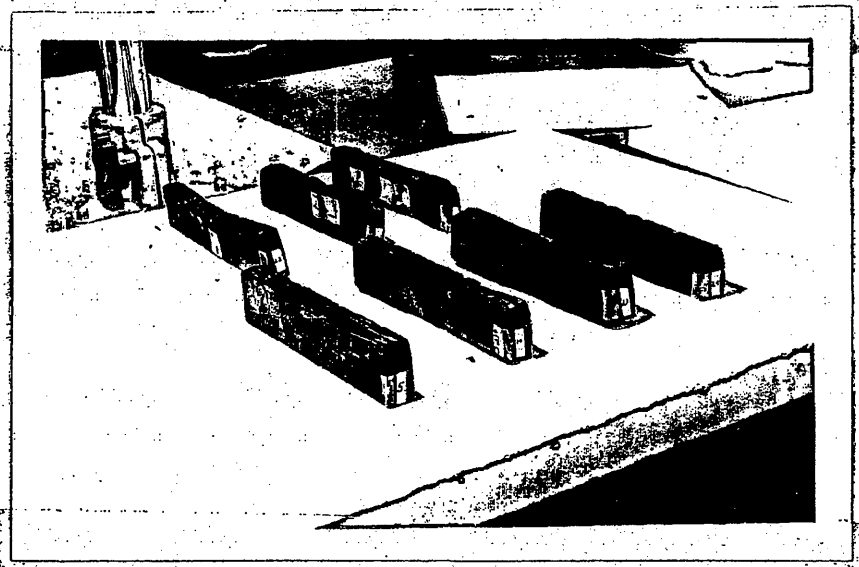
TESTS #1-#24 AT 45° FROM METAL SIDE
(SEE ENLARGEMENT OPPOSITE PAGE #1)



TESTS #1-#24 AT 45° FROM CORE SIDE
(SEE ENLARGEMENT IN FILES)



PURE SPECIES TESTS ONLY
(SEE ENLARGEMENT OPPOSITE PAGE #3)



LAMINATED PLASTIC & PARTICLE BOARD ONLY
(SEE ENLARGEMENT IN FILES)

GP0023693

TITLE Screening tests for Fire-Rated Door Edge Banding – (Continued)

Project No. 295

Book No. 134

REFERENCE NUMBER	WOOD SPECIES ****	DESCRIPTION	DENSITY* (lb./ft.³)	ORIGINAL DIMENSIONS (in.) LENGTH	WIDTH	THICKNESS
1	treated soft maple	solid with no laminations (presently in use)	43.74	6	1 1/2	19/32
2	fir	6 layers of 1/8" thickness	44.08	6 1/32	1 7/16	11/16
3	fir	5 layers of 1/8" thickness	44.08	6 1/32	1 11/32	5/8
4	fir	5 layers of 1/8" thickness	44.08	5 31/32	1 9/32	21/32
5	fir and plastic laminate	4 layers of 1/8" thickness fir separated by 3 alternating layers of 1/16" plastic laminate	56.51	5 31/32	1 7/16	21/32
6	mahogany plywood veneer	8 layers of 3/32" thickness	29.03	6	1 5/32	5/8
7	fir	4 layers of 1/4" thickness	44.08	5 3/4	1 3/8	1
8	oak	5 layers of 1/8" thickness	50.30	6	1 1/2	19/32
9	hemlock	5 layers of 1/8" thickness	38.27	6	1 1/2	5/8
10	soft maple	5 layers of 1/8" thickness	40.67	6	1 5/32	5/8
11	masonite	5 layers of 1/8" thickness	66.42	6	1 1/2	21/32
12	dense particle board	4 layers of scant 3/16" thickness	47.12	5 31/32	1 1/2	22/32
13	slow fir growth	5 layers of 1/8" thickness	32.38	5 31/32	1 1/2	5/8
14	fir and plastic laminate	3 1/8 layers of fir separated by 2 1/8 layers of plastic laminate with an extra 1/8 fir layer on top	59.27	6	1 1/2	3/4
15	dense particle board	4 layers of scant 3/16" thickness	47.12	6	1 1/2	11/16
16	large chipped particle board	5 layers of scant 3/16" thickness	45.34	6	1 1/2	20/32
17	alder	5 layers of 1/8" thickness	32.92	6	1 1/2	5/8
18	red cedar	5 layers of 1/8" thickness	26.06	6	1 1/2	5/8
19	birch	5 layers of 1/8" thickness	44.03	6	1 1/2	5/8
20	hard maple	5 layers of 1/8" thickness	46.18	6	1 1/2	5/8
21	fir	5 layers of 1/8" thickness	44.09	6	1 1/2	9/8
22	treated soft maple	solid with no laminations	40.06	6 1/32	1 1/2	5/8
23	fir, dense particle board, & plastic laminate	the following ordering of the layers: particle board, plastic laminate, particle board, plastic laminate, fir, fir	58.49	6	1 1/2	21/32
24	fir and dense particle board	same as #14 except dense particle board replaces plastic laminate	45.14	6	1 1/2	22/32
25	fir and hardboard	same as #24 except hardboard replaces fir	58.95	6	1 1/2	21/32
26	fir and hardboard	same as #24 except hardboard replaces fir	48.62	6	1 1/2	3/4

REFERENCE NUMBER	SHRINKAGE IN FINAL DIMENSIONS (in.) UNEXPOSED SIDE LENGTH	EXPOSED SIDE LENGTH	AVERAGE END WIDTH	CENTER WIDTH	NUMBER OF CRACKS ACROSS FULL LAMINATE OF EXPOSED SIDE	NUMBER OF CRACKS THROUGH WIDTH (> 1/8 inch)	% OF ORIGINAL WEIGHT LOST AFTER BURNING	OBJECTIVE RATING OF PERFORMANCE IN COMPARISON TO PREVIOUS TESTS	COMMENTS
1	-0-	3/32	1/32	1/32	9	4	40.72	—	note very large crack on center of exposed side & partial parallel burning on unexposed side
2	-0-	4/32	2/32	1/32	2	1	38.48	less cracking than #1 but flame penetrated through	—
3	-0-	4/32	1/32	2/32	-0-	1	40.09	similar to #2 except burning is more to one side	severely burnt & falling apart
4	3/32	4/32	4/32	3/32	2	3	39.61	worst performance to date	—
5	-0-	3/32	-0-	2/32	1	2	35.33	best performance to date or equal to #1	no burn through till near end of test
6	-0-	3/32	1/32	4/32	1	1	21.85	very good - surpassed only by #5	note considerable sideways warping
7	-0-	7/32	6/32	2/32	4	1	81.34	very poor performance	wax broken in cracks/grooves
8	4/32	13/32	5/32	5/32	4	4	66.31	remarkably even exposed side surface	note longer burn through time & low flame spread
9	-0-	3/32	4/32	4/32	4	2	54.20	exceptionally good for a wafer wood	no noticeable cracking & charring
10	4/32	6/32	7/32	10/32	5	6	66.49	similar to #5 except flame went more rapidly through	at 10 min. exposed piece of panel was removed & fire stop installed
11	TOTALLY DISINTEGRATED DUE TO POPPING & SNAPPING						total failure	slower burn through & flame spread than other	no noticeable warpage and piece retrieved
12	REMAINING SAMPLE BURNED AFTER TEST — WILL HAVE TO BE REDONE * quenched with H2O								through considerably
13	10/32	13/32	8/32	9/32	4	3	69.02	very poor performance	clamps slipped - broke panel out of test
14	7/32	8/32	4/32	4/32	2	2	58.07	very good performance similar to #5 but not as good as #5	showed burn through at 7 min.
15	6/32	10/32	4/32	10/32	1	2	65.97	similar or slightly better than #5	re paper at 12 — doused with H2O at 14
16	14/32	16/32	5/32	9/32	-0-	-0-	70.00	similar to #5 but little or no laminate burn	unusual effervescing with H2O — excessive shrinkage
17	5/32	18/32	7/32	5/32	1	2	69.93	very similar to #9	—
18	4/32	13/32	5/32	5/32	4	2	55.35	extremely good fire such a light wood	—
19	9/32	13/32	10/32	10/32	5	6	74.28	similar to #16 except quicker burning	very heavy warpage & cracking
20	6/32	10/32	13/32	13/32	5	6	74.71	very bad & extreme cracking to — lined up	steel strap used as clamp
21	10/32	11/32	7/32	7/32	2	3	71.45	apparently more severe than #9	as previous as check of test panels
22	1/32	10/32	5/32	5/32	8	9	48.47	more severe than #9	—
23	6/32	14/32	5/32	5/32	-0-	1	46.73	exceptionally good test ever	particle board & laminate stayed flame spread
24	4/32	5/32	4/32	4/32	2	1	39.05	very good, surpassed only by #23	very low flame spreading
25	4/32	5/32	6/32	4/32	2	1	44.09	very good similar to #24 very little diff.	flame was a bit more severe on sample
26	4/32	7/32	5/32	5/32	2	2	49.27	good similar to #25 but slightly	at stage flame

Witnessed & Understood by me,

R. Hanke

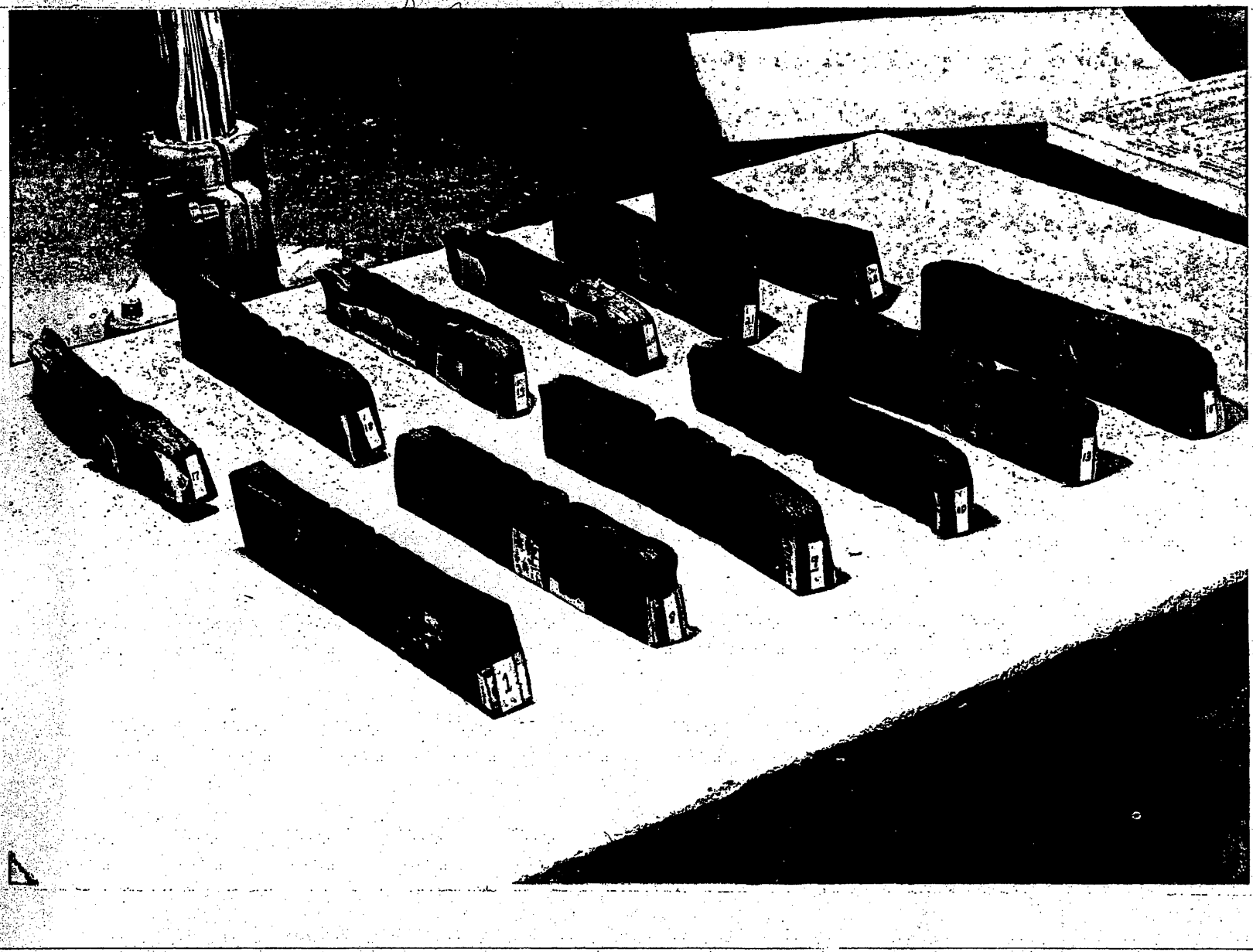
Date 8-15-75

Invented by

Jack L. Sullivan

Date 8/18/75

GP0023694



PURE SPECIES TESTS ONLY

GP0023695

Notes on table on preceding page:

* An estimate value for sample numbers 1 through 7

** Probably good only to an accuracy of ±0.3%

*** An average measurement taken approximately 3/32" or less from the specified location

**** Borden's Wonderbond adhesive used rather than the G-P adhesive

***** All fir refer to fast-growth fir unless otherwise stated

Conclusions:

Generalizing the results from the various species, the least shrinkage was observed in hemlock, red cedar, and alder, the least cracking in alder and particle board, the least weight loss in hemlock and red cedar, and the best at retaining its original form was hemlock, red cedar, and fir. Thus the only species which shall be considered further are hemlock (and possibly alder), red cedar, fir, and particle board. It is important to note, however, that since the test gradually apparently got more severe, only broad generalizations can be drawn.

With the pronounced indications from test numbers 23 and 24 that particle board as well as plastic laminate is very effective at reducing cracks and burning, the idea of using alternating layers of fir, particle board, and maybe plastic laminate for the core side layers with a face layer of hemlock shall be pursued. The plastic laminate though expensive is thought needed to replace the screw holding power of particle board, which is weak. Formalized strength tests for screw holding power would be useful for the further study of these edge banding combinations.

With the results of these tests, actual pilot door tests shall now be made testing these favored combinations.

As mentioned earlier, these tests did not show the hoped for consistency. Below are suggestions for improving the test:

1. To avoid treated wood shrinkage, use Kaylo core material instead.
2. Lengthen the test pieces to around 8 inches to avoid burning around ends.
3. To get constancy of flame, use thermocouple at sample piece height to pre-set flame temperature to a fixed temperature (say 1700°F) and simultaneously adjust flame height to a fixed height (say 5 inches).

As an additional comment, it appears that increased numbers of laminations helps to retard flame deterioration.

Witnessed & Understood by me,	Date	Invented by	Date
R. Henkel	8-18-75	Jack L. Sullivan	8/18/75

GP0023696

Project No. 2

TITLE Competitive Board Survey Book No. 134 4

Board Reference Number	G-P Plant Furnishing Samples	Board Manufacturer	Board Manufacturer's Code Number	Board Weight (per 1000 sq ft)	Board Width (in.)	Caliper Thickness of Board	Taper (in) Width Left Edge	Taper (in) Width Right Edge	Shoulders (in.)
1	Lovell	Georgia-Pacific	7305 LL5	1775	47 5/32	0.472	2 1/2	2 1/2	0.014
2	Lovell	Celotex	297523C3	1754	48 1/32	0.489	2 3/8	2 3/16	0.011
3	Lovell	U.S. Gypsum	042852424116	1936	48	0.524	2 1/8	2 1/4	-0.005
4	Buchanan	Georgia-Pacific	0735N514	1727	47 3/32	0.504	2 1/8	2 3/16	-0.015
5	Buchanan	U.S. Gypsum	060753378	1803	48 1/32	0.490	2 1/4	2 1/8	-0.003
6	Buchanan	National Gypsum	071151 07R	1814	48	0.497	2 3/8	2 5/8	0.001
7	Buchanan	Flintkote	771475C22	1836	47 15/16	0.495	2 1/4	2 1/16	0.009
8	Brunswick	Georgia-Pacific	07305 BF4	1906	48 1/16	0.505	2 1/4	2 1/2	0.004
9	Brunswick	U.S. Gypsum	072552254F8	1822	47 3/32	0.493	2 1/4	2 1/2	0.001
10	Brunswick	National G	06025520	1764	48	0.498	2 7/16	2 1/2	-0.001
11	Sigurd	Georgia-Pacific	180655336P5	1715	47 3/32	0.497	2 7/16	2 1/4	-0.007
12	Sigurd	Flintkote	772952N4	1842	48	0.518	2 7/8	2 3/16	0.003
13	Sigurd	Republic	7673175	1750	48 1/32	0.495	2 3/8	2 3/8	0.018
14	Sigurd	Celotex	385751C3	1764	48 1/32	0.501	2 3/16	2 5/16	0.010
15	Sigurd	U.S. Gypsum	072652348	1695	48	0.494	2	2 1/16	0.006
16	Fort Dodge	Georgia-Pacific (fac. Flintkote)	08095FF3	1785	48	0.484	2 3/16	2 9/16	0.002
17	Fort Dodge	National	07305F065	1807	48 1/32	0.493	2 5/16	2 5/16	-0.005
18	Fort Dodge	Celotex	(none)	1709	47 9/16	0.510	2 7/16	2 5/16	0.006
19	Fort Dodge	U.S. Gypsum	(none)	1844	48	0.496	2 1/4	1 3/4	0.005
20	~~Wilmington~~	~~Georgia-Pacific Flintkote~~	8575WD6	1672	47 3/32	0.499	2 1/8	2 1/4	0.011
21	Wilmington	U.S. Gypsum	080175833 1W3	1768	48	0.490	2 1/4	2 1/8	0.007
22	Wilmington	Kaiser	6B26075 6	1883	47 3/32	0.492	2 3/16	2	0.000
23	Wilmington	Flintkote	7728??205	1910	48	0.507	2 1/4	2	0.012
24	Wilmington	National	72255 3P	1811	48	0.492	2 5/16	2 5/8	0.001
25	Blue Rapids	Georgia-Pacific	082805 KB1	1750	48 1/32	0.497	2 1/2	2 3/16	0.005
26	Blue Rapids	Republic	03237503	1852	47 7/8	0.497	1 7/8	2	0.010
27	Blue Rapids	National	07245MA	1701	48	0.491	2 9/16	2 3/8	0.004
28	Blue Rapids	U.S. Gypsum	080952277D	1686	47 15/16	0.487	2 1/16	2 7/16	0.008
29	Blue Rapids	National	08025MA	1738	48	0.499	2 3/8	2 1/4	0.009
30	Blue Rapids	Weyerhaeuser	A6185B11	1795	47 15/16	0.489	2 1/16	2 3/16	0.010
31	Blue Rapids	U.S. Gypsum	062353202812	1738	48	0.491	2 5/16	2 1/8	0.005
32	Acme	Georgia-Pacific	08135 FBC11	1799	47 15/16	0.498	2 1/16	2 1/8	-0.005
33	Acme	Weyerhaeuser	B7155 B21	1840	47 31/32	0.495	2 5/8	2 3/4	-0.001
34	Acme	Republic	0810750 25	1830	48 1/32	0.504	2	2 1/16	0.002
35	Acme	National	08165 R01S	1785	47 29/32	0.498	2 1/8	2 5/16	0.002
36	Acme	Texas Gypsum	T7157545	1840	48	0.481	2	2	0.008

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	10/8/75

GP0023697

Project No. 2

TITLE Competitive Board Survey-(Continued) Book No. 134

Board Reference Number	Taper Depth (in.) Left Edge point #1	point #2	point #3	Right Edge point #4	point #5	point #6	Transverse Strength (With Grain) Face Up	Face Down	Transverse Strength (Across Grain) Face Up	Face Down	Falling Ball Test (in.)	Nail Pull Resistance
1	.064	.037	.016	.024	.042	.058	41	46 3/4	151 3/4	133 1/4	.045	113.33
2	.028	.023	.007	.017	.038	.040	49 1/4	61 1/4	145 1/2	136 1/4	.049	110.00
3	.046	.032	.019	.026	.046	.048	41 1/2	43 3/4	175 1/2	163	.053	123.42
4	.026	.024	.009	.019	.031	.053	43 1/4	44	140 1/2	145 1/4	.054	96.46
5	.038	.032	.009	.014	.029	.032	41 1/2	43 1/2	144 3/4	142	.052	107.75
6	.028	.030	.013	.014	.025	.025	46 1/4	45 1/2	127 1/4	148 1/4	.047	108.25
7	.052	.049	.020	.014	.042	.059	47 1/2 XIII	61 1/4 XIII	173 XIII	174 XIII	.039	110.58
8	.026	.030	.013	.029	.048	.043	43 1/2	43 1/2	151 3/4	159	.053	91.67
9	.041	.038	.018	.030	.054	.038	45 1/4	45 1/2	171 1/2	162 1/2	.053	116.67
10	.037	.048	.024	.026	.042	.047	43 1/2	48 1/2	142 1/4	153	.040	103.83
11	.020	.024	.002	.030	.039	.034	45	49 3/4	136 1/4	core failure (127)	.059	90.67
12	.040	.054	.042	.043	.069	.062	49 1/4	51 1/2	151 1/2	151 1/4	.051	102.58
13	.062	.048	.029	.038	.059	.049	43 3/4	53 1/2	142 3/4	151 1/4	.049	112.58
14	.058	.019	.014	.029	.060	.076	58 3/4	50	136 1/4	127 3/4	.058	95.50
15	.032	.026	.001	.028	.045	.058	41 1/2	42	150	160	.040	103.42
16	.068	.018	.025	.031	.054	.052	51	45 1/2	143 1/2	131 1/2	.055	104.00
17	.033	.030	.014	.003	.048	.053	42	46 1/4	132	155 1/2	.049	116.50
18	.053	.048	.027	.022	.047	.040	49	53 1/2	137 1/2	core failure (136)	.064	92.63
19	.046	.045	.021	.015	.033	.047	37	40 3/4	131	143 3/4	.058	97.75
20	.040	.035	.013	.033	.045	.049	44	42	147	148 1/4	.058	93.83
21	.048	.033	.009	.019	.042	.043	45 1/2	42 1/2	156 1/4	152	.052	101.50
22	.053	.037	.008	.009	.042	.038	59 1/2	60	184 1/4	180 1/2	.050	113.08
23	.077	.037	.025	.044	.038	.044	49 1/2	57	166 1/4	167 1/2	.041	113.67
24	.036	.037	.019	.033	.056	.079	45 1/2	46 1/4	154 1/2	146 1/2	.048	101.08
25	.045	.042	.022	.014	.039	.048	47	49 3/4	140	147	.052	100.83
26	.030	.020	.003	.013	.033	.042	49 1/4	52 3/4	157 1/2	166	.045	119.08
27	.008	.008	.008	.014	.007	.006	43	42 1/2	132	136 3/4	.061	85.58
28 II	.036	.038	.021	.011	.018	.021	49 3/4	49 1/4	159	157 1/4	.052	106.17
29	.056	.051	.031	.044	.056	.063	41 1/4	43	137	148 1/2	.056	98.04
30	.080	.045	.018	.034	.067	.058	61 1/2	55	182 1/4	169 1/2	.048	112.83
31	.046	.039	.018	.022	.033	.033	46	43 1/4	158	152 1/4	.058	96.08
32	.082	.073	.035	.014	.029	.033	45 1/4	51 1/2	148 1/4	155 1/2	.045	111.50
33	.028	.016	.012	.020	.036	.045	51	49 1/4	156	164	.046	112.17
34	.040	.031	.012	.014	.034	.036	46	52	163	151 1/2	.045	112.33
35	.055	.047	.016	.020	.026	.015	45	44 1/2	156 1/4	146 1/2	.045	95.00
36	.026	.023	.005	.016	.030	.037	73 3/4	71	160 1/4	170	.034	135.33

Witnessed & Understood by me,

Date

Invented by Jack L. Sullivan

Date 10/8/15

GP0023698

Project No. 2

TITLE Competitive Board Survey - (Continued) Book No. 134

Board Reference Number	Penetrometer Reading	End Hardness	Edge Hardness	Core Hardness	Humid Bond Rating Face	Humid Bond Rating Back	Humid Deflection (in. no. 8)	Cash Test (lbs. per sq. in.)	Face Paper Appearance Rating	End Grinding Rating	Scoring And Break Rating
1	4.33	27.04	27.29	28.175	3 1/3	1 1/2	1.75	0.82	Good	Poor	Poor
2	3.58	24.75	39.08	23.75	0	0	2.00	1.38	Excellent	Good	Excellent
3	3.50	24.54	38.25	30.56	4	2 1/3	0.88	1.42	Good	Good	Excellent
4	6.25	19.73	19.46	19.25	1/4	0	2.00	0.97	Fair	Fair	Poor
5	4.00	25.54	25.29	25.56	1/4	1/4	2.00	0.76	Fair	Poor	Fair
6	3.00	26.79	53.48	27.38	0	0	2.13	1.49	Good	Fair	Good
7	3.92	30.75	43.50	31.75	1 1/2	2 1/2	3.13	0.97	Good	Fair	Fair
8	3.25	22.63	37.63	23.88	3/4	1/4	1.88	1.15	Fair	Poor	Poor
9	2.58	24.17	45.38	24.38	3 3/4	2 1/2	2.50	1.37	Fair	Good	Good
10	3.83	25.71	36.21	25.50	2 1/2	1/2	2.25	1.50	Poor	Fair	Poor
11	4.61	18.29	18.96	~~18.75~~ 20.69	4	4	7.38	0.87	Good	Fair	Fair
12	4.17	23.46	35.17	24.69	2 1/4	1 1/3	3.88	0.85	Good	Fair	Good
13	3.33	23.50	23.96	25.88	1/4	2 1/2	3.38	0.69	Fair	Poor	Excellent
14	3.83	18.88	25.04	20.13	1	3 1/4	2.25	1.63	Fair	Fair	Good
15	4.00	20.58	33.52	20.69	1	0	2.13	1.47	Fair	~~Excellent~~ Good	Excellent
16	2.17	22.63	50.37	22.94	3	3 1/3	3.50	0.87	Good	Fair	Excellent
17	4.08	25.54	43.79	23.81	0	0	5.00	1.75	Good	Good	Poor
18	8.54	17.46	15.54	16.94	4	4	5.13	1.31	Poor	Fair	Poor
19	2.33	25.92	47.21	25.00	2/3	0	2.13	1.42	Good	Excellent	Excellent
20	3.50	22.34	37.00	18.25	1/4	0	9.25	1.12	Fair	Fair	Poor
21	3.75	23.75	25.63	23.19	0	1/4	8.63	0.93	Fair	Fair	Good
22	4.67	24.67	29.79	26.25	4	4	5.38	1.41	Good	Fair	Fair
23	3.67	28.36	25.38	27.44	3 1/4	1 1/2	6.88	1.26	Good	Good	Poor
24	3.83	29.83	42.38	28.22	0	0	5.75	1.12	Good	Good	Poor
25	4.33	22.08	23.17	24.81	0	1/2	2.38	1.28	Fair	Good	Good
26	3.50	29.96	29.58	29.88	3 1/4	2 1/2	4.38	0.76	Fair	Good	Poor
27	~~3.00~~	17.90	44.21	18.31	1/3	0	5.88	1.61	Good	Good	Good
28	4.83	28.54	41.54	29.81	0	1/2	1.38	1.51	Good	Excellent	Fair
29	3.17	24.81	43.38	21.63	0	0	5.13	1.64	Good	Fair	Fair
30	5.67	27.23	22.25	24.00	1/2	1 1/2	3.38	0.84	Poor	Good	Excellent
31	6.33	24.25	20.71	24.55	4	3	4.00	1.16	Good	Excellent	Excellent
32	4.83	26.04	32.63	26.38	1 1/3	1	3.75	1.18	Fair	Poor	Excellent
33	3.00	29.00	34.63	28.25	1	1/2	4.00	1.22	Fair	Fair	Good
34	3.83	24.67	27.29	24.25	3	2 1/3	3.63	0.84	Fair	Fair	Fair
35	3.50	25.88	44.89	33.75	0	0	3.63	1.65	Good	Fair	Fair
36	4.00	37.00	37.58	40.00	1/4	0	1.75	1.17	Good	Good	Good

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	10/8/75

GP0023699

Board Reference Number	G-P Plant Furnishing Samples	Board Manufacturer	Board Manufacturers Code Number	Board Weight (Lbs. per 1000 sq. ft.)	Board Width (in.)	Caliper Thickness of Board (in.)	Taper Width (in.) Left Edge	Taper Width (in.) Right Edge	Shoulders (in.)
37	Grand Rapids	Georgia-Pacific	08287506TF	1818	47 15/16	0.500	2 1/16	2 3/8	0.000
38	Grand Rapids	U.S. Gypsum	08205891114	1762	48 1/32	0.490	2 3/16	2 3/8	-0.004
39	Grand Rapids	National	08025N18	1736	47 31/32	0.505	2 1/16	2 1/16	-0.008
40	Grand Rapids	Grand Rapids Gyp.	07245GR38	1576	48	0.509	2 5/16	2 3/8	-0.006
41 (E)	Sigund	Georgia-Pacific	08015516P3	1331	48	0.321	2 3/16	2 1/2	0.008

Board Reference Number	Taper Depth (in.) (V) Left Edge point #1	Left Edge point #2	Left Edge point #3	Right Edge point #1	Right Edge point #2	Right Edge point #3	Transverse Strength (With Grain) (VI) Face Up	Transverse Strength (With Grain) (VI) Face Down	Transverse Strength (Across Grain) (VI) Face Up	Transverse Strength (Across Grain) (VI) Face Down	Falling Ball Test (in.)	Nail Pull Resistance (VII)
37	.044	.029	.016	.037	.049	.052	41 1/2	50 1/2 (XIII)	142 1/4	160 1/4	.053	106.92
38	.059	.049	.020	.024	.050	.056	59	43 1/4	144	135 1/2	.068	93.04
39	.065	.061	.034	.015	.039	.038	41	46 1/2	140 1/2	148 1/4	.052	107.88
40	.036	.040	.018	.021	.049	.049	55 3/4 (XIII)	75 (XIII)	142 1/4	144 1/2	.058	79.67
41	.028	.029	.009	.009	.012	.012	42 3/4	40 3/4	114 1/2	108 1/2	0.033	95.09

Board Reference Number	Penetrometer Reading (VIII)	End Hardness (IX)	Edge Hardness (X)	Core Hardness (XI)	Humid Rating Face	Humid Rating Back	Humid Deflection (in. no.) (XII)	Cobb Test (gm gain) (XIII)	Face Paper Appearance Rating (XIV)	End Grinding Rating (XV)	Score and Board Rating (XVI)
37	2.17	23.13	53.04	25.35	3 2/3	0	1.82	1.74	Fair	Fair	Good
38	3.00	23.29	46.29	24.30	0	0	1.50	1.25	Fair	Poor	Fair
39	5.83	22.79	30.46	23.40	1/4	1/3	3.50	1.42	Good	Fair	Good
40	5.00	13.25 (VIII)	27.17	13.25 (XI)	4	3 2/3	0.88	1.25	Fair	Fair	Fair
41	3.67	34.54	29.92	33.56	1/4	0	14.00	0.95	Good	Fair	Poor

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	10/8/75

GP0023700

I should next try as #K, a formula with 15% TC-100 talc and 4.0% attagel with Ivanico reduced to 0.75% to allow for proper water carrying. Spray at high pressure (90 psi) & for Procaine (30 psi) over joint & check open time. If otherwise acceptable, consider some method 228 (check grade as being bag product grade) to extend open time over joint if needed

also need to check out new raw materials

GP0023701

Notes and comments concerning data on previous 4 pages:

(I): Board number 141 was not part of the 1/2" wallboard survey but was a sample of 3/8" pre-decorated board from Sigurd. This board was tested to verify that it surpassed our hardboard recommended ASTM standards for such board.

(II): Board number 28 (a USE board from Blue Rapids) was found to contain excessive amounts of glass fibers. This is probably a board produced during a plant changeover from fine-top board to regular board. Therefore, this board may not be representative.

(III): These taper widths are good approximations made on tapers which were rather smoothly rounded. These tapers actually began deepening as far out as 5 inches but began deepening noticeably only in the width reported.

(IV): All shoulder measurements were made in 3 inches from each edge. This average caliper then had the board caliper subtracted from it to yield the given values.

(V): Points number 1, 2, and 3 respectively are depths measured at distances of 1/8", 3/4", and 1 1/2" respectively in from each edge.

(VI): All tests so noted are reported in pounds-force of lead applied at which failure occurred.

(VII): These transverse strength values were obtained on a second test. In both cases, the first test failed prematurely due to paper to core bond failure in the form of splittering. The actual first test values were not recorded though they were considerably less than the reported values from the second test.

(VIII): All three values so marked are estimated due to the pounds-force value of the empty bucket alone (13.25) being sufficient to cause failure in at least 1 trial of the given board. A more descriptive account of the three instances is as follows: (1) For edge hardness of board #18, one edge was accurately tested as 18.08 but the other edge failed 2 out of 3 times as above mentioned. (2) For end hardness of board #40, 4 out of 6 trials failed as mentioned above. (3) For core hardness of board #40, 4 out of 5 trials failed as mentioned above.

(Continued on next page)

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	10/8/75

GP0023702

(X): The humid bond rating number indicates the number of inches of splittering observed in bond failure after peeling. A rating of 4 is complete splittering and a rating of 5 is complete failure with paper peeling cleanly from core.

(XI): This ASTM test was conducted with the following modifications. Only 150 milliliters of water was used and the test was conducted for only 30 minutes.

(XII): This Cobb test value may be high due to the excessive absorption of water through the grains of the paper (that is parallel to the grain). The apparent ring leakage was not correctable upon several efforts. The resultant overabsorption however was not excessive.

(XIII): These subjective ratings were awarded as decided by a committee of Dale Greve, Joe Watt, and myself.

(XIV): The following tests were redone as a check with the following results (original results in parenthesis):

Flintkote from Buchanan (*7) - Transverse Strength:

With Grain FU	50½	(47½)
With Grain FD	57	(61¼)
Across Grain FU	171	(173)
Across Grain FD	177½	(174)

G-P from Grand Rapids (*37) - Transverse Strength:

With Grain FD	46⅛	(50½)

GRG from Grand Rapids (*40) - Transverse Strength:

With Grain FU	61¼	(55¾)
With Grain FD	87	(75)

Humid Deflection Tests for Grand Rapids:

Georgia-Pacific (*1)	1.88	(3.50)
U.S. Gypsum (*38)	0.75	(1.50) — U.S. Gypsum (*19) 1.50 (2.13
National (*39)	1.88	(3.50) — National (*17) 3.75 (5.00)
Grand Rapids (*40)*	1.38 + 1.38	(0.88) (used 2 different boards)
Georgia-Pacific**	1.38	(sample containing boric acid)
Georgia-Pacific***	2.13	(sample with no boric acid)

In addition a second Texas Gypsum board (*36) was tested by the Acme plant for transverse strength and hardness.

* Board weights of 1566 and 1581 respectively / ** Board weight of 1937 / *** Board weight of 1886

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	10/8/75

GP0023703

Project No. 363

TITLE Chicago Ready Mix (Cover Coat) Book No. 134 10

An effort was made to produce a ready mix product for Chicago to compete with USG's Cover Coat product. The USG product though a year old sample had the following test results:

whiteness*:	wet	2.5
	dry	2.5
viscosity		600
bonds:	room	100%
	humid-warm	100%
	dry-cold	100%
	cold	100%
cracking:	fan	5½
	air	4
sanding		0.48
water resistance		high

*Whiteness was rated subjectively on a scale of 1 to 10 with 1 being maximum whiteness.

The primary effort was concentrated toward whitening our product and retaining good working properties. Excellent bonding was also sought.

Dry Ingredients (present formula)	A (%)	B (%)	C (%)	D (%)	E (%)	F (%)	G (%) (same as E stated up)
Asbestos SG 210	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Asbestos 7RF02	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Dowicil	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Natrosol	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Hamico	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mica	7.50	7.50	10.00	7.00	8.50	8.50	8.50
Sericite	12.00	12.00	5.00	5.00	5.00	5.00	5.00
Limestone	75.10	74.35	78.60	81.60	80.10	78.10	80.10
Titamax	-	0.75	1.00	1.00	1.00	1.00	1.00
Paper Ad	-	-	-	-	-	2.00	-
Wet							
Filler	94.90	94.90	94.90	94.90	94.90	94.90	94.90
Nalco	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Airflex 510	5.00	5.00	5.00	5.00	5.00	5.00	5.00

(Test Results on Next Page)

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	12/10/75

GP0023704

Project No. 363

TITLE Chicago Ready Mix (Cover Coat) Book No. 134

Test results of formulations A–G from previous page:

Test	A	B	C	D	E	F	G	USG
H_2O	63.25%	63.25%	63.25%	56.94%	56.94%	56.94%	56.94%	~56.60%
viscosity	440	495	485	580	640	610	605	600
whiteness: wet	7.5	5.5	4.0	2.5	2.75	2.75	2.6	2.5
dry	7.5	7.0	4.5	4.0	5.0	4.0	5.0	2.5
bonds: room	100%	100%	100%	–	–	100%	100%	100%
humid-warm	100%	95%	80%	–	–	90%	90%	100%
cold	100%	100%	95%	–	–	80%	100%	100%
cracking: fan	5	4	5	6	5½	–	6	5½
air	2½	2½	3	3½	1¾	–	1½	4
sanding	0.62	0.65	0.67	–	–	–	0.59	0.48
cost/bucket (estimate)	$1.5019	–	–	–	–	–	$1.6244	–
water resistance	< USG	< USG	< USG	–	–	–	< USG	relatively high

Dry Ingredients	H (%)	I (%)	J (%) (used Ahrun limestone)	K (%) (used Ahrun limestone)	L (%)
Asbestos SG210	2.25	1.75	2.00	2.00	2.00
Asbestos 7RF-02	1.00	1.75	1.00	1.00	1.00
Dowicil	0.40	0.40	0.40	0.40	0.40
Natrosol	0.50	0.50	0.50	0.50	0.50
Hamico	1.00	1.00	1.00	1.00	1.00
Mica	8.50	8.50	8.50	8.50	8.50
Sericite	5.00	4.00	–	8.50	5.00
Limestone	80.35	81.10	85.60	77.10	80.10
Titamox	1.00	1.00	1.00	1.00	1.50
Gelvatol 6000	–	–	–	–	–
Wet					
Filler	94.90	94.90	94.90	94.90	94.90
Nalco	0.10	0.10	0.10	0.10	0.10
Airflex	5.00	5.00	5.00	5.00	5.00

(Test Results on Next Page)

Witnessed & Understood by me,	Date	Invented by	Date
		Jack F. Sullivan	10/12/75

GP0023705

Test results of formulations H-L from previous page:

Test	H	I	J	K	L
H_2O	59.31%	59.31%	58.36%	58.36%	56.94%
viscosity	520	495	580	620	580
whiteness: wet	2.75	2.75	–	–	2.55
dry	5.0	4.5	–	–	3.5
cracking: fan	6½	6	5¼	5¼	6½
air	2½	2	2¼	2	2
sanding	–	–	–	–	0.58
water resistance	–	–	–	–	< VSG

Dry Ingredients	M (%) (used Atlas limestone)	N (%) (used Atlas limestone)	O (%) (used Atlas limestone)	P (%) (used Atlas limestone)	Q (%)	R (%)	S (%)
Asbestos SG-210	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Asbestos 7RF-02	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Dowicil	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Natrosol	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Hamico	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Mica	8.50	8.50	8.50	8.50	8.50	8.50	10.00
Sericite	5.00	5.00	5.00	5.00	5.00	–	5.00
Limestone	78.85	79.85	78.85	79.85	79.85	84.85	78.35
Titamox	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Gelvatol 6000	–	–	1.00	–	–	–	–
Wet							
Filler	94.90	93.90	94.90	94.90	94.90	94.90	94.90
Nalco	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Aiflex	5.00	6.00	5.00	5.00	5.00	5.00	5.00
Tests							
H_2O	69.59%	59.47%	60.10%	56.94%	56.94%	56.94%	56.94%
viscosity	460	640	560	620	640	630	690
whiteness: wet	–	–	–	–	2.55	1.5	3.0
dry	–	–	–	–	2.6	2.45	2.65
bonds: room	100%	100%	100%	100%	–	–	–
humid-warm	100%	100%	100%	97%	–	–	–
dry-cold	92%	88%	98%	88%	–	–	–
cold	100%	97%	100%	95%	–	–	–
cracking: fan	6½	6¼	6	6	6½	6½	6½
air	3	3	3	2¼	3	3	3
sanding	0.55	0.53	0.39	–	–	–	–
water resistance	< VSG	< VSG	< VSG	< VSG	–	–	–

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	12/15/75

TITLE Chicago Ready Mix (Cover Coat)

Project No. 363
Book No. 134

Dry Ingredients	T (%) (used Alcan Limestone)	U (%)	V (%)	W (%) (scaled up batch 2000 grams Silica)	X (%)	Y (%) (test of H.P.O. asbestos (Alcan limestone))	Z (%)
Asbestos SG-210	2.25	2.25	2.00	2.00	2.00	1.60 (H.P.O. asbestos)	2.00
Asbestos 7RF-02	1.00	1.00	1.50	1.50	1.50	1.50	1.50
Dowicil	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Natrosol	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Hamico	1.00	—	1.00	1.00	1.00	1.00	1.00
Mica	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Limestone	83.35	84.35	83.10	83.10	79.60	80.00	83.60
Titamox	1.50	1.50	1.50	1.50	—	—	1.00
T.P. Blend Talc	—	—	—	—	5.00	5.00	—
Wet							
Filler	94.90	93.90	94.90	93.90	93.90	93.90	93.90
Nalco	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Airflex 510	5.00	6.00	5.00	6.00	6.00	6.00	6.00
Tests							
H_2O	61.68%	56.34%	62.63%	56.34%	59.47%	59.47%	56.34%
viscosity	560	500	560	610	615	680	660
whiteness: wet	—	—	—	1.75	6.5	—	2.25
dry	—	—	—	2.75	2.85	—	2.75
bonds: room	100%	100%	100%	100%	—	—	—
humid-warm	90%	85%	95%	100%	—	—	—
dry-cold	75%	60%	70%	95%	—	—	—
cold	97%	65%	90%	100%	—	—	—
cracking: fan	5½	4¼	5½	6¼	6¼	5½	—
air	2¼	2¼	2¾	2	2¾	3¼	—
sanding	—	—	—	0.45	—	—	—
water resistance	—	—	—	poor to fair (WCW)	—	—	—
cost/bucket	—	—	—	$1.7680	$1.6377	—	—
open time	—	—	—	50 min.	—	—	—

Summary to date (as of W):

The whiteness and bonding appear excellent with formulation W. The fan cracking however is marginal. Also, formulation W lacks the smoothness, slickness when pulled with a knife, and lighter weight of the USG product. For cost purposes, the tiranex may need to be reduced or even removed.

Witnessed & Understood by me.	Date	Invented by	Date
		Jack L. Sullivan	12/16/75

GP0023707

TITLE Chicago Ready Mix (Cover Coat)

Project No. 363
Book No. 134

Dry Ingredients	AA (%)	BB (%)	CC (%)	DD (%)	EE (%)
Asbestos SG 210	—	—	3.00	2.00	—
Asbestos 7RF-09	4.50	4.50	—	1.50	—
Dowicil	0.40	0.40	0.40	0.40	0.40
Natrosol	0.50	0.50	0.50	0.50	0.50
Hamico	1.00	1.00	1.00	1.00	1.00
Mica	8.00	8.00	8.00	8.00	8.00
Limestone	84.60	74.60	86.10	85.60	86.60
Titamox	1.00	1.00	1.00	1.00	1.00
T.P. Blend Talc	—	10.00	—	—	—
Asbestos HPO	—	—	—	—	2.50
Wet					
Filler	93.90	93.90	93.90	93.90	93.90
Nalco	0.10	0.10	0.10	0.10	0.10
Airflex 510	6.00	6.00	6.00	6.00	6.00
Tests					
H_2O	57.90%	65.73	56.34%	56.34%	56.34%
viscosity	525	550	550	565	470
whiteness: wet	2.4	2.6	2.3	2.6	2.3
dry	3.25	3.25	2.4	2.55	2.45
cracking: fan	5 1/2	6 1/2	7	6 1/2	6 3/4
air	2 1/2	3 1/2	3 3/4	3	3 3/4
cost/bucket	$1.6352	$1.8271	$1.6744	$1.6613	$1.6504

The USG product tested earlier was a year old. A current bucket of USG Cover Coat was obtained and tested with the following results:

% solids	65.51%
H_2O (estimate)	59.8%
viscosity	740
whiteness: wet	2.25
dry	2.25
cracking: fan	6 1/2
air	4 3/4
bonds: room	100%
humid-warm	85%
dry-cold	70%
cold	65%
sanding	0.28
water resistance	very high

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	12/19/75

GP0023708

Project No. 363

TITLE Chicago Ready Mix (Cover Coat) Book No. 134 15

Dry Ingredients	FF (%)	GG (%)	HH (%)	II (%)	JJ (%)	KK (%)	LL (%)	MM (%)	NN (%)
	Used Marietta limestone in absence of Chicago limestone						returned to use of Chicago limestone		
Asbestos SG-210	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Asbestos 7RF-02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Dowicil	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Natrosol	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Hamico	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mica	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Limestone	86.35	85.35	85.35	85.35	85.35	85.35	85.35	81.35	82.85
Titamox	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mineral Colloid MO	–	1.00	–	–	–	–	1.00	–	0.50
TC-100 Talc	–	–	1.00	–	–	–	–	5.00	3.00
Kaopaque 10	–	–	–	1.00	–	–	–	–	–
Kaopaque 30	–	–	–	–	1.00	–	–	–	–
Hydrite MP	–	–	–	–	–	1.00	–	–	–
(Wet)									
Filler	93.90	93.90	93.90	93.90	93.90	93.90	93.90	93.90	93.90
Nalco	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Anflex 510	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Tests									
H_2O	53.99%	63.38%	55.40%	53.99%	53.99%	53.99%	64.16%	54.15%	59.47%
viscosity	650	430	610	610	660	690	450	660	620
smoothness *	3.8	1.2	2.0	3.2	2.8	4.2	1.3	2.5	1.8
whiteness: wet	–	–	–	–	–	–	2.00	2.60	2.35
dry	–	–	–	–	–	–	2.00	2.60	2.45
cracking: fan	6¾	7	6½	6½	7	6¾	7	7	7
air	–	–	–	–	–	–	5	4	4½
cost/bucket	–	–	–	–	–	–	$1.7767	$1.6728	$1.7283

* Smoothness was rated on a scale of 1 to 5 on which the current USG product rated 1 (buttery) and the previous scaled up batch (W) rated 5

Although a key to making the product smooth and buttery has been found in the mineral colloid MO, the resultant cracking seems to be a major problem which the TC-100 talc seems to help. Scaled up batches shall now be tested using these two raw materials.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	12/31/75

GP0023709

Project No. 363

TITLE Chicago Ready Mix (Cover Coat) Book No. 134 16

Dry Ingredients	(scaled up batch) OO (%)	PP (%)	QQ (%)	RR (%)	SS (%)	(scaled up batch) TT (%)	(scaled up batch) UU (%)
Asbestos SG-210	1.75	–	1.75	1.75	1.75	–	1.30
Asbestos 7RF-02	1.00	3.00	1.00	1.00	1.00	3.00	1.40
Dowicil	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Natrosol	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Hamica	1.00	1.00	0.50	1.00	1.00	0.50	0.50
Mica	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Limestone	80.85	80.60	81.35	86.35	80.85	81.10	81.40
Titamox	1.00	1.00	1.00	1.00	0.50	1.00	1.00
Mineral Colloid MO	0.50	0.50	0.50	0.50	0.50	0.50	0.50
TC-100 Talc	5.00	5.00	5.00	–	5.00	5.00	5.00
(Wet)							
Filler	93.90	93.90	93.90	93.90	93.90	93.90	93.90
Nalco	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Aniflex 510	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Tests							
H_2O	57.51%	54.93%	54.46%	54.46%	56.34%	51.64%	53.76%
viscosity	610 before 500 after pump	690	715	700	705	680	635
smoothness	1.2	–	–	–	–	3.5	1.5
whiteness wet	2.55	2.60	2.35	2.00	3.35	2.85	2.30
dry	2.40	2.65	2.20	2.18	3.00	2.75	2.65
cracking: fan	7	6 5/8	6 3/4	7	–	6	5 1/2
air	3 3/4	2 3/4	4	4 1/2	–	3 1/4	4
bonds: room	80%	–	–	–	–	100%	100%
humid-warm	75%	–	–	–	–	100%	98%
cold-dry	60%	–	–	–	–	97%	95%
cold	65%	–	–	–	–	95%	98%
sanding	0.52	–	–	–	–	0.67	0.56
water resistance	<USG	–	–	–	–	<USG	<USG
cost/bucket	$1.7423	–	–	–	–	$1.6580	$1.6832

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	1/9/76

GP0023710

Project No. 363

TITLE Chicago Ready Mix (Cover Coat) Book No. 134

Dry Ingredients	VV (%)	WW (%)	XX (%)	YY (%)	ZZ (%)	(scaled up batch) AAA (%)	Cover Coat USG
Asbestos SG-210	1.30	1.30	1.30	1.30	1.30	1.30	
Asbestos 7RF-02	1.40	1.40	1.40	1.40	1.40	1.40	
Dowicil	0.40	0.40	0.40	0.40	0.40	0.40	
Natrosol	0.50	0.50	0.50	0.50	0.50	0.50	
Hamico	0.50	0.50	0.50	0.50	0.50	0.50	
Serecite	5.00	5.00	5.00	5.00	7.50	5.00	
Mica	–	–	–	–	–	–	
Titamox	1.00	1.00	1.00	1.00	1.50	1.00	
Mineral Colloid MO	0.50	0.75	1.00	0.75	0.75	0.75	
Limestone	84.40	84.15	83.90	89.15	81.15	89.15	
TC-100 Talc	5.00	5.00	5.00	–	5.00	–	
(Wet)							
Filler	93.90	93.90	93.90	93.90	93.90	93.90	
Nalco	0.10	0.10	0.10	0.10	0.10	0.10	
Airflex 510	6.00	6.00	6.00	6.00	6.00	6.00	
Tests							
% solids	–	–	–	–	–	67.20%	65.51%
H_2O	47.58%	48.51%	48.51%	46.95%	48.51%	45.54%	~53.8%
viscosity	630	610	640	620	620	610	740
smoothness	1.25	1.20	1.22	1.45	1.35	1.1	1.0
whiteness wet	2.55	2.40	2.45	2.50	2.45	2.12	2.25
dry	2.55	2.40	2.30	2.35	2.35	2.30	2.25
cracking fan	6 3/4	6 1/2	7	6 3/4	6 3/4	7	6 1/2
air	5	4 1/2	5 1/4	5 1/4	5	5	4 3/4
bonds room	–	–	–	–	–	100%	100%
humid-warm	–	–	–	–	–	99%	100%
cold-dry	–	–	–	–	–	99%	99%
cold	–	–	–	–	–	99%	100%
sanding	–	–	–	–	–	0.37	0.28
water resistance	–	–	–	–	–	previous trials << AAA < USG	high
cost/bucket	–	–	–	–	–	$1.6046	–
open time							24 min

Product AAA appears acceptable in every manner except cracking. Efforts at adding mica and seresite had limited success.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	1/12/76

While addition of 5% sericite, 5% sericite and 3% mica, and 3% mica alone had little improvement on cracking, addition of 5% mica to AAA seemed to help. Therefore a scaled up batch accordingly is in order.

Dry Ingredients	BBB (%) (scaled up batch)
Asbestos SG-210	1.30
Asbestos 7RF-02	1.40
Dawicil	0.40
Natrosol	0.50
Hamico	0.50
Sericite	5.00
Mica	5.00
Titanox	1.00
Mineral Colloid MO	0.50
Limestone	84.40
(Wet)	
Filler	93.90
Nalco	0.10
Airflex 510	6.00
Tests	
H_2O	50.47%
viscosity	620
% solids	—
smoothness	1.5
whiteness: wet	2.50
dry	2.45
cracking: fan	6½
air	3¾
bonds: room	—
humid-warm	—
cold-dry	—
cold	—
open time	26 min
sanding	0.46
water resistance	—
cost / bucket	current production BBB cost $1.6966 ← revised cost of current ready mix product is $1.5563

At this point, a screen analysis was made (by H_2O washing) of the USG Covercoat product. No evident trace was found of any asbestos whatsoever. Also, no regular-sized mica could be found. This called for a brief look for an asbestos free formulation. Attemps are shown on the next page. Unsuccessful attempts leads me to the conclusion that a key asbestos replacement raw material is needed that we haven't found. Therefore, work on an asbestos free product was temporarily postponed until a good asbestos product was accepted. Product BBB appears close to an acceptable product.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L Sullivan	1/23/76

GP0023712

TITLE Chicago Ready Mix (Cover Coat)

Project No. 363

Book No. 134

Dry Ingredients	CCC	DDD	EEE	FFF (scaled up batch)	GGG	HHH	III (scaled up batch same as CCC)	JJJ (repeat of BBB)	
Asbestos SG-210	—	—	—	—	1.75	1.25	1.75	1.30	
Asbestos 7RF-02	—	—	—	—	—	—	—	1.40	
Pyrophyllite	—	5.00	10.00	10.00	5.00	8.00	5.00	—	
Attagel 40	2.00	2.00	—	2.00	—	—	—	—	
Portland Cement	—	—	—	0.75	—	—	—	—	
Aluminum Sulfate	—	—	—	0.75	—	—	—	—	
Dowicil	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Natrosol	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
Hamico	0.50	0.50	0.50	1.00	0.50	0.50	0.50	0.50	
Serecite	5.00	5.00	5.00	10.00	5.00	5.00	5.00	5.00	
Mica	5.00	5.00	5.00	—	5.00	5.00	5.00	5.00	
Titanox	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Mineral Colloid MO	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
Limestone	85.10	80.10	77.10	73.10	80.35	77.85	80.35	84.40	
(Wet)									
Filler	93.90	93.90	93.90	93.05	93.90	93.90	93.90	93.90	
Nalco	0.10	0.10	0.10	0.20	0.10	0.10	0.10	0.10	
Airflex 510	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
Acrysol	—	—	—	0.75	—	—	—	—	
Tests									USE
H_2O	39.75%	43.82%	39.75%	51.03%	51.65%	49.30%	48.12%	49.30%	≈53%
viscosity	655	650	380	595	590	620	580	610	740
% solids	—	—	—	—	—	—	65.97%	64.80%	62.0%
smoothness	2.00	1.95	—	2.50	1.10	1.20	1.30	1.50	1.00
whiteness: wet	—	—	—	—	1.10	—	2.50	2.70	2.35
dry	—	—	—	—	—	—	2.35	2.70	2.35
cracking: fan	6¾	6½	7	8	6¾	6¾	6½	6½	6½
air	4	4	4½	8	4¾	4¼	4	3½	4¼
bonds: room	—	—	—	100%	—	—	100%	100%	100%
humid-warm	—	—	—	100%	—	—	99%	100%	100%
cold-dry	—	—	—	100%	—	—	99%	95%	99%
cold	—	—	—	100%	—	—	98%	99%	100%
open time: initial	—	—	—	—	—	—	23 min.	24 min.	27 min.
final	—	—	—	—	—	—	49 min.	47 min.	54 min.
sanding	—	—	—	—	—	—	0.42	0.41	0.28
water resistance	—	—	—	—	—	—	<USG	<USG	high
tool tester	—	—	—	—	—	—	—	—	8.94
corner bead cracking	—	—	—	—	—	—	fair	fair	fair
bond	—	—	—	—	—	—	fair	fair	fair
cost/bucket	—	—	—	—	—	$1.7534	$1.7300	$1.6861	—

Witnessed & Understood by me,	Date	Invented by	Date	
		Jack L. Sullivan	1/28/76	

GP0023713

Project No. 363

TITLE Chicago Ready Mix (Cover Coat) Book No. 134

Dry Ingredients	(scaled up batch - 3000 gm) KKK	(scaled up batch - 3000 gm) LLL		MMM	Product LLL looks
Asbestos SG-210	1.75	1.75		1.75	satisfactory in all
Pyrophyllite	5.00	5.00		5.00	testing. Though still
Dowicil	0.40	0.40		0.40	a little short of
Natrosol	0.50	0.50		(Methocel) 0.50	USG's good working
Hamico	1.00	1.00		1.00	properties, it is believed
Sericite	5.00	5.00		5.00	that it can compete
Mica	5.00	5.00		5.00	with it very well overall.
Titanox	1.00	—		—	The latest cost projections
Mineral Colloid MO	0.50	0.50		0.50	show LLL as 0.026¢ over
Limestone	79.85	80.85		80.85	the current ready mix
Wet					all purpose product. A
Filler	93.90	93.90		93.90	plant trial is now in
Nalco	0.10	0.10		0.10	order. Use of natrosol
Airflex 510	6.00	6.00		6.00	and the MO together
Tests			USG		creates an initially heavy
H_2O	49.30%	48.98%	—	50.47%	mix with water release
viscosity	660	635	740	600	causing thinning later
smoothness	1.30	1.30	1.00	1.30	on (≈25 min.). This
whiteness: wet	2.50	3.50	2.25	—	problem may have to
dry	2.50	3.50	2.25	—	be resolved by using
cracking: fan	6¾	6½	6½	5½	methocel rather than
air	4	3¾	4¾	3	natrosol. A plant batch
bonds: room	100%	100%	100%	—	will initially be attempted
humid-warm	100%	100%	100%	—	using natrosol, if it doesn't
dry-cold	98%	97%	99%	—	work methocel will be
cold	100%	100%	100%	—	used. A plant batch
open time	22 min. (USG-20 min.)	27 min. (USG-25 min.)	—	—	and field trial is
sanding	0.35	0.32	0.28	—	scheduled for the
water resistance	≤USG	≤USG	high	—	week of 2/16/76 - 2/21/76.
cost/bucket	$1.7782	$1.6189	—	$1.6165	JFS
corner bead bond	—	good	fair	—	
cracking	—	fair	poor	—	LLL Freeze/Thaw - OK
tool test	—	31.10	8.94	—	
% solids	—	67.27%	68.00%	—	
joint show through paint	—	ok	—	—	
texture	—	ok	—	—	

Start	Vis. 590	Bonds after 5 cycles	
1 cycle	590	room	100%
2 cycles	590	humid-warm	95%
3 cycles	625	dry-cold	80%
4 cycles	670	cold	100%
5 cycles	665		

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	2/10/76

GP0023714

TITLE Screening Tests for Fire-Rated Door Edge Banding

Project No. 295

Book No. 134

The bunsen burner bench test reported earlier was modified for a series of three further tests. New metal plates were cut to accomodate 9 inch test samples. Also the flame height was reduced to about 3 inches above the tripod. To more resemble an actual door construction, fire door core was used alongside the test samples rather than the treated maple as before. Performance ratings shall be based primarily upon final appearance although weight loss shall also be measured. The results from these tests are as follows:

SAMPLE NUMBER	WOOD SPECIES	DESCRIPTION	DENSITY (lb/ft³)	% RECOVERED UNBURNT
1 (Koppers)	maple	treated for fire retardation-no laminations	45.70	70.89 %
2 (Global)	hemlock	treated for fire retardation-no laminations	37.73	83.27 %
3 (Pacific)	hemlock	treated for fire retardation-no laminations	40.10	78.94 %

Sample #1 was of Koppers treated maple commonly used in the past. Sample #2 was of the currently used treated hemlock source. Sample #3 was of a new possible source of treated hemlock. Results seemed good although the new wood source appears a little less in quality to the current source. However quality seems good enough to warrant a further full scale pilot test. To the left are pictures of these test specimens. At a later date, further testing was done to check out a Pacific wood shipment. Results follow:

Manufacturer	Wood Species	Description	Density	% Recovered Unburnt
Pacific	hemlock	treated for fire retardation-no laminations	46.29 lb/ft³	77.60%
Global	hemlock	treated for fire retardation-no laminations	43.19 lb/ft³	82.94%

The Pacific wood sample was not thoroughly dried for liquid bubbled out of the sample as it was burned. Surprisingly, traces also bubbled out of the Global sample. This high moisture content accounts for the high density measurements. It also will affect the % recovered. Also, the latest Global sample is affected as to its density measurement by splinters which had been shaved off one edge in handling. Pictures of these test pieces are also shown at left.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	5/11/76

GP0023715

These two new emulsions were tested at a 6% loading in Marietta's current ready-mix formula against elvace 1875 which is presently used. Particular interest was taken in cold bonding*. Following are the results:

Dry	%
Asbestos 7RF-02	1.00
Asbestos SG-210	2.10
Cosan	0.10
Natrosol	0.75
Mica	8.00
Limestone	88.05
Wet	
Filler	93.90
Nalco	0.10
Emulsion	6.00

Test	Elvace 1875	Elvace E-9347-14	Airflex 456
Water	56.34%	62.60%	71.99%
Viscosity	580	530	435
Cracking: fan	6½	5	5¼
air	3½	1½	3
Bonds: room	100%	50%	50%
humid-warm	99%	25%	15%
humid-cold	97%	20%	20%
normal-cold	95%	15%	10%
dry-cold	100%	20%	15%
Sanding	0.44	1.18	1.02
Water Resistance	fair	poor	poor

General appearance of the three muds were very similar although the new elvace and especially the airflex appeared a bit grainier than the elvace 1875. Very poor bonding and low water resistance make both of these emulsions appear quite unsatisfactory.

Grade B23/500 glass bubbles were evaluated in the formula below with and without the glass bubbles. Working properties showed some improvement in smoothness, slickness, and especially lightness of weight. Body was also improved to some degree. The high cost of this product makes the following loading in excess of the affordable limit. Results are as follows:

Dry	%	%
Asbestos SG-210	1.75	1.75
Limestone	78.10	77.10
Pyrophyllite	10.00	10.00
Mica	5.00	5.00
Sericite	5.00	5.00
Daniel	0.40	0.40
Natrosol	0.50	0.50
Hamico	1.00	1.00
Glass Bubbles	-	1.00
Wet		
Filler	93.90	93.90
Nalco	0.10	0.10
Airflex 510	6.00	6.00

Test	Without Bubbles	With Bubbles
Water	≈52.0%	≈53.5%
Viscosity	695	660
Cracking: fan	7	7
air	3	3
Sanding	0.54	0.66
H_2O Resistance	same	same

Results indicate that the bubbles do improve the product but not to the extent to compensate for the high cost.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	2/13/76

GP0023716

Staley I13-103 and J14-142 Project No. —

TITLE Starch Evaluation Book No. 134 23

These two starches were evaluated first as a Hamico 267 Starch replacement (using Marietta's formula) in a ready-mix product and then as a pva (gelvatol) and hamico replacement (Chicago's all-purpose) in a bag product as shown

Asbestos 7RF-02	1.00%	1.00%	1.00%	Natrosol	0.50%	0.50%	0.50%	0.50%	0.50%
Cosan JTA 20	0.10%	0.10%	0.10%	Vancide	0.05%	0.05%	0.05%	0.05%	0.05%
Hamico 267	1.00%	—	—	Gelvatol 6000	1.00%	—	—	—	—
Staley I13-103	—	1.00%	—	Hamico 267	1.00%	—	—	—	—
Staley J14-142	—	—	1.00%	Staley I13-103	—	2.50%	—	5.00%	—
Natrosol	0.50%	0.50%	0.50%	Staley J14-142	—	—	2.50%	—	5.00%
Mica	8.00%	8.00%	8.00%	Attagel 40	4.00%	4.00%	4.00%	4.00%	4.00%
Asbestos SG-210	2.10%	2.10%	2.10%	Mica	21.25%	21.25%	21.25%	21.25%	21.25%
Sorbitol	0.10%	0.10%	0.10%	Sorbitol	0.20%	—	—	—	—
Limestone	87.20%	87.20%	87.20%	Limestone	72.00%	71.70%	71.70%	69.20%	69.20%
Nalco	0.10%	0.10%	0.10%	Tests					
Elvace 1875	5.00%	5.00%	5.00%	H_2O	72.50%	80.00%	83.75%	82.50%	88.75%
Tests				Viscosity	380	320	390	370	340
H_2O	57.57%	53.78%	56.94%	pH	8.82	8.74	8.56	8.65	8.46
Viscosity	630	600	540	Bonds: room	100%	99%	40%	100%	100%
Cracking: fan	6½	6½	6½	humid-warm	70%	65%	30%	100%	97%
air	2¼	2	2	humid-cold	98%	85%	45%	100%	90%
Smoothness	same	same	same	cold	100%	96%	50%	100%	98%
General appearance	same	same	same	Cracking: fan	6¼	6½	6½	6¾	6½
Open time	18 min	20 min	17 min	air	1¼	1	2	1¾	2
Bonds: room	100%	100%	100%	Open time	19 min	18 min	19 min	22 min	23 min
humid-warm	90%	93%	91%	Sanding	0.69	0.69 slightly worse yet	0.98 slightly worse	0.32 better	0.38 slightly better
humid-cold	85%	90%	90%	H_2O resistance	good				
cold	99%	99%	99%	General appearance:	both 5% experimental starch mixes were very sticky & lacking body giving a smoother appearance, otherwise they all looked similar				

Based on these results and subsequent trials, the I13-103 starch showed promise in the loading range of 1½ to 2½ per cent. The use of this starch is being considered presently.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/12/76

GP0023717

TITLE Pyrax ABB Pyrophyllite Evaluation – Complaint Investigations

Project No. –

Book No. 134

An alternate and cheaper source of pyrophyllite was evaluated as follows:

Dry	#1 (%)	#2 (%)
Pyrophyllite SK	7.50	–
Pyrax ABB	–	7.50
Mica	10.00	10.00
Methocel	0.50	0.50
Hamico	0.50	0.50
Aluminum Sulfate	0.40	0.40
Portland Cement	0.40	0.40
Limestone	80.70	80.70
Wet		
Filler	93.40	93.40
Nalco	0.10	0.10
Elvace	6.00	6.00
Acrysol	0.50	0.50

Tests	#1	#2
H_2O	55.11%	56.04%
Viscosity	500	500
pH	10.50	10.53
Cracking: fan	3¼	3¼
air	1½	3¼
Smoothness	same	same
Body	slightly better	slightly worse
Whiteness: wet	whiter	darker
dry	a little whiter	a little darker
General appearance	same	same
Sanding	0.57	0.58
H_2O resistance	same	same
Bonds: room	100%	100%
humid-warm	90%	93%
humid-cold	60%	60%
cold	90%	92%

Note: #1 was a little more thixotropic though both were highly thixotropic.

If the cracking is not already critical and whiteness is not a big concern, this source of pyrophyllite (Pyrax ABB) shows much promise.

While in Chicago testing a covercoat formulation, investigation of several complaints was done led by George Fowler. The following sample testing was done. A sample of Chicago's current production (6% airflex 510) was compared to a complaint sample (5% airflex 510?). Also several tapes from other complaints were tested for tape quality. Below is the identifications and the results:

Identifications	
regular production	plant sample (6% airflex)
complaint sample	taken from job (5% airflex?)
tape #1	Chicago lab tape
tape #2	USG tape from Sal's Drywall
tape #3	sample from Tampa (c/o George Fowler)
tape #4	Ames tape from Griffith's Drywall

tape mud	Results: room	cold humid cabinet	warm humid room
#1 - reg. prod.	100%	95%	95%
#1 - comp. samp.	100%	98%	95%
#2 - reg. prod.	100%	99%	95%
#2 - comp. samp.	100%	100%	90%
#3 - reg. prod.	85%	–	55%
#3 - comp. samp.	95%	–	45%
#4 - reg. prod.	93%	–	45%
#4 - comp. samp.	100%	–	50%

Witnessed & Understood by me.	Date	Invented by	Date
		Jack L. Sullivan	3/19/76

GP0023718

Project No. 338

TITLE Fibre-Free Wall Texture Book No. 134

The purpose of this project is to formulate a wall texture with no fibre's which could pass as asbestos in the OSHA regulations. Fibrous talc (international pl) is the present culprit. Basis for acceptance will be how well it applies (an objective consideration). A screening test for body and general appearance was developed where (1) the texture is mixed at exactly 100 ± 5 on the brabender viscometer, (2) a ring or cross section of pipe with inside diameter of 1½ inches and 5/8 inch tall is placed vertically on a piece of wallboard ~~and the~~ approximately 5" x 12" toward one end, (3) the side of the ring toward the empty end of the wallboard is marked with a reference line, (4) the ring is filled with the texture and screeded off, (5) the ring is lifted smoothly and vertically off the wallboard leaving a pat of texture, (6) the pat is allowed to settle for exactly 30 seconds, (7) the wallboard is turned up at 90° on end allowing the pat of texture to slump down the board for 5 minutes, (8) the distance that the pat moves downward is then measured and reported as "wall sag" in 1/64" m. Below are initial raw material trials using the indicated filler: (#A is the current formula at Acme upon which this work will be based)

Filler	%
Land plaster	74.150
Staramic 747	3.125
Hamico 267	1.250
Titanox RA-48	1.250
Paper Ad	2.500
Mica	2.500
Vancide	0.125
Gendriv 492 S	0.100
FILLER TOTAL	85.000

trial number	% filler	% land plaster	% attagel	% other (raw material)	% H_2O	Viscosity	Wall Sag
1	85.00	3.75	1.25	10.00 (talc)	86	95	203
2	85.00	3.00	2.00	10.00 (pyrophyllite)	86	95	305
3	85.00	11.75	2.50	0.75 (polyethylene fibers)	87	100	293
4	85.00	11.50	2.50	1.00 (CMC)	85	100	527
5	85.00	12.00	2.50	0.50 (dow resin 164)	86	95	359
6	85.00	11.50	2.50	1.00 (mineral colloid MO)	85	95	251
7	85.00	12.00	2.50	0.50 (xanthan gum)	85½	95	864
8	85.00	11.50	3.50	—	85	~100	231
9	85.00	2.50	2.50	10.00 (beaver white talc)	85	100	222
10	85.00	11.25	1.25	2.50 (mineral colloid MO)	86	95	227
11	85.00	11.65	1.25	0.20 (polyethylene fibers) 1.90 (mineral colloid MO)	86	95	277

Results from these screening tests indicate that the only promising raw materials are attagel 40, mineral colloid MO and beaver white 200 talc from Montana (a platy talc). These raw materials shall now be tested for their application qualities.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	2/26/76

GP0023719

Project No. 338

TITLE Fibre - Free Wall Texture — Book No. 134 — 26

Ingredients	(Acme Plant Sample) A (%)	B (%)	C (%)	D (%)	E (%)
Land Plaster	77.900	85.400	76.650	84.150	84.650
Staramic 747	3.125	3.125	3.125	3.125	3.125
Hamico 267	1.250	1.250	1.250	1.250	1.250
Titanox	1.250	1.250	1.250	1.250	1.250
Paper Ad	2.500	2.500	2.500	2.500	2.500
Mica	2.500	2.500	2.500	2.500	2.500
Attagel	1.250	1.250	2.500	2.500	2.000
Vancide	0.125	0.125	0.125	0.125	0.125
Gendriv	0.100	0.100	0.100	0.100	0.100
Mineral Colloid MO	–	2.500	–	2.500	2.500
Beaver White Talc	–	–	10.000	–	–
International Fibre pl Talc	10.000	–	–	–	–
Tests					
H_2O	86%	81%	82 3/4%	87 1/4%	85 3/4%
Viscosity	95	95	90	90	100
Wall Sag	203/234	227	222	216	–

Comments: A: This is the plant made material currently on the market which looks very good in all respects which I shall try to copy.

B: Looks good in most respects. Flattens out a little too much on the wall indicating a need for more body. Breaks up too fine at higher pressures, especially for trowling applications. With low water carrying, increased attagel could solve all problems. (see D below)

C: Looks generally unacceptable. Breaks up too fine at all pressures and very much so at high pressures. Paint roller application was much too flat and untextured. An apparent lack of body. Mild reaction with pva emulsion causing thinning. Little chance of correcting problems foreseen.

D: Does not look as good as expected possibly due to its being mixed a little thin. Tended to splatter and flatten out on the board indicating a lack of body. Roller application was very good indicating very good body. Breaks up too fine which again could be due to the thinness. Further investigation is proposed (See E below)

E: Looked very good in the mixing bowl. Only problem was it breaking up too fine. It needs to be stickier even if some body is sacrificed. It looked good otherwise. Shall try increasing gendriv or adding xanthan gum. ~~See E and C on next page.~~ 28

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	3/1/76

GP0023720

TITLE Fibre-Free Wall Texture

Project No. 338
Book No. 134

Ingredients	F (%)	G (%)	H (%)	I (%)	J (%)
Land Plaster	67.400	67.150	72.500	67.750	70.325
Staramic 747	3.125	3.125	3.125	3.125	3.000
Hamico 267	1.250	1.250	1.250	5.000	2.000
Titanox RA-48	1.250	1.250	1.250	1.250	1.250
Paper Ad	2.500	2.500	2.500	2.500	2.500
Mica	2.500	2.500	2.500	2.500	2.500
Attagel 40	1.750	1.750	2.500	2.500	2.500
Vandide	0.125	0.125	0.125	0.125	0.125
Gendriv 492 S	0.100	0.350	0.250	0.100	0.200
TC-100 Talc	20.000	20.000	15.000	15.000	15.000
Tests					
H_2O	85½%	85%	91¼%	113½%	85%
Viscosity	75	90	95	100	95
Wall Sag	190	–	–	–	182

Comments: F: Looks as good as the previous MO formula though it still breaks up too fine on normal application. Trowled application however looked quite good. This formula is also cheaper than previous ones. Increasing gendriv to make it stichier appears in order (see G below)

G: Generally looks very good. Breaks up good except still questionable at 90 psi. Roller application also borderline. Otherwise exceptional. Will propose to (1) reduce gendriv a little to help body and cost, (2) reduce talc to help color, & (3) increase attagel to retain proper water carrying (see H below)

H: Looks very good. Only questionable aspect is roller application. Gendriv may still be a bit high. Water carrying is low but looks promising

I: Produces similar effect as gendriv only holds body better. Water carrying however is prohibitive.

J: Still breaks up too fine & splatters flat at high pressure. Dries too rapidly over joint – unacceptable formula for this reason. Looks generally acceptable otherwise.

Witnessed & Understood by me,	Date	Invented by	Date

GP0023721

The following work was done to improve the asbestos free formulation by Bill Gettel with respect to bonds. The regular or initial formula was as follows:

Dry		Wet	
Attagel 40	2.000%	Dry Filler	92.70%
Pyrophyllite 5K	5.000%	Elvace 1875	6.50%
Portland Cement	0.400%	Nalco 71-D5	0.20%
Aluminum Sulfate	0.400%	Tamol 731	0.10%
Methocel K4M	0.650%	Acrysol ASE-60	0.50%
Cosan JTA 20	0.075%		
Mica P80-F	10.000%		
Sorbitol	0.100%		
Limestone	81.375%		

Fallowing are described changes made in this formula and their test results:

Formula Description	A regular formula (plant sample)	B 7% elvace	C 7½% elvace	D 0.05% amp 0.2% alum & p.c.	E 0.2% amp 1.0% acrysol no alum & p.c.	F 0.4% gelmatol 9000 5% elvace 0.15% sorbitol
H_2O	—	59.93%	59.60%	57.13%	55.23%	57.15%
Viscosity	270	500	540	490	550	570
pH	9.45	10.43	10.41	10.11	9.69	9.95
Cracking: fan	4	5¾	6¼	6½	7	5¼
air	2½	6	5	5	2	5
Sanding	0.53	0.53	0.36	0.48	0.37	0.46
Bonds: room-tape #1	98%	55%	80%	85%	100%	95%
tape #2	98%	99%	95%	99%	100%	98%
tape #3	68%	50%	80%	90%	100%	95%
humid cabinet* tape #1	—	—	—	—	—	—
tape #2	83%/90%	5%/15%	10%/20%	15%/25%	70%/99%	35%/85%
tape #3	—	—	—	—	—	—
humid room* tape #1	48%/73%	50%/75%	55%/60%	80%/85%	90%/98%	50%/70%
tape #2	78%/96%	40%/75%	55%/90%	90%/97%	98%/100%	75%/95%
tape #3	45%/60%	45%/50%	50%/50%	55%/70%	90%/98%	50%/70%

*First percentage is after 2 days in stated condition, second percentage is after conditioning to room conditions after a third day.

(See continuation on next page.)

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/1/76

Project No. 347

TITLE Akron Asbestos Free Ready Mix Book No. 134

Formula Description	G 1% hamico 5% elvace	H 1% hamico 6% elvace	I 1% I13-103 5% elvace	J 1% I13-103 6% elvace	K 1% J14-142 5% elvace	L 1% J14-142 6% elvace
H_2O	62.80%	61.51%	61.23%	59.96%	69.08%	68.35%
Viscosity	510	490	550	550	470	380
pH	9.69	10.66	9.71	9.69	9.70	9.60
Cracking: fan	6	6½	6¼	6	5	2½
air	5¾	5¼	6	5¼	5	4
Sanding	0.60	0.43	0.56	0.45	0.62	0.58
Bonds: room: tape #1	70%	95%	75%	95%	50%	90%
tape #2	95%	100%	95%	100%	55%	99%
tape #3	75%	90%	50%	90%	50%	70%
humid cabinet* tape #1	–	–	–	–	–	–
tape #2	10%/85%	5%/70%	10%/15%	25%/80%	10%/10%	25%/35%
tape #3	–	–	–	–	–	–
humid room* tape #1	50%/55%	50%/90%	50%/50%	50%/55%	45%/50%	50%/70%
tape #2	30%/65%	95%/99%	35%/50%	55%/95%	20%/30%	45%/70%
tape #3	45%/50%	50%/75%	45%/55%	45%/75%	30%/45%	45%/55%

* See note on bottom of previous page.

Notes: (1) Mixtures E, K, and L showed minimal if any thickening from the acrysol.

(2) Mixture E in addition to note 1 was not as thixotropic as the rest, was sticky and stringy, and was lacking in body.

(3) The J14-142 starch mixtures showed noticeably longer open time under the fan than the I13-103 starch mixtures.

(4) The hamico starch mixtures were smoother than the others.

Formula Description	M regular, formula (lab batch)	N airflex 510 (6½%) in place of elvace	O 6½% airflex 510 1% hamico	P 6½% airflex 510 1% staromic 747	Q 5% elvace 0.4% gelvatol 3000	R 6% elvace 0.2% gelvatol 3000
H_2O	57½%	57½%	61½%	57½%	57½%	57½%
Viscosity	525	610	540	530	540	510
Cracking: fan	5½	4¾	6½	6½	6	5½
air	–	–	–	–	–	–
Sanding	0.47	0.63	0.44	0.45	0.39	0.45
Bonds: room tape #4	90%	80%	96%	95%	98%	95%
tape #5	25%	25%	40%	50%	50%	50%
humid cabinet* tape #4	30%/50%	5%/30%	35%/60%	30%/85%	40%/70%	40%/55%
tape #5	25%/30%	5%/10%	10%/20%	15%/25%	20%/25%	25%/30%
humid room* tape #4	60%/60%	45%/60%	60%/90%	50%/85%	60%/70%	75%/75%
tape #5	25%/25%	20%/20%	35%/40%	25%/25%	–/–	30%/30%

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/6/76

Formula Description	S 5% alvace 1.8% stacryl	T 5% stacryl	U 5% alvace 1% hamico 1.5% stacryl	V 5% alvace 1% staramic 747 1.5% stacryl	W 5% alvace 1% J13-103 1.5% stacryl	X 5% alvace 1% J14-142 1.5% stacryl	Y 5% alvace 2.5% J13-103 1.5% stacryl
H_2O	60%	61½%	59%	59½%	56%	59%	56½%
Viscosity	560	540	520	500	590	510	570
Cracking fan	7	7	7¼	7	7¼	6½	7½
air	-	-	-	-	-	-	-
Sanding	0.72	2.68	0.40	0.37	0.40	0.41	0.25
Bonds: room-tape #4	60%	10%	98%	100%	98%	97%	100%
tape #5	15%	5%	45%	50%	60%	65%	98%
humid cabinet*-tape #4	40%/40%	5%/10%	85%/95%	95%/95%	85%/85%	70%/70%	100%/100%
tape #5	10%/15%	5%/5%	25%/35%	50%/50%	30%/30%	30%/30%	60%/65%
humid room*-tape #4	50%/80%	5%/10%	90%/95%	75%/85%	70%/95%	75%/90%	99%/100%
tape #5	25%/35%	5%/10%	50%/50%	40%/60%	45%/50%	30%/30%	85%/98%

* See previous notation

Notes: (1) Stacryl (a new raw material) is evaluated as being a dispersant with no bonding properties. Also it produces a light weight mud with smooth working properties. Also it seemed to destroy some of the body.

(2) Hamico was again observed to give smooth working properties.

(3) Staramic 747 seemed to remove some smoothness but made the mud slicker under a knife.

(4) J14-142 starch seemed to make the mud sticky at higher loadings.

Formula Description	Z regular formula	AA 4% alvace 2.5% J13-103	BB 4% alvace 2.5% staramic	CC 3% alvace 2.5% J13-103	DD 3% alvace 2.5% staramic	EE 2% alvace 2.5% J13-103	FF 2% alvace 2.5% staramic
H_2O	57%	62%	61%	63%	63%	63½%	62½%
Viscosity	600	600	600	610	590	600	570
Cracking fan	5½	7¼	6¾	7	6½	7	6¾
air	4	4¾	4¾	4½	4¾	4½	4¾
Sanding	0.55	0.41	0.39	0.52	0.46	0.69	0.63
Bonds: room-tape #4	99%	100%	100%	99%	100%	98%	100%
tape #5	70%	99%	98%	90%	99%	45%	98%
humid cabinet*-tape #4	50%/50%	95%/98%	99%/99%	98%/98%	99%/99%	96%/96%	98%/100%
tape #5	25%/25%	30%/50%	70%/80%	30%/35%	98%/98%	35%/35%	35%/92%
humid room*-tape #4	85%/96%	35%/98%	40%/95%	60%/92%	25%/30%	75%/85%	50%/75%
tape #4	70%/90%	75%/97%	70%/80%	70%/85%	50%/50%	40%/45%	20%/20%
tape #5	15%/25%	20%/45%	30%/50%	25%/45%	15%/20%	35%/35%	15%/25%
tape #5	25%/30%	30%/45%	30%/30%	25%/25%	20%/25%	25%/30%	10%/15%

Witnessed & Understood by me,	Date	Invented by	Date
		Jacob L. Sullivan	4/13/76

GP0023724

TITLE Akron Asbestos Free Ready Mix

Project No. 347
Book No. 134

Formula Description	GG 5% elvace 2.5% TI3-103	HH 5% elvace 2.5% staramic	II 5% elvace 2% TI3-103	JJ 5% elvace 2% staramic	KK 5% elvace 1.5% TI3-103	LL 5% elvace 1.5% staramic	MM 5% elvace 1% TI3-103	NN 5% elvace 1% staramic
H_2O	60%	59½%	59%	60%	63%	60%	60½%	62%
Viscosity	600	620	540	580	560	570	600	590
Cracking - fan	7¼	6¾	6¾	6¾	6½	6¼	6¾	6
air	5	4¾	4	4	4¼	3¾	4¼	4½
Sanding	0.38	0.33	0.45	0.40	0.58	0.40	0.68	0.61
Bonds - room - tape #4	100%	100%	100%	100%	100%	100%	80%	97%
tape #5	98%	100%	97%	100%	80%	99%	65%	90%
humid cabinet* - tape #4	100%/100%	100%/100%	98%/97%	99%/100%	97%/90%	98%/95%	60%/65%	70%/70%
tape #5	50%/75%	98%/95%	30%/30%	60%/75%	35%/35%	50%/60%	20%/20%	25%/30%
humid room** - tape #4	80%/100%	75%/99%	70%/97%	45%/99%	45%/80%	60%/80%	80%/98%	35%/50%
tape #4	99%/100%	97%/98%	90%/95%	80%/95%	65%/70%	65%/70%	60%/65%	50%/50%
tape #5	45%/95%	55%/55%	30%/30%	25%/50%	25%/35%	25%/40%	25%/25%	25%/25%
tape #5	35%/95%	35%/60%	30%/30%	45%/45%	25%/25%	25%/30%	25%/25%	25%/25%

* Same as previously indicated

** On any one tape, the first two numbers are from overnight in the stated conditions and then 24 hours later conditioned to room conditions. The last 2 numbers are 24, hours and 6 days respectively in the stated condition.

On the basis of this testing, the following larger scale batch was examined

Dry	%
Attagel	2.000
Pyrophyllite	5.000
Portland Cement	0.400
Aluminum Sulfate	0.400
Methocel	0.650
Cosan	0.100
Mica	10.000
Sorbitol	0.100
Staramic 747	1.500
Limestone	79.850

Wet	%
Filler	94.10
Elvace	5.00
Nalco	0.20
Tamol	0.10
Acrysol	0.50

Test	Result
H_2O	57½%
Viscosity: before pump	610
after pump	600
3 days later	700
pH initially	10.59
3 days later	10.40
Cracking: fan	6¾
air	5½
Sanding	0.49
Bonds: room - tape #4	100%
tape #5	93%
humid cabinet* - tape #4	97%/100%
tape #5	60%/60%
humid room* - tape #4	90%/95%
tape #5	50%/50%

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/13/76

GP0023725

This work was done in conjunction with the work done for Ahren on the previous pages. Trials A-H were done earlier in that work. The Ahren adhesive system was then adapted for Acme. The regular formula for Acme is as follows:

Dry	%	Wet	%
Land Plaster	83.750	Filler	92.900
Pyrophyllite	5.000	Elvace	6.500
Mica	7.500	Nalco	0.100
Attagel	2.000	Acrysol	0.500
Portland Cement	0.400		
Aluminum Sulfate	0.400		
Galactosol	0.650		
Sorbitol	0.100		
Vanicide	0.025		
Dowicil	0.175		

The trials described as follows differ from this formula only as described:

Formula Description	A regular formula	B 1% hamico	C 0.1% gelmul 3000	D 6% elvace 0.2% gelmul 3000	E 0.12 gelmul 6000	F 1% hamico 0.5% staramic	G 7½% elvace	H 5% elvace 1% hamico 1½% I13-103
H_2O	51⅓%	53⅓%	52⅓%	53%	52⅓%	53⅓%	53⅓%	—
Viscosity	610	610	580	640	600	600	410	—
Cracking fan:	4	6½	3½	4	4	6¾	4	—
air	1½	2	1¾	2	1½	2¼	1¾	—
Sanding	0.23	0.16	0.18	0.19	0.19	0.12	0.24	—
Bonds: room - tape #4	85%	98%	65%	80%	80%	100%	97%	100%
tape #5	30%	75%	55%	55%	35%	96%	80%	92%
humid cabinet* - tape #4	45%/50%	85%/92%	65%/65%	50%/60%	50%/50%	90%/99%	50%/80%	85%/80%
tape #5	20%/25%	25%/35%	25%/25%	20%/25%	25%/25%	45%/80%	35%/30%	35%/60%
humid room* - tape #4	35%/35%	55%/91%	25%/45%	30%/80%	50%/80%	85%/99%	98%/99%	85%/97%
tape #5	25%/35%	40%/40%	20%/25%	20%/35%	30%/30%	35%/85%	40%/55%	35%/65%

* First number is after 24 hours in stated conditions, second number is 24 hours later conditioned to room conditions.

Migration is observed to be a problem with the staramic starch causing discoloration after dried. However, with the immediate need for a solution, staramic 147 will be interpreted and later switching to I13-103 since only the former is on hand. The possibility of aluminum sulfate causing poor bonding will also be investigated by leaving it out.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/13/76

GP0023726

Formula Description	I regular formula	J 4% elvace 2% starmic	K 5% elvace 1½% starmic	L regular formula	M 10% aluminum sulfate 0.1% phenolic content
H_2O	53%	55½%	54½%	—	—
Viscosity	540	610	580	—	—
Cracking fan	5¾	4¾	4¼	—	—
air	2	3	2	—	—
Sanding	—	—	0.16	—	—
Bonds room-tape #4	60%	100%	98%	95%	70%
tape #5	35%	45%	50%	30%	25%
humid cabinet* tape #4	35%/40%	95%/90%	98%/100%	50%/85%	30%/35%
tape #5	15%/25%	50%/85%	30%/35%	30%/35%	15%/25%
humid room* tape #4	5%/35%	25%/75%	10%/65%	50%/70%	80%/90%
tape #5	15%/25%	10%/25%	10%/35%	30%/30%	25%/30%

* Dried initially in stated condition, second number after tapes conditioned to room conditions.

Though the formula K performed acceptably in all other ways, the mud was left soft and lacking water resistance. The gelvatol 6000 formulas below also looked good in every way except working properties. Following are further trials with the same fill

Formula Description	N 1% gelvatol 6000 0.4% sebitol 3.9% elvace	O 0.75% gelvatol 6000 0.3% sebitol 3.5% elvace	P 0.5% polyalcohol 1.5% arrogel 1.0% homico 3.25% elvace
H_2O	53.94%	52.74%	52.34%
Viscosity	690	690	610
Cracking fan	4	5¾	6¼
air	1¼	1¼	1¼
Sanding	0.10	0.15	0.15
Bonds room-tape #4	100%	100%	100%
tape #5	99%	98%	90%
humid cabinet-tape #4	100%/100%	97%/100%	80%/100%
tape #5	85%/95%	50%/80%	30%/50%
humid room-tape #4	95%/98%	50%/80%	95%/95%
tape #5	25%/50%	15%/40%	40%/40%

The bonds observed with formula P were deemed acceptable. The working properties seemed unchanged except for an added smoothness from the homico. All other properties appear unchanged from the original formula. The only problem might be the limited supply of homico starch. In addition virtually no cost increase would be realized.

Below are efforts to convert formula P at left to Akron's limestone formula:

Formula Description	Q limestone 13% mica 0.2% nicabol 1.5% arrogel 10% homico 5.2% silvace 0.5% cosan 3% attagel	R limestone 10% mica 1.0% arrogel 0.3% attagel 10% homico 6% silvace 0.4% cosan	S limestone original 40 Zuma (see page 29)
H_2O →	65.13%	56.61%	57.09%
Viscosity	450	560	505
Cracking fan	5	6¼	6
air	4	4	5
Sanding	0.48	0.41	0.55
Bonds room #4	95%	97%	92%
#5	45%	50%	45%
humid cabinet #4	40%/45%	65%/85%	30%/45%
#5	20%/20%	35%/35%	15%/15%
humid room #4	95%/55%	45%/75%	45%/80%
#5	20%/20%	20%/20%	15%/15%

The limestone formula #R above was found generally acceptable. Although further testing should be done before establishing this formula, it looks acceptable and ends my present involvement on this project.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/27/76

GP0023727

Chicago field testing of the original "cover coat" formula showed a possibly short open time. Furthermore, discovery of above-average quality lab testing tape placed question into the bonding qualities. With these changes needed and in light of the push to convert to asbestos-free products, an asbestos-free product will be formulated converting Bill Getrel's all purpose asbestos-free product to a covercoat formulation. Also shown initially below are initial exploratory trials to investigate the problem and also work done to provide Milford with a "cover coat" formula for Vine Street Drywallers:

Milford "cover coat":

Dry	A-2 (%)	B-2	C-2	D-2	E-2
Asbestos SG-210	1.75	1.75	1.75	1.75	—
Asbestos 7RF-02	—	—	—	—	2.00
Pyrophyllite SK	5.00	5.00	5.00	5.00	5.00
Cosan JTA-20	0.10	0.10	0.10	0.10	0.10
Dowicil	0.40	—	—	—	—
Hamico 267	1.00	1.00	1.00	1.00	1.00
Mica	5.00	5.00	5.00	5.00	5.00
Sericite	5.00	—	—	—	—
Mineral Colloid MO	0.50	0.50	0.50	0.50	0.50
Natrosol	0.50	0.50	—	0.50	0.50
Methocel	—	—	0.50	—	—
Limestone	80.85	86.15	86.15	86.15	85.90
Wet					
Filler	92.90	92.90	92.90	92.90	92.90
Airflex 510	7.00	7.00	7.00	7.00	7.00
Nalco 71-D5	0.10	0.10	0.10	0.10	0.10
Tests					
H_2O	54.58%	55.28%	56.90%	54.19%	52.64%
Viscosity	695	680	655	710	750
Cracking: fan	6¾	6½	6	6½	6¼
air	3½	4	4	3¼	2¼
Sanding	0.62	0.56	0.53	—	—
Open Time	24 min.	29 min.	28 min.	—	—
Bonds: room - tape #4	—	—	—	95%	98%
tape #5	—	—	—	40%	70%
humid-cabinet - tape #4	—	—	—	80%/95%	40%/15%
tape #5	—	—	—	35%/50%	25%/30%
humid-room - tape #4	—	—	—	40%/40%	40%/30%
tape #5	—	—	—	15%/40%	25%/35%

On the basis of these trials, formula E-2 was selected as the formula for milford. Though 7RF-02 asbestos may have hurt the working properties just a little, it is available at Milford and shows better cracking results. Sericite mica was felt unneeded for working properties. Raw materials were ordered but the higher cost of the formula may result in deciding against producing any. JS

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/14/76

GP0023728

Project No. 363

TITLE Chicago Asbestos Free "Cover Coat" Book No. 134

The following series of tests were done to explore means of extending open time. Following is the basic formula used, changes made for each trial are described, all formulas are othewise the same:

Dry	%	Wet	%
Asbestos SG-210	1.75	Filler	92.90
Pyrophyllite SK	5.00	Airflex 510	7.00
Dowicil 75	0.40	Nalco	0.10
Methocel K4M	0.50		
Hamico 267	1.00		
Serecite	5.00		
Mica	5.00		
Mineral Colloid MO	0.50		
Limestone	80.85		

	A-3	B-3	C-3	D-3	E-3
Formula Description	no methocel 0.5% natrosol	regular formula	0.65% methocel	2% hamico	2.5% SG-210
H_2O	52.66%	54.21%	55.76%	59.79%	58.86%
Viscosity	715	705	720	675	710
Open Time	24 min	29 min	30 min	36 min	33 min
Cracking: fan	6 1/2	6 3/4	7	7	6 3/4
air	4 1/4	4 1/2	4 3/4	4 1/2	5 1/4
Working Properties:	heavier & not as buttery as others	not as heavy & stickier to run knife through	not as good looking as B-3	smoother but stickier than others	a noticeable increase in body

The following series of trials were done to explore means of increasing the bonding quality: The filler used was always the same varying from the one above by having 2.5% asbestos SG-210 and 1.5% hamico starch. Liquid additives were added to the wet mix as described:

	F-3	G-3	H-3	I-3	J-3
Formula Description	control formula	0.4% carbitol acetate added	0.7% benzoflex added	0.5% texanol added	7% vear resin WC130 used in place of airflex 5
Bonds: room-tape #6	100%	100%	100%	100%	100%
tape #5	85%	93%	90%	70%	85%
humid cabinet-tape #6	98%/100%	85%/90%	90%/95%	85%/90%	97%/100%
tape #5	20%/45%	15%/25%	15%/25%	10%/15%	35%/95%
humid room-tape #6	40%/98%	10%/50%	20%/98%	15%/40%	90%/90%
tape #5	15%/30%	0%/20%	10%/30%	10%/15%	10%/15%

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/13/76

Project No. 363

TITLE Chicago Asbestos Free "Cover Coat" Book No. 134 34

Chicago field testing of the original "cover coat" formula showed a possibly short open time. Furthermore, discovery of above-average quality lab testing tape placed question into the bonding qualities. With these changes needed and in light of the push to convert to asbestos-free products, an asbestos-free product will be formulated converting Bill Gettel's all purpose asbestos-free product to a covercoat formulation. Also shown initially below are initial exploratory trials to investigate the problem and also work done to provide Milford with a "cover coat" formula for Vine Street Drywallers:

Milford "cover coat":

Dry	A-2(2)	B-2	C-2	D-2	E-2
Asbestos SG-210	1.75	1.75	1.75	1.75	—
Asbestos 7RF-02	—	—	—	—	2.00
Pyrophyllite SK	5.00	5.00	5.00	5.00	5.00
Cosan JTA-20	0.10	0.10	0.10	0.10	0.10
Dowicil	0.40	—	—	—	—
Hamica 267	1.00	1.00	1.00	1.00	1.00
Mica	5.00	5.00	5.00	5.00	5.00
Sericite	5.00	—	—	—	—
Mineral Colloid MO	0.50	0.50	0.50	0.50	0.50
Natrosol	0.50	0.50	—	0.50	0.50
Methocel	—	—	0.50	—	—
Limestone	80.85	86.15	86.15	86.15	85.90
Wet					
Filler	92.90	92.90	92.90	92.90	92.90
Airflex 510	7.00	7.00	7.00	7.00	7.00
Nalco 71-05	0.10	0.10	0.10	0.10	0.10
Tests					
H_2O	54.58%	55.28%	56.90%	54.19%	52.64%
Viscosity	695	680	655	710	750
Cracking: fan	6¾	6½	6	6½	6¼
air	3½	4	4	3¼	2¼
Sanding	0.62	0.56	0.53	—	—
Open Time	24 min.	29 min.	28 min.	—	—
Bonds room-tape #4	—	—	—	95%	98%
tape #5	—	—	—	40%	70%
humid-cabinet-tape #4	—	—	—	80%/95%	40%/15%
tape #5	—	—	—	35%/50%	25%/30%
humid-room-tape #4	—	—	—	40%/40%	40%/30%
tape #5	—	—	—	15%/40%	25%/35%

On the basis of these trials, formula E-2 was selected as the formula for milford. Though 7RF-02 asbestos may have hurt the working properties just a little, it is available at Milford and shows better cracking results. Sericite mica was felt unneeded for working properties. Raw materials were ordered but the higher cost of the formula may result in deciding against producing any. JFS

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L Sullivan	4/14/76

GP0023728

The following series of tests were done to explore means of extending open time. Following is the basic formula used, changes made for each trial are described, all formulas are otherwise the same.

Dry	%	Wet	%
Asbestos SG-210	1.75	Filler	92.90
Pyrophyllite SK	5.00	Airflex 510	7.00
Dowicil 75	0.40	Nalco	0.10
Methocel K4M	0.50		
Hamico 267	1.00		
Sericite	5.00		
Mica	5.00		
Mineral Colloid MO	0.50		
Limestone	80.85		

Formula Description	A-3 no methocel 0.5% natrosol	B-3 regular formula	C-3 0.65% methocel	D-3 2% hamico	E-3 2.5% SG-210
H_2O	52.66%	54.21%	55.76%	59.79%	58.86%
Viscosity	715	705	720	675	710
Open Time	24 min	29 min	30 min	36 min	33 min
Cracking: fan	6 1/2	6 3/4	7	7	6 3/4
air	4 1/4	4 1/2	4 3/4	4 1/2	5 1/4
Working Properties	heavier & not as buttery as others	not as heavy & stickier to run knife through	not as good looking as B-3	Smoother but stickier than others	a noticeable increase in body

The following series of trials were done to explore means of increasing the bonding quality: The filler used was always the same varying from the one above by having 2.5% asbestos SG-210 and 1.5% hamico starch. Liquid additives were added to the wet mix as described:

Formula Description	F-3 control formula	G-3 0.4% carbitol acetate added	H-3 0.7% benzoflex added	I-3 0.5% texanol added	J-3 1% vear resin WC130 used in place of airflex
Bonds: room - tape #6	100%	100%	100%	100%	100%
tape #5	85%	93%	90%	70%	85%
humid cabinet - tape #6	98%/100%	85%/90%	90%/95%	85%/90%	97%/100%
tape #5	20%/45%	15%/25%	15%/25%	10%/15%	35%/95%
humid room - tape #6	40%/98%	10%/50%	20%/50%	15%/40%	90%/90%
tape #5	15%/30%	0%/20%	10%/30%	10%/15%	10%/15%

Witnessed & Understood by me,	Date	Invented by	Date
		Jack F. Sullivan	4/13/76

GP0023729

Project No. 363
TITLE Chicago Asbestos Free "Cover Coat" Book No. 134
36

Following begins the concentrated effort at formulating the asbestos-free product: Below is the basic formulation deviations from which are described with each trial

Dry	%	Wet	%
Attagel 40	2.00	Filler	92.20
Pyrophyllite SK	5.00	Airflex 510	7.00
Portland Cement	0.40	Nalco 71-D5	0.20
Aluminum Sulfate	0.40	Tamol	0.10
Methocel K4M	0.50	Acrysol ASE-60	0.50
Hamico 267	2.00		
Dowicil 75	0.30		
Mica	5.00		
Serecite	5.00		
Mineral Colloid MO	0.50		
Limestone	79.40		

Formula Description	A-4 control formula	B-4 1% attagel	C-4 1% attagel no acrysol	D-4 no mineral colloid MO	E-4 3% attagel no acrysol	F-4 10% mica	G-4 1% attagel 15% pyrophyllite no acrysol	H-4 (scaled up batch) 1.75% asbestos SG 210 - no asbestos free ingredients - 1.5% hamico
H_2O	55.32%	53.78%	50.98%	50.71%	56.55%	59.88%	55.62%	53.42%
Viscosity	≈675	≈675	≈675	≈675	≈675	≈675	≈675	610
pH	10.53	10.59	10.54	10.86	11.00	10.84	—	—
Cracking: fan	8	7¾	7	8	8	7¼	7	5
air	6¾	6½	5¼	7	8	6½	6½	2
Bonds: room-tape #2	—	—	—	—	—	—	—	100%
tape #3	—	—	—	—	—	—	—	90%
humid cabinet-tape #2	—	—	—	—	—	—	—	10%/10%
tape #3	—	—	—	—	—	—	—	80%/90%
humid room-tape #2	—	—	—	—	—	—	—	10%/20%
tape #3	—	—	—	—	—	—	—	90%/95%
Working Properties:	control (generally acceptable)	generally looked better but a bit low on body	looked very good but lacking body	not as smooth - noticeably worse	comparable to control	lacking smoothness not acceptable	generally good though lacking a bit in body	←

	LU-1	2	USG
Bonds: room-tape #2	100%	100%	100%
tape #3	90%	100%	100%
humid cabinet-tape #2	10%/10%	20%/20%	90%/95%
tape #3	80%/90%	85%/90%	25%/35%
humid room-tape #2	10%/20%	15%/20%	50%/90%
tape #3	90%/95%	90%/95%	95%/100%

At this point work was halted until the regular formula for asbestos free ready mix was revised for improved bonding strength. See pages 28-33 of this notebook for some of this work. It appears that no more than 1% hamico starch should be used. Loadings of 0.5% MO, and 5% mica also seem needed.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	4/22/76

Raw Material	A-5	B-5	C-5 (control)	D-5	E-5	F-5	G-5
Attagel 40	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Pyrophyllite SK	5.00	5.00	5.00	5.00	5.00	—	5.00
Portland Cement	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Aluminum Sulfate	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methocel K4M	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Hamico 267	0.75	0.75	—	—	—	—	1.00
Staramic 747	0.75	0.75	1.50	1.50	1.50	1.50	1.50
Dowicil 75	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Mica	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Sericite	—	10.00	10.00	10.00	10.00	10.00	10.00
Mineral Colloid MO	0.50	0.50	0.50	0.50	—	0.50	0.50
Limestone	80.40	70.40	69.40	69.30	69.70	59.40	68.40
Xanthan Gum	—	—	—	—	0.20	—	—
TC-100 Talc	—	—	—	—	—	15.00	—
Sorbitol	—	—	—	0.10	—	—	—
Wet							
Filler	92.30	92.30	92.90	92.90	92.90	92.90	92.90
Airflex 510	7.00	7.00	6.50	—	6.50	6.50	6.50
Elvace 1875	—	—	—	6.50	—	—	—
Nalco 71-05	0.20	0.20	0.10	0.10	0.10	0.10	0.10
Aerysol ASE-60	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Tests							
H_2O	59.31%	59.37%	62.71%	58.06%	62.71%	67.35%	65.03%
Viscosity	730	680	645	490	575	610	630
Smoothness (1=good 10=bad)	5	2	5	5	2	5	1.5
Cracking fan	—	5 6½	6½	6½	5¼	5	7¼
air	—	4 5¼	—	—	—	—	—
Body (1=good 10=bad)	4	4 —	5	5	7	3	5
Bonds: room-tape #4	—	35% 100%	35%	100%	—	—	90%
tape #5	—	10% 95%	20%	98%	—	—	45%
humid cabinet-tape #4	—	10%/10% 20%/50%	5%/10%	100%/100%	—	—	60%/90%
tape #5	—	0%/5% 25%/50%	0%/10%	90%/96%	—	—	20%/30%
humid room-tape #4	—	5%/10% 30%/50%	10%/10%	95%/98%	—	—	20%/30%
tape #5	—	5%/5% 30%/50%	5%/10%	60%/80%	—	—	10%/15%
Sanding	—	0.79 0.23	0.66	—	—	—	0.50
H_2O Resistance	—	poor excellent	poor	—	—	—	poor
Cost/Bucket	—	$2.0391	$2.0391	$2.0100	$2.1541	$2.1382	

Witnessed & Understood by me, Date

Invented by Jack L. Sullivan Date 5/5/76

GP0023731

Obviously, the airflex 510 emulsion is not compatible with this asbestos-free formula. Elvace 1875 is thus adopted. To get the effect from sericite, more than 5% appears needed, I shall currently use 10%. The galaxy XB Xanthan Gum shows promise for a mineral colloid MO replacement though it is very expensive. Hamico 267 definitely needs to be in the formula for the smoothness it provides. The TC-100 talc seems to help body but may hurt smoothness, at this point it is deemed unpractical. An adhesive loading and the Xanthan gum are checked out below:

Raw Material		H-5	I-5	J-5	K-5	L-5	M-5
Attagel 40		2.00	2.00	2.00	2.00	2.00	2.00
Pyrophyllite SK		5.00	5.00	5.00	5.00	5.00	5.00
Portland Cement		0.40	0.40	0.40	0.40	0.40	0.40
Aluminum Sulfate		0.40	0.40	0.40	0.40	0.40	0.40
Methocel K4M		0.50	0.50	0.50	0.50	0.50	0.50
Hamico 267		1.00	1.00	1.00	1.00	1.00	1.00
Staramic 7497		-	0.50	1.00	1.50	1.00	1.00
Dowicil 75		0.30	0.30	0.30	0.30	0.30	0.30
Mica P-80 F		10.00	10.00	10.00	10.00	10.00	10.00
Sericite Mica		10.00	10.00	10.00	10.00	10.00	10.00
Mineral Colloid MO		0.50	0.50	0.50	0.50	0.50	—
Limestone		69.90	69.40	68.90	68.40	68.90	69.30
Sorbital		0.10	0.10	0.10	0.10	0.10	0.10
Xanthan Gum		—	—	—	—	—	0.10
Wet							
Filler		92.90	92.90	92.90	92.90	92.90	92.90
Elvace 1875		6.50	6.50	6.50	6.50	6.50	6.50
Nalco 71-05		0.10	0.10	0.10	0.10	0.10	0.10
Acrysol ASE-60		0.50	0.50	0.50	0.50	0.50	0.50
Tests							
H_2O		62.71%	64.10%	65.03%	58.51%	55.74%	54.81%
Viscosity		660	600	530	670	610	580
Cracking fan		6½	6½	6⅝	6¾	3½	5½
Smoothness (1=good 10=poor)	USG	—	—	—	—	2	2
Bonds room - tape #4	100%	99%	99%	100%	100%	—	—
tape #6	100%	100%	100%	100%	100%	—	—
humid cabinet - tape #4	99%/100%	95%/95%	95%/99%	98%/100%	100%/100%	—	—
tape #6	95%/100%	30%/85%	98%/100%	100%/100%	100%/100%	—	—
humid room - tape #4	98%/100%	93%/95%	95%/100%	98%/100%	99%/100%	—	—
tape #6	99%/100%	90%/99%	93%/99%	95%/99%	100%/100%	—	—
Cost/Bucket	-	$2.0312	$2.0732	$2.1151	$2.1571	$2.1151	$2.1266

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	5/5/76

GP0023732

Though Galaxy XB Xanthan Gum looked like an adequate replacement for Mineral Colloid MO, I remained with the latter due to its giving better body to the product and for its more reasonable cost. A staramic 747 loading of 12 was selected yielding formula N-5 at the right. To bring the cost within reason, a series of reductions were made in various raw materials producing formula O-5. Though this was only checked out using 300 gm batches, formula O-5 looks excellent. After further testing, I would deem formula O-5 as probably acceptable. However, sales has now asked to postpone introduction of this product until fall. Therefore this project has temporarily been dropped. Formula O-5 should be returned to when the project is recontinued.

JSS
2

Raw Material	N-5	O-5	
Attagel 40	2.00	1.50	
Pyrophyllite 9H	5.00	5.00	
Portland Cement	0.40	0.40	
Aluminum Sulfate	0.40	0.40	
Sorbitol	0.10	0.10	
Dowicil 75	0.30	0.30	
Hamico 267	1.00	1.00	
Staramic 747	1.00	1.00	
Methocel K4M	0.50	0.40	
Mica P-80 F	10.00	7.50	
Sericite Mica	10.00	7.50	
Mineral Colloid MO	0.50	0.40	
Limestone	68.80	74.50	
Wet			
Filler	92.90	93.40	
Elvace 1875	6.50	6.00	
Nalco 71-05	0.10	0.10	
Acrysol ASE-60	0.50	0.50	
Tests			USG
H_2O	61.93%	56.04%	—
Viscosity	570	560	~730
Body (1=excellent 10=poor)	2.0	2.5	1.5
Smoothness (1=excellent 10=poor)	2.5	2.0	1.0
Cracking: fan	7	6¾	6½
air	6	5½	5¼
Open Time	22 min.	22 min.	30 min.
Sanding	0.21	0.24	0.23
H_2O Resistance	fair	fair	excellent
Bonds: room (tape pull)	100%	100%	100%
humid cabinet	99%/100%	99%/100%	99%/100%
humid room	87%/100%	90%/100%	90%/100%
Cost/Bucket	$2.1182	$1.9024	—

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	5/6/76

GP0023733

An acceptable adhesive for applying vinyl to wallboard requires especially good wetting ability with high tack for immediate bond. Currently the formula shown below is being produced at Fort Dodge and some also at Wilmington. Problems have arisen over federal regulations limiting the use of toluene. Also problems have been incurred in attaining acceptable shipments of Fastak #3. Therefore these two ingredients need to be formulated out. Cost is also critical. The present formula costs about 33¢/lb with a commercially available and acceptable adhesive (PVC-E) costing 39½¢/lb. In order for the plants to be willing to make their own adhesive, a greater cost savings than this needs to be realized. Below are test results from testing the old formula and PVC-E. Also the old formula is listed:

OLD FORMULA

RAW MATERIAL	%
Elvace 1875	74.5
Fastak #3	20.0
Toluene	5.0
Acrysol G-110	0.5

TEST RESULTS

TEST	OLD FORMULA 1st test	OLD FORMULA 2nd test	PVC-E 1st test	PVC-E 2nd test
Glueability Machine Test:				
Pull #1	2.4	2.9	2.1	2.0
Pull #2	0.6	0.5	0.8	0.7
Pull #3	0.8	0.4	0.5	0.5
Vinyl Strip Tear Time*				
Film Formation?	ok	ok	ok	ok
First Trace-Paper Tear	12	16	12	8
Clear Evidence-Paper Tear	20	20	16	12
100%-Paper Tear	40	36	28	24
First Trace-Paper Delamination	36	40	48	44
Clear Evidence-Paper Delamination	40	44	56	48
100%-Paper Delamination	70	70	70	60
Tack Test**/***				
Between Fingers	4	3	2	2
On Vinyl With Finger	–	4	–	2
Film Formation on Vinyl***				
initial	2	2	1	2
wet	3	3	1	2
dry	2	2	3	3

* The vinyl strip tear test is the applying of a 0.0032" film on a vinyl strip 1½" wide, attaching to a piece of wallboard, and pulling it up 1" every 4 seconds. Therefore all times are in increments of 4 seconds until after 60 seconds when the increments become 5 seconds.

** The tack tests are simple objective tests of tack of a wet film on fingers or vinyl.

*** Numbered objective ratings correspond to: 1-excellent, 2-good, 3-fair to good, 4-fair, 5-fair to poor, 6-poor

Witnessed & Understood by me,	Date	Invented by	Date
		Jack F Sullivan	5/11/76

GP0023734

Project No. 331

TITLE Vinyl Pre-Dec Adhesive — Book No. 134 — 41

Following are trial formulas and test results:

Formula	A	B	C	D	E	F	G	H	I	J
Elvace 1875	100.0	–	78.3	74.5	74.5	74.5	74.5	74.5	78.8	74.5
Fastak #3	–	–	21.2	20.0	20.0	20.0	–	–	–	–
Acrysol G-110	–	–	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Elvace 1873	–	100.0	–	–	–	–	–	–	–	–
Butyl Cellusolve Acetate	–	–	–	5.0	–	5.0	5.0	5.0	–	5.0
Carbitol acetate	–	–	–	–	5.0	–	–	–	–	–
Picco Resin A-60	–	–	–	–	–	–	20.0	–	–	–
Picco Resin A-62	–	–	–	–	–	–	–	20.0	21.2	–
Hycar Nitrile Latex	–	–	–	–	–	–	–	–	–	20.0
Test										
Glueability Test – Pull #1	2.3	2.7	2.0	3.0	2.7	2.9	–	2.8	–	–
Pull #2	0.9	0.8	0.5	0.7	0.7	0.4	–	0.9	–	–
Pull #3	0.6	0.5	0.6	0.4	0.4	0.5	–	0.5	–	–
Vinyl Tear Test – film formation?	fair	poor	poor	ok	ok	ok	–	ok	–	–
first trace-paper tear	12	12	12	12	12	20	–	8	–	–
clear evidence-paper tear	16	20	16	16	16	24	–	12	–	–
100%-paper tear	32	36	32	28	36	44	–	32	–	–
first trace-paper delamination	36	48	60	48	56	48	–	40	–	–
clear evidence-paper delamination	48	56	70	52	65	52	–	44	–	–
100%-paper delamination	60	90% at 80	50% at 80	70	70	60	–	60	–	–
Tack Test – between fingers	2	1	2	2	1	3	–	3	–	–
on vinyl with finger	–	–	–	–	–	5	–	2	–	–
Film Formation – initial	1	2	3	1	3	2	–	2	5	–
wet	1	3	4	2	4	2	–	2	6	–
dry	2	4	3	1	4	1	–	1	5	–

Notes:

(a) Straight elvace was rejected due to inadequate film formation on vinyl.

(b) The solvent was found to be the wetting agent essential for coating vinyl.

(c) Carbitol acetate was insufficient as a wetting agent.

(d) Butyl cellusolve acetate worked acceptably as a wetting agent but seemed to reduce tac

(e) Picco resin A-60 reacted with the emulsion to produce rubber.

(f) Picco resin A-62 though seeming (surprisingly) satisfactory at first was found to react with the acrysol. Other thickeners may be possible however.

(g) Hycar nitrile latex reacted with the emulsion to form rubber.

(h) Elvace 1875 was adopted over 1873 due to better wetting properties & reportedly better quick-tac

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	5/13/76

GP0023735

Project No. 331

TITLE Vinyl Predec Adhesive — Book No. 134 — 42

Raw Materials	K	L	M	N	O	P	Q	R
Elvace 1875	94.5	60.0	50.0	44.5	40.0	38.75	–	–
Acrysol G-110	0.5	–	–	–	–	–	–	–
Butyl Cellusolve Acetate	5.0	–	–	–	–	2.50	–	–
Rhoplex N-495	20.0	20.0	50.0	44.5	40.0	38.75	40.0	40.0
Picco Resin A-62	–	20.0	–	11.0	–	–	–	–
Picco Resin A-22	–	–	–	–	20.0	20.00	–	–
Elvace 1873	–	–	–	–	–	–	60.0	55.0
Tamol 731	–	–	–	–	–	–	–	5.0
Test								
Glueability Test – Pull #1	–	–	–	–	–	–	–	–
Pull #2	–	–	–	–	–	–	–	–
Pull #3	–	–	–	–	–	–	–	–
Vinyl Tear Test – film formation?	–	–	–	–	–	–	–	–
first trace paper tear	–	–	–	–	–	–	–	–
clear evidence paper tear	–	–	–	–	–	–	–	–
100% paper tear	–	–	–	–	–	–	–	–
first trace paper delamination	–	–	–	–	–	–	–	–
clear evidence paper delamination	–	–	–	–	–	–	–	–
100% paper delamination	–	–	–	–	–	–	–	–
Tack Test – between fingers	3	4	1	–	5	4	2	2
on vinyl with finger	–	–	–	–	–	–	2	–
Film Formation – initial	–	–	3	–	–	–	3	–
wet	–	–	3	–	–	–	7	–
dry	–	–	4	–	–	–	6	–
Cost/pound	–	–	–	$0.3480	$0.3230	$0.3165	$0.3450	–

Notes:

(a) Though not discovered initially, butyl cellusolve acetate was found incompatible with the rhoplex N-495

(b) Picco Resin A-62 was found finally mildly incompatible with Rhoplex N-495

(c) Rhoplex N-495 was found excellent at producing tack but too expensive for a complete elvace replacement.

(d) Picco resin A-22 was found inadequate as a tackifier

(e) Butyl cellusolve acetate was found to be incompatible with Rhoplex N-495

(f) Elvace 1875 was found mildly incompatible with Rhoplex N-495 so elvace 1873 was found as an acceptable alternative though a wetting agent is needed.

(g) Tamol though effective as a wetting agent was found incompatible with elvace 1873

Witnessed & Understood by me,	Date	Invented by	Date	
		Jack L. Sullivan	5/19/76	

GP0023736

Raw Materials	S	T	U	V	W	X	Y	Z
Elvace 1873	55.0	–	–	–	–	89.5	–	99.5
Rhoplex N-495	40.0	40.0	–	–	–	–	–	–
Alkanol WXN	5.0	5.0	5.0	0.5	0.5	0.5	0.5	0.5
Elvace 1875	–	55.0	95.0	89.5	84.5	–	99.5	–
1,1,1, Trichloroethane	–	–	–	10.0	15.0	10.0	–	–
Tests								
Glueability Test- Pull #1	–	2.6	–	2.0	–	–	2.5	2.1
Pull #2	–	0.6	–	0.5	–	–	0.2	0.3
Pull #3	–	0.3	–	0.5	–	–	0.2	0.2
Vinyl Tear Test- film formation?	–	ok	–	ok	–	–	ok	ok
first trace-paper tear	–	20	–	12	–	–	8	12
clear evidence-paper tear	–	24	–	16	–	–	12	16
100%-paper tear	–	36	–	24	–	–	20	28
first trace-paper delamination	–	65	–	40	–	–	40	48
clear evidence paper delamination	–	70	–	52	–	–	44	52
100% paper delamination	–	80 40% at	–	80 90% at	–	–	70	55% at 80
Tack Test- Between Fingers	2	2	2	2	–	–	2	2
On Vinyl With Finger	–	2	–	2	–	–	2	2
Film Formation- initial	–	2	–	2	–	–	2	2
wet	–	2	–	2	–	–	2	2
dry	–	2	–	2	–	–	2	2
Cost/Pound	–	–	–	$0.3126	$0.3338	$0.3171	$0.2702	$0.2752

Notes:

(a) Elvace 1875 was adopted for use with rhoplex N-495 and alkanol WXN because it yielded a thinner adhesive

(b) Formula T was decided to be lacking a little on bond quality (from vinyl tear test) and possibly a little on tack (from glueability test). The rhoplex should probably be eliminated.

(c) Formula U is too thick though looking good otherwise, a suitable thinning solvent is needed.

(d) 1,1,1, Trichloroethane seems to work suitably as a solvent though the alkanol is essential for its wetting action. Due to foaming action from wetting agents, only 0.5% may be safely used.

(e) Formula V dries very quickly, still pretty thick though probably acceptable.

(f) The alkanol WXN was finally found as incompatible with the 1,1,1 trichloroethane. The elvace 1873 was also incompatible with 1,1,1 trichloroethane.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	5/21/76

GP0023737

Notes: (continued from previous page)
(g) The alkanol WXN seemed to work acceptably in either elvace grade but slightly better in 1875. Though thinner in 1875 than in 1873, formula Y is still rather thick. More tack would also help.

Raw Materials	AA	BB	CC	DD	EE	FF	GG
Elvace 1875	90.0	85.0	94.5	94.5	97.0	–	97.0
Surfynol 104E	10.0	15.0	5.0	–	–	–	–
Elvace 1873	–	–	–	–	–	96.5	–
Alkanol WXN	–	–	0.5	0.5	0.5	0.5	0.5
Polyvinyl Alcohol (6.27% soln. plain cooked)	–	–	–	5.0	2.5	3.0	2.5
Test							
Glueability Test: Pull #1	–	–	+	–	–	–	3.0
Pull #2	–	–	–	–	–	–	1.0
Pull #3	–	–	–	–	–	–	0.4
Vinyl Tear Test – first paper tear – trace-tear	–	–	12	–	–	–	8
clear paper tear – evidence-tear	–	–	16	–	–	–	12
100% paper tear	–	–	24	–	–	–	24
first paper delamination – trace-delamination	–	–	48	–	–	–	40
clear paper delamination – evidence-delamination	–	–	48	–	–	–	44
100% paper delamination	–	–	75% at 50	–	–	–	95% at 80
Tack Test – between fingers	–	–	3+	3	2-	2-	2-
on vinyl with finger	–	–	3	–	–	–	2-
Film Formation – initial	3	2	1	2-	–	–	2
wet	4	4	1	2	–	–	2
dry	4	4	1	2	–	–	2
Cost/Pound	–	–	–	–	–	–	–

Notes:
(a) The surfynol proved inadequate by itself as a wetting agent for vinyl.
(b) The surfynol seemed to work adequately as a solvent in conjunction with alkanol as a wetting agent although the tack seemed reduced. An unknown tackifier would be needed.
(c) The polyvinyl alcohol solution doesn't seem to help tack and may hurt it a little but it does act as a thinning agent. No difference was observed between the two elvace grades so the cheaper was adapted. Formula GG is a scaled up repeat of EE.
(d) Formula GG appears acceptable in all ways except for a slight lack of a tacky feel.

Witnessed & Understood by me,	Date	Invented by	Date
		Jack L. Sullivan	5/29/76

GP0023738

Raw Materials	HH	II	JJ	KK	LL
Elvace 1875	76.0	94.0	97.0	97.0	99.5
Alkanol WXN	0.5	0.5	0.5	0.5	–
Polyvinyl Alcohol (6.27% soln.-plant cooked)	3.5	5.0	–	–	–
Dibutyl Pthalate	–	–	2.5	–	–
Acrysol G-110	–	0.5	–	–	–
Rhoplex N-495	20.0	–	–	–	–
Propylene Glycol	–	–	–	2.5	–
Triton GR-7	–	–	–	–	0.5
Tests					
Gluеability Test-Pull #1	–	–	2.7	3.2	
Pull #2	–	–	0.3	0.7	
Pull #3	–	–	0.3	0.3	
Vinyl Tear Test-paper tear (first trace clear evidence)	8	12	8	12	8
paper tear	12	16	12	16	8
paper tear (100%)	20	28	24	28	28
paper delamination (first trace clear evidence)	48	44	36	56	36
paper delamination	48	48	44	75	48
paper delamination (100%)	56	70	56	80 (90% at)	60
Tack Test-between fingers	2-	2-	2	2=	2
on vinyl with finger	2-	2=	2	2-	3
Film Formation-initial	–	–	2	2-	2
wet	–	–	2	2-	2
dry	–	–	1	2	2
Cost/Pound	–	–	$0.2748	–	$0.2720

Notes:

(a) Rhoplex N-495 helped produce tack little if any but not justifiable due to cost.

(b) Acrysol G-110 also failed to aid tack detectably however it could later be added to help aid viscosity controlability of the formula.

(c) It was found that a plasticiser such as dibutyl pthalate acted as a better solvent than the pva solution. However, dibutyl pthalate like most all plasticisers was later discovered insoluble in elvace 1875 creating a bubbly-looking suspension. Only propylene glycol (and other glycols) ware found to produce a good solution.

(d) Propylene glycol unfortunately was found generally lacking in quality as a solvent.

(e) Formula LL with the Triton GR-5 seemed excellent, tack could have been better but was very good.

Witnessed & Understood by me,	Date	Invented by	Date

GP0023739

1		2		3		4	
860.45	868.12	972.92	979.20	939.43	954.30	883.70	893.06
799.27	810.37	857.8	861.57	901.14	912.60	827.56	842.58
61.18	57.75	115.12	117.63	38.29	41.70	56.14	50.68
(7.7)	(7.1)	(13.4)	(13.7)	(4.2)	(4.6)	(6.8)	(6.0)

5		6		7		8	
1150.40	1143.9	1009.2	1034.70	1160.9	1128.2	1021.6	1016.8
843.30	843.80	930.01	951.58	962.36	939.18	858.80	856.93
307.1	300.1	79.19	83.12	198.5	188.5	162.8	159.7
(36.4)	(35.6)	(8.5)	(8.7)	(20.6)	(20.1)	(19.0)	(18.6)

9		10		11		12	
1051.8	1052.2	1002.5	996.8	1155.1	1045.7	851.8	854.4
876.0	875.9	860.8	855.4	890.4	898.6	805.7	811.8
175.8	176.3	141.7	141.4	164.7	167.1	46.1	42.6
(20.1)	(20.2)	(16.5)	(16.5)	(18.5)	(18.6)	(5.7)	(5.3)

13		14	
933.7	903.6	944.7	945.0
905.0	871.1	890.1	892.9
28.7	32.5	54.6	52.1
(3.2)	(3.7)	(6.2)	(5.8)

GP0023740

TITLE Competetive W/R BOARD Survey

Project No. _____

Book No. _____

No.	G.P. Plant	Manufacturer	Code No.	Board Wt.	Water Absorption			Cobb
							Av.	
1	Williamsburg	Flintkote	4-7-76C29	1760	7.7	7.1	7.4	1.43
2	Buchanan	GP	05296FC7	1893	13.4	13.7	13.6	1.26
3	Buchanan	USG	?	1998	4.2	4.6	4.5	1.19
4	Buchanan	NATIONAL	?	1839	6.8	6.0	6.4	1.60
5	Blue Rapids	Celotex	?	1860	36.4	36.6	36.5	1.25
6	Acme	G.P.	05186TPM10	2073	8.5	8.7	8.6	1.43
7	SIGURD	G.P.	U52726SBGP6	2094	20.6	20.1	20.4	1.85
8	Brunswick	G.P.	05261BX7	1890	19.0	18.6	18.8	1.89
9	Fort Dodge	Celotex	F176FD3	1929	20.1	20.2	20.2	2.01
10	ACME	National	?	1890	16.5	16.5	16.5	1.00
11	Blue Rapids	GP	05246DKM	1970	18.5	18.6	18.1	1.57
12	SIGURD	USG	?	1781	5.7	5.3	5.5	1.66
13	Fort Dodge	National	05266F135	1880	3.2	3.7	3.5	~~2~~ 1.95
14	Grand Rapids	G.P.	?	1873	6.2	5.8	6.0	1.33

Witnessed & Understood by me, | Date | Invented by | Date

GP0023741

27

31.25

#27- Board Broken

1543?

Project No. 2

TITLE Competitive 1/2" Wallboard Survey

Book No. 134

Board Reference Number	G-P Plant Furnishing Samples	Manufacturer of Board	Board Code Number	Board Weight	Board Width	Board Caliper	Taper Width	Shoulders
1 S	Sigurd	Georgia-Pacific	5136S3GP8	1676				+15
2	Sigurd	U.S. Gypsum	0511622348	1723				+4
3	Sigurd	Johns-Manville	051376LVB14	1887				+19
4	Sigurd	Flintkote	5116N3	1719				+5
5	Sigurd	Celotex	2297623C4	1754				+9
6 A	Acme	Republic	033076D22	1789				+18
7	Acme	Weyerhaeuser	A3256B15	1793				+4
8	Acme	National	03186R23S	1781				+18
9	Acme	Georgia-Pacific	5236TBC5	1750				+2
10 G	Brunswick	National	05146S12C	1773				-15
11	Brunswick	Flintkote	513603G	1777				+9
12	Brunswick	U.S. Gypsum	051362251C2	1770				+4
13	Brunswick	Georgia-Pacific	05186BD6	1730				+3
14 L	Lovell	Georgia-Pacific	42076LT2	1816				+4
15	Lovell	Flintkote	5662R2	1805				-7
16	Lovell	National	51562R8	1867				-2
17	Lovell	Big Horn	159765C	1785				+16
18 K	BLUE RAPIDS	NATIONAL	103286MC	1690				+6
19	BLUE RAPIDS	Republic	032476D17	1844				+12
20	BLUE RAPIDS	U.S.G.	04236227380	1656				+9
21	BLUE RAPIDS	Celotex	D236H2	1688				+35
22	BLUE RAPIDS	G.P.	050366KR	1813				+21
23 B	Buchanan	Celotex	E056E3	1875				-11
24	Buchanan	Flintkote	5-11-76C-1	1719				+11
25	Buchanan	USG	0123623754	1750				+19
26	Buchanan	G.P.	0521N6M1	1719				+4
27 M	Grand Rapids	?	04166N22	1786	- Board Broken No Taper Run			
28	Grand Rapids	G.P.	030576GAJ	1781				+29
29	Grand Rapids	USG	0521688132	1688				-5
30	Grand Rapids	GRG	04276GR38	1593				+15
31 W	Wilmington	G.P.	51376RE	1750				+7
32	Wilmington	Flintcote	52576C-13	1840				+13
33	Wilmington	National	5276B14T	1880				+9
34 F	Fort Dodge	USG	0620640438	1734				+10
35	Fort Dodge	National	06276F13M	1750				+10
36	Fort Dodge	Celotex	1286FA1	1766				0
37	Fort Dodge	G.P.	06276F62	1750				-25

Witnessed & Understood by me,	Date	Invented by	Date

Project No. 2

TITLE Competitive ½" Wallboard Survey

Book No. 134

Board Reference Number	TAPER DEPTH ~~Taper Depth~~ ~~F-Square Method~~ Left			MACHINE METHOD ~~Machine Clamp Method~~ Right			Transverse Strength Mill Direction		Cross Direction	
	Point #1	Point #2	Point #3	Point #1	Point #2	Point #3	Backup	Face up	Back up	Face up
#1	47	50	34	47	38	16	128.5	149.0	45.0	41.0
#2	14	14	7	34	28	16	165.0	167.0	43.5	45.0
#3	35	36	23	9	20	10	178.25	178.25	50.5	51.0
#4	26	12	1	43	24	7	148.25	140.0	54.0	43.0
#5	45	48	25	35	38	17	149.0	151.0	61.0	48.5
#6	8	15	6	29	24	9	149.0	169.5	58.5	37.5
#7	40	37	18	22	25	15	148.75	155.0	47.0	49.75
#8	53	52	28	37	38	26	148.75	145.5	43.0	43.0
#9	53	48	36	33	33	15	136.75	133.0	44.5	43.75
#10	31	36	20	36	45	33	136.5	159.5	50.0	52.5
#11	39	28	20	30	26	15	148.0	148.5	46.0	45.0
#12	11	23	10	16	12	6	162.5	169.25	43.0	43.5
#13	60	52	27	45	40	20	145.0	148.75	42.0	46.75
#14	27	16	6	29	3	2	142.25	154.75	48.0	40.5
#15	34	30	13	26	28	13	153.0	149.0	61.0	46.5
#16	35	40	20	36	35	12	173.0	170.0	62.5	49.5
#17	15	21	14	33	35	17	136.5	150.0	74.0	49.0
#18	6	12	15	6	12	12	137.0	148.5	39.0	46.5
#19	28	31	16	9	22	12	152.0	163.0	57.0	42.5
#20	59	58	42	48	42	20	148.0	148.5	43.0	42.5
#21	41	27	12	48	31	15	142.5	148.0	55.0	48.5
#22	50	40	18	41	29	9	151.5	167.0	50.0	52.0
#23	11	15	9	18	16	9	144.0	143.0	58.75	50.0
#24	25	27	14	40	33	13	163.0	166.5	49.75	53.0
#25	31	20	8	15	19	12	161.0	146.5	43.0	43.75
#26	25	16	2	16	11	8	154.75	151.75	43.5	45.5
#27	No test - Broken Board						No test - Broken Board			
#28	39	25	12	7	7	3	140.0	164.0	42.0	43.5
#29	45	30	8	35	29	10	147.0	159.0	42.5	42.5
#30	34	34	22	22	10	10	145.75	153.5	55.75	43.0
#31	35	27	3	13	12	11	157.0	155.0	40.75	42.5
#32	11	28	10	10	15	4	161.0	153.5	47.0	46.0
#33	41	36	20	26	31	18	146.5	130.25	44.5	46.75
#34	50	45	24	45	41	21	155.0	157.0	40.0	43.5
#35	36	41	30	55	52	29	150.0	137.0	43.0	42.0
#36	54	43	24	71	58	30	106.0	140.0	54.0	42.5
#37	32	36	24	45	40	31	154.0	150.0	42.5	41.0

Witnessed & Understood by me,	Date	Invented by	Date

GP0023744

Project No. 2

TITLE Competitive ½" Wallboard Survey Book No. 134

Board Reference Number	Edge Hardness	End Hardness	Core Hardness	Nail Pull Resistance	Falling Ball 6 feet	Falling Ball 5 feet	Falling Ball 4 feet	Penetration	Score and Break Rating	Face Paper Appearance Rating
#1	21	24.4	20.5	98	55.7					
#2	21	23.9	25.2	108	50.7					
#3	25	28.9	30.3	129	41.3					
#4	24	24.8	20.2	104	60.3					
#5	21	26.4	32.5	110	47.0					
#6	25	29.6	26.6	115	41.0					
#7	20	26.0	23.4	107	45.3					
#8	35	28.6	25.8	109	49.0					
#9	23	28.1	25.6	107	52.3					
#10	34	24.9	28.8	108	55.3					
#11	21	26.0	26.9	110	43.7					
#12	34	25.7	22.8	104	56.7					
#13	18	20.9	18.2	88	66.0					
#14	28	27.9	29.8	113	50.7					
#15	23	27.3	25.5	110	44.0					
#16	28	30.5	28.8	121	44.3					
#17	20	24.8	25.0	105	49.7					
#18	29	22.0	21.3	98	65.3					
#19	23	29.4	32.5	127	38.3					
#20	38	22.6	23.6	89	62.7					
#21	27	27.4	22.2	105	57.3					
#22	29	29.8	30.8	119	50.3					
#23	20	35.3	35.8	134	42.7					
#24	33	27.6	26.5	115	51.7					
#25	42	23.2	19.8	96	58.7					
#26	16	20.3	18.4	96	63.0					
#27			No test-Broken Board		Broken Board					
#28	33	24.7	27.5	108	50.7					
#29	44	22.6	20.8	94	64.7					
#30	44	19.3	16.5	92	61.7					
#31	25	22.0	22.2	95	59.7					
#32	27	32.5	34.5	124	37.3					
#33	19	27.4	25.4	106	56.0					
#34	22	20.6		95	60.3					
#35	40	22.2		106	60.7					
#36	38	18.3		99	57.7					
#37	38	19.6		95	61.3					

Witnessed & Understood by me, Date Invented by Date

GP0023745

Project No. 2

TITLE Competitive ½" Wallboard Survey Book No. 134

Board Reference Number	End Grinding Rating	End Bond (Calcination Check) Face	End Bond (Calcination Check) Back	Humid Bond Face	Humid Bond Back	Humid Deflection	Cobb Test
#1							1.43
#2							1.47
#3							.87
#4							1.67
#5							1.32
#6							.98
#7							1.67
#8							1.88
#9							1.54
#10							2.29
#11							1.75
#12							1.60
#13							.74
#14							1.20
#15							.81
#16							.88
#17							1.58
#18							1.59
#19							1.11
#20							1.61
#21							1.71
#22							1.72
#23							1.63
#24							1.44
#25							1.65
#26							1.05
#27							no test Broken Board
#28							1.18
#29							1.50
#30							1.02
#31							1.10
#32							1.58
#33							1.30
#34							2.31
#35							.86
#36							1.64
#37							1.61

Witnessed & Understood by me, Date Invented by Date

GP0023746

TITLE Laminated Gypsum Fire Door Edge Banding

Project No. 295

Book No. 134

Following an idea and formulation developed by Dale Greve, the following attempts were made along with Ray Hinkel to produce an improved edge banding for fire doors using a gypsum based composition with a relatively thin layer of wood laminated to it. The initial formula below was supplied by Dale Greve. An initial pilot fire test was conducted to determine the promise of this material. Below is the formula:

Dry Filler	%	Wet Mix	%
Malding Plaster	91.69	Dry Filler	49.06
Kraft Paper Fiber	4.13	Elvace 1873	16.35
Glass Fiber (1/4")	0.66	Benzoflex	1.63
Vermiculite	3.30	Nalco 71-D5	0.26
Gendriv 4925	0.20	Water	32.70
Sodium Citrate	0.02		

Following are properties of this material:

Wet Mix Working Time	10 minutes
Final Density	61.4 lb./ft.^{3}
Screw Pull Resistance	114.46 (average of 3)

Below is a description of the door and the edge banding tested:

door size: 60" X 35 7/8"

door core: current G-P core manufacture

door skins: oak veneer

hinge stile: 1/4" / 1/2" — untreated hemlock / gypsum composition

top rail & lock stile: 1/4" / 1/2" — untreated fir / gypsum composition

bottom rail:

1 1/2" — treated maple (Koppers)

The door was subjected to a 1-hour fire test with no subsequent hose stream test. The door passed the 1-hour test. The face veneer was charred around the lock. The face veneer burned out in an area about 1/4" in from the edge on the lock side in a couple of places but never beyond the door jam. This burning seemed to stop when it reached the gypsum composition.

Witnessed & Understood by me,	Date	Invented by	Date
R Hinkel	Aug 5'96	Jack L. Sullivan	8/3/96

GP0023747

TITLE Laminated Gypsum Fire Door Edge Banding

Project No. 295
Book No. 134

The decision was made to make up two more doors generally similar to the first test door where one used untreated fir and the other used treated hemlock. Both of these doors would then be tested to ultimate failure Below is the gypsum composition formula used for the first door:

Dry Filler	%	Wet Mix	%
Denscal	91.73	Dry Filler	50.82
Kraft Paper Fiber	4.13	Rhoplex N-388	16.89
Glass Fiber (1/4" & 3/8" mixed)	0.66	Benzoflex	1.68
Vermiculite	3.30	Nalco 71-D5	0.10
X-anthan Gum	0.10	Water	30.50
Sodium Citrate	0.08		

Following are properties of this material:

Wet Mix Working Time — several hours

Final Density — 64.29 lb/ft³

Screw Pull Resistance — 116.79 (average of 3)

Below is a discription of the door and the edge banding tested:

door size: 60" X 35 7/8"

door core: current G-P core manufacture

door skins: oak veneer

stiles & top rail: 7/8" } - 3 laminations of 1/8" fir veneer (untreated)
1" } - gypsum composition

bottom rail: 1 1/2" } - treated maple (Hoppers)

Fire test:

The door was subjected to an ultimate fire test. Failure was observed along the top rail at 1:05. The burn was continued and failure at the lock occurred at around 1:10. The hinge side failed a little after this The test was ended at 1:20. Subsequent examination of the edge banding showed the gypsum calcined clear through and soft and missing completely in many places.

Witnessed & Understood by me,	Date	Invented by	Date
R.W. Hurley	Aug. 12 '76	Jack L. Sullivan	8/11/76

GP0023748

TITLE Laminated Gypsum Fire Door Edge Banding

Project No. 295
Book No. 134

Below is the gypsum composition formula for the second ultimate fire test door:

Dry Filler	%	Wet Mix	%
Denscal	91.26	Dry Filler	52.36
Kraft Paper Fiber	4.11	Rhoplex N-388	24.07
Glass Fiber (1/4" & 1/8" mixed)	0.66	Benzoflex	2.41
Vermiculite	3.28	Nalco 71-D5	0.10
Xanthan Gum	0.10	Water	21.06
Sodium Citrate	0.04		
Set Accelerator	0.55		

Following are the physical properties:

Wet Mix Working Time	~28 minutes
Dry Density	68.57
Screw Pull Resistance	160.83

Below is a description of the door and the edge banding tested:

door size: 60" x 35 7/8"

door core: current G-P core manufacture

door skins: oak veneer

stiles & top rail: 3/8" – treated hemlock (Pacific Wood); 1/2" – gypsum composition

bottom rail: 1 1/2" – treated maple (Koppers)

Fire test:

The door was subjected to a 1 1/2 hour fire test followed by a hose stream test. Failure was observed on the top rail at the hinge corner at 1:14. However no other failure was observed throughout the duration of the test. At about 1:18 glowing was observed however at the top hinge and the door knob. Subsequent examination showed the gypsum material generally in tact though calcined pretty thoroughly. Performance seemed considerably better than the test with untreated wood.

Witnessed & Understood by me,	Date	Invented by	Date
R. W. Hikel	Aug. 12 '76	Jack L. Sullivan	8/11/76

GP0023749

TITLE Laminated Gypsum Fire Door Edge Banding

Project No. 295
Book No. 134

The next step of this project will be to make a door slam test to test the durability of this edge banding. For this critical test, the maximum strength will be needed from the gypsum composition. Therefore, a series of small samples were made to make corresponding improvements in the formulation. Below are the formulas tested and the results:

Dry Filler	A	B	C	D	E	F	G	H	I
Denscal	91.29	87.64	83.65	90.84	90.94	90.60	–	–	90.94
Molding Plaster	–	–	–	–	–	–	91.90	91.90	–
Kraft Paper Fiber	4.10	7.50	7.50	4.10	4.10	4.10	4.10	4.10	4.10
Glass Fiber (1/4"&3/8" mixed)	0.66	0.66	1.25	0.66	0.66	–	0.66	0.66	0.66
Glass Fiber (1/2")	–	–	–	–	–	1.00	–	–	–
Vermiculite	3.30	3.30	6.60	3.30	3.30	3.30	3.30	3.30	3.30
Accelerator (land plaster-lignosite)	0.65	0.80	1.00	1.00	1.00	1.00	–	–	1.00
Retarder (sodium citrate)	–	–	–	–	–	–	0.04	0.04	–
Gendriv 492 S	–	0.10	0.10	–	–	–	–	–	–
Aluminum Sulfate	–	–	–	–	–	–	–	–	0.40
Wet Mix									
Dry Filler (from above)	52.50	51.50	47.50	46.50	55.00	55.00	52.50	50.00	61.50
Rhoplex AC-388	24.00	25.00	25.00	36.00	25.00	25.00	25.00	–	15.00
Elvace 1875	–	–	–	–	–	–	–	25.00	–
Benzoflex	2.40	2.40	2.40	2.40	–	–	–	2.50	2.40
Nalco 71-D5	0.10	0.10	0.10	0.10	–	–	–	–	0.10
Water	21.00	21.00	25.00	15.00	20.00	20.00	22.50	22.50	21.00
Data									
Working Time (min.)	24	25	28	33	26	24	90	8	5
Density (lb./ft.³)	70.31	69.24	68.71	75.57	67.31	64.60	60.12	67.05	80.26
Screw Pull Resistance (average of 3)	170.00	188.25	167.29	136.12	216.00	237.92	187.42	144.33	217.52

Comments:

The gendriv seemed generally ineffective at holding the water in the cast during setting, so it was removed. The mixes were all too thin, the water should be cut down except for C and B which didn't have enough water. On the basis of the above tests, it was decided to increase the paper fiber, use 1/2" glass, increase the vermiculite (partially due to the fine tests), eliminate gendriv, benzoflex, and nalco from the formula, and reduce the rhoplex to 15%. The set time was adjusted to about 15 minutes using aluminum sulfate and accelerator. The final formula is shown at the top of the next page.

Witnessed & Understood by me,	Date	Invented by	Date
R. W. Hunkel	Aug. 17 '76	Jack L. Sullivan	8/13/76

GP0023750

$m^3 \times 3.931654 = lb/ft^3$

TITLE Laminated Gypsum Fire Door Edge Banding

Project No. 295
Book No. 134

Dry Filler	%
Densecal	88.75
Kraft Paper Fiber	5.00
Glass Fiber (1/2")	1.00
Vermiculite	5.00
Aluminum Sulfate	0.20
Accelerator (Hydroplaster-lignosite)	0.05

Wet Mix	%
Dry Filler	56.00
Rhoplex AC-388	15.00
Water	29.00

An initial small batch of this formula was made at the same time that a large cast was made. The test results for both are shown below:

Test	Small Scale Batch	Large Scale Batch
Working Time	14 minutes	13 minutes
Density	63.00	58.14
Screw Pull Resistance	226.46	169.58

This batch mixed very thick and the large casting resulted in having numerous air voids some of which were sizable. The decision was made to repour the cast reducing the paper fiber to 4.00% and increasing the water to 34.00%. This casting came out much better with few air voids. However a problem was still incurred with the paper fiber. The paper formed sizable lumps in the mix which were pulled out by hand. A means is needed for getting the paper properly dispersed. However, this casting was determined adequate for making the door for the slam test. Below are the test results:

Test	Data
Working Time	14 minutes
Density	62.60
Screw Pull Resistance	187.00

We found evidence that the rhoplex doesn't form a film of maximum hardness for several days. Therefore a later screw pull measurement was taken and measured at 202. A door was then made up with this second casting using Pacific Wood material (treated hemlock) of 3/8" thickness. The door was made the same as the corresponding fire tested door on page 53. The door was then subjected to a slam test.

Witnessed & Understood by me,	Date	Invented by	Date
R. W. Hunkel	Sept 15 '76	Jack L. Sullivan	

GP0023752

Variation of Formula Amounts of Preceding Page (#55)

Formula (grams)		Sample No. Control	One	Two	Three
Denscal		89.75	90.20	94.20	100.00
Paper - Kraft		4.00	3.00	3.00	2.00
Glass ½"		1.00	—	—	—
Glass ¼"		—	1.00	1.00	1.00
V-Mica		5.00	5.00	5.00	5.00
Al Sulphate		.20	.10	.10	.10
Sandplaster (tube milled)		.05	.50	.50	.50
K_2SO_4		—	.20	.20	.20
Adhesive - 388		26.	26.	18.	26.
Water		59.	52.	56.	56.
Defoamer		1 drop	1 drop	1 drop	1 drop
Set (min.)		? 15+	-16	-16	-16
Density lbs/ft³		69.3	71.3	71.3	74.3
Nail Pull lbs.	9/10	260	+264	+264.	+264
	9/13	219	249	247	285

GP0023753

Laminated Gypsum Fire Door

TITLE Edge Banding

Project No. 295

Book No. 134

Tests using Varying Amounts of Formula

* all samples using ~2 drops defoamer

Formula (grams)

	2-A	2-B	2-C	2-D (50% larger batch)	2-E	2-F	2-G	3-A	** Mold (2-F)
Denscal	94.2	94.2	94.2	141.3	141.3	94.2	188.4	216.00	4710.
Kraft Fiber	3.0	3.0	3.0	4.5	4.5	3.0	6.0	4.0	150
¼ Glass	1.0	1.0	1.0	1.5	1.5	1.0	2.0	2.0	50
V-Mica	5.0	5.0	5.0	7.5	7.5	5.0	10.0	10.0	250
Al Sulphate	.1	.1	.1	1.5	1.5	.1	.2	.2	5
T.M. Landplaster	.5	.5	.3	.3	.2	.1	.2	.2	5
K_2SO_4	.2	.2	.1	.1	–	.05	.1	.1	2.5
Rhoplex AC-388	18.	18.	18.	27.	27.	18.	36.	36.	900
Water	56.	56.	56.	84.	84.	56.	112.	120.	2800
Set (min)	7	9	12	7	9	18	15	19	17
Wet density (lbs/ft³)	–	–	–	92.3	–	–	89	86.3	–
Dry density	67.2	68.9	68.5	68.1	66.6	70.5	64.8	69.0	61.8
Screw Hold (lbs)	208	256	231	186	201	218	197	168	~~174~~ 207.4 (after longer drying time)

(2-G) amts = twice (2-F) amts

classified as (M-11)

* (2-G) and (3-A) mixed made in Waring blender

** mold sample using 3g defoamer

~~Mold #2~~

Witnessed & Understood by me,	Date	Invented by	Date
R. Hinkel	10/7/76	Chick Ciccarelli	10/7/76

Continued Tests With Variation of Formula Amount and Paper Banding

	M-2 (without paper band)	M-2 (with paper band)	M-3 (w/ kraft paper)	M-4 *
Set	17 min.	17	18	16
Dry Den.	61.3	60.4	63.1	62.1
wet Den.			85.3	83.3
Screw Holding (lb)	167	182	216	*190 ; 241 ← used 4g defoam

after few days drying period

	M-5 (formula used)	M-5B	V-1 *	M-5C
Densecal	5000. g	(same formula as M-5)	200.g	
Kraft	100.		4.00	
¼" Glass	50.		2.00	
V-Mica	250.		10.00	
Alum Sulphate	5.		.20	
Landplaster	6.		.24	
K_2SO_4	3.		.12	
AC-388	1300.		52.00 * Borden WB-904 plus catalyst instead of AC-388	
Water	2800.		112.00	
Defoamer	5.		.20	(same formula as M-5)
Set time (min.)	21.	21.0	4.50	20.
Wet den.	92.5	—	—	—
Dry den.	65.7	68.5	—	64.4
Screw Hldg. (lb)	~~280.~~ 280.	223.0	118.00	278.6

*V-1 done as a variation of M-5 ; smaller dose of same formula but Borden WB-904 and catalyst used (52.g) instead of Rhoplex AC-388.

* M-5 Formula used in edge banding M-5 B — M-5 D for slam door test #3

Witnessed & Understood by me,	Date	Invented by	Date
		Chick Ciccarelli	

GP0023755

1-12-77

Micro-LAM edge banding - compressed layers of wood at high pressure

3 pieces — densities: A - 32.6
B - 37.7 - for first test
C - 34.3

GP0023756

TITLE Laminated Gypsum Fire Door Edge-Banding

Project No. 295
Book No. 134

M-5 D (M-5 Formula)

Set time	20. min.
Wet dens.	—
Dry dens.	66.6
Screw hld.	221 lb

B-1 *

Densal	200.00
Dry Kraft	4.00
Glass ½"	2.00
V-Mica	10.00
Al Sulphate	.30
Landplaster	.24
K_2SO_4	.12
AC-388	52.00
Water	112.00
Defoam	2 drops

Set time 14 min
Wet dens —
Dry dens 63.4
Screw hldg (lb.) 191

B-2 *

	200.
(pre-mixed wet pulp) →	116
	2
	10
(accelerators	
eliminated - present	
in wet pulp mixture)	
	52.
(used in weight of wet pulp)	
	2 drops

Set time 12 min.
Wet dens —
Dry dens 65.1
Screw hldg (lb.) 306

* B-1, B-2 used ½" glass fibers in formula

M-5 E **

Set time	22. min
Wet dens	91.5
Dry dens	66.6 (3 Cubes)
Screw hld.	250
Comp. Stgth.	~~3075~~ 2537 lb/sq in (3 cubes (2-2))

** First mold using heavy Kraft paper

M-5 F (using 25% increase)

Densal	8750 g
Kraft	175
¼" Glass	87.5
V-Mica	437.5
Al Sulphate	8.75
Landplaster	10.5
K_2SO_4	5.25
AC-388	2275
Water	4900
Defoam	8.75

Set time - 40 min
Wet dens. - 93.4
Dry dens - 69.5
Screw hld. { ¾" - 331 ; ½" - 227

M-5 G (65% increase)

Densal	7875 g
Kraft	157.5
¼" Glass	78.75
V-Mica	393.75
Al Sulphate	7.88
Landplaster	9.45
K_2SO_4	4.73
AC-388	2047.5
Water	4410
Defoam	7.88

Set time - 32 min.
Wet dens - 93.5
Dry dens - 74.2
Screw hld. { ¾" - 339 ; ½" - 282

M-5 H (65% increase)

Set time - 37 min.
Wet dens. - 91.9
Dry dens. - 69.5
Screw hld. - { ¾" - 315 ; ½" - 219

Witnessed & Understood by me,	Date	Invented by	Date

GP0023757

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Board Ref. Number	G-P Plant	Manufacturer	5/8 in.	1/2 in.	Code Number	Board Wt. lbs/1000 ft.	Caliper Thickness	Board Width	Shoulder (in.)	Penetrometer
1	Buchanan	GP		✓	1325-NOR5	1734	.501	48.13	.020	2.8
2		Flintkote		✓	3477C312	1836	.502	48.00	.000	5.3
3		Goldbond		✓	3017Y22D	1750	.511	48.06	.008	3.5
4		Flintkote	✓		3477C36	2195	.619	48.03	.011	4.0
5		USG		✓	305A23762	1719	.493	48.00	.000	3.2
6		USG	✓		0829623732	2383	.617	48.00	.014	2.0
7		GP	✓		0307N7M5	2406	.622	48.00	.020	2.0
8		GP		✓	0311N7M1	1859	.484	48.00	.006	2.8
9	Blue Rapids	USG	✓		0122722725K	2305	.637	47.88	.000	5.0
10		Celotex		✓	M286F03	1781	.498	47.97	.014	3.2
11		Celotex	✓		B047F01	2180	.604	48.00	.000	4.5
12		Goldbond		✓	07036MA	1695	.499	47.91	.004	3.6
13		Weyerhauser		✓	A387B18	1727	.500	48.00	.000	5.5
14		USG		✓	1023682035	1797	.489	47.94	.009	3.0
15		Weyerhauser	✓		A1246B23	2359	.627	48.00	.007	4.0
16		GP		✓	021007KC	1789	.485	48.00	.018	4.3
17		GP	✓		030807KB	2383	.628	47.94	.006	4.6
18		GP		✓	032207KC	1750	.480	48.00	.017	4.3
19	Fort Dodge	Celotex		✓	B107103	1813	.499	47.94	.022	3.8
20		Goldbond		✓	02017F14N	1711	.484	47.97	.026	4.8
21		GP		✓	03207FS3	1703	.488	47.97	.010	3.3
22		USG	✓		309740467	2352	.638	47.94	.000	3.8
23		USG		✓	3137404A2	1758	.486	47.97	.011	2.3
24		GP		✓	03117FS8	1750	.480	47.94	.011	3.6
25		GP	✓		03257FS7	2398	.629	47.94	.009	2.5
26		Celotex	✓		C187F02	2180	.629	47.88	.009	5.0
27		Goldbond	✓		03037F02N	2242	.622	48.03	.002	4.2
28	Sigund	GP	✓		03137S2GP7	2422	.614	47.94	.003	4.0
29		Flintkote		✓	M22873N3	1781	.503	47.97	.000	3.3
30		J-M		✓	030877LVB10	1734	.495	47.97	.006	6.0
31		Big Horn		✓	3317775C3	1664	.500	48.03	.009	4.3
32		USG		✓	03L12722348	1680	.495	48.06	.012	4.5
33		GP		✓	01097S2GP1	1703	.482	48.00	.009	5.8
34		GP		✓	03117S1GP4	1656	.494	47.94	.000	10.1
35		USG	✓		0219722334	2234	.619	48.00	.001	4.3
36	Brunswick	Goldbond		✓	032070018	1797	.498	47.94	.002	4.3

Witnessed & Understood by me,	Date	Invented by	Date
		Chick Ciccarelli	4-29-77

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Board Ref. Number	G-P Plant	Manufacturer	5/8 in.	1/2 in.	Code Number	Board Wt. lbs/1000 sq ft	Caliper Thickness	Board Width	Shoulder in.	Penetrometer
37	Brunswick	USG		✓	012972251T3	1852	.493	48.00	.007	4.3
38		USG	✓		030272255E3	2477	.624	48.00	.015	4.0
39		GP	✓		03077BX2	2391	.639	48.00	.008	2.7
40		GP		✓	01317BS8	1758	.496	47.88	.000	3.6
41		GP		✓	03227BX4	1789	.498	48.00	.011	4.0
42		Flintkote		✓	31573G7	1766	.481	48.00	.012	3.6
43		Celotex		✓	B077120200	1938	.481	47.97	.015	4.8
44		Flintkote	✓		32273G8	2359	.630	48.09	.003	3.0
45	Lovell	GP	✓		32977LS3	2344	.625	47.97	.000	5.0
46		GP		✓	32977LA1	1695	.499	47.97	.013	6.5
47		GP		✓	4177LA4	1711	.487	48.03	.003	6.5
48		USG		✓	0325724234	1766	.504	47.97	.032	3.0
49		USG	✓		0225724233	2320	.604	48.13	.004	4.2
50		Big Horn	✓		22217 7C4	2219	.616	48.09	.012	4.0
51		Big Horn		✓	2131771 0C2	1727	.501	48.14	.017	4.5
52	Acme	Republic		✓	—	1844	.503	48.00	.004	4.0
53		Republic	✓		T997517	2547	.615	48.00	.021	4.3
54		Weyerhauser	✓		A317B37	2438	.626	47.97	.013	4.0
55		Goldbond		✓	02217R21S	1828	.512	47.98	.006	3.5
56		GP		✓	11296TDD7	1711	.499	47.84	.000	6.7
57		GP	✓		8116TBC6	2352	.624	48.02	.000	6.3
58		USG	✓		03127861PALMA3	2219	.622	47.97	.008	5.0
59		USG		✓	03087861FBABR	1672	.492	47.97	.000	4.3
60		GP		✓	8216TRR9	1766	.496	48.02	.000	5.7
61	Wilmington	USG		✓	0310778332H6Z	1750	.489	48.06	.019	9.3
62		USG	✓		0131778331W3	2406	.609	47.06	.000	2.6
63		GP	✓		4677WF7	2390	.637	47.94	.031	3.5
64		GP		✓	4777WG8	1703	.490	48.00	.008	4.3
65		Flintkote		✓	21777C38	1797	.485	47.97	.004	3.8
66		Flintkote	✓		12176C16	2313	.629	47.69	.000	3.1
67		Goldbond		✓	44759SK	1938	.481	48.02	.014	5.0
68	Grand Rapids	Grand Rapids Gypsum	✓		03037GR18	2094	.633	47.94	.009	4.5
69		Gold Bond	✓		0347N11	2250	.622	48.08	.000	5.3
70		USG	✓		0313789124	2250	.619	48.02	.000	4.0
71		GP	✓		040477GEL	2375	.630	47.97	.025	2.8
72		GRG		✓	022GE7GR13	1641	.478	47.97	.014	3.0

Witnessed & Understood by me, | Date | Invented by Chick Ciccarelli | Date

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Board Ref. Number	G-P Plant	Manufacturer	5/8 in	1/2 in	Code Number	Board Wt lbs/1000 sq ft	Caliper Thickness	Board Width	Shoulder in.	Penetrometer
73	Grand Rapids	USG		✓	0321289114	1836	.495	48.03	.000	5.3
74		GP		✓	040577GEJ	1781	.489	47.94	.021	4.0
75		Goldbond		✓	3/2LN17	1727	.496	48.10	.008	3.3
76		GP		✓	031177GTA	1750	.488	48.00	.017	4.5

Bd. Ref. Number	Taper Depth (Point w/most deviation from Specs) .055	.050	.027	Falling Ball Avg. (in.)	Nail Pull Avg	Transverse (with grain) Face Up	Down	Transverse (against grain) Face Up	Down
1	-.042	-.034	-.019	.064	88	43	46	169	156
2	-.011	-.040	-.012	.053	99	45	46	157	148
3	-.024	-.022	-.017	.055	101	47	44	150	145
4	-.016	-.018	-.013	.051	118	77	85	203	215
5	-.013	-.023	-.017	.064	85	49	56	145	150
6	-.018	-.031	-.016	.050	109	80	89	182	227
7	-.044	+.003	+.011	.039	175	58	68	233	251
8	+.026	+.018	+.006	.047	117	41	41	161	169
9	+.013	+.023	+.005	.050	120	91	107	220	253
10	-.030	-.022	-.012	.059	96	47	56	147	138
11	-.018	-.023	-.018	.054	106	71	82	195	178
12	-.019	-.013	+.002	.054	93	39	47	151	146
13	-.013	-.022	-.020	.064	92	43	48	149	141
14	-.024	-.016	-.019	.053	104	50	46	173	173
15	-.028	-.035	-.022	.056	110	60	58	215	196
16	+.019	+.002	-.004	.043	132	54	56	142	175
17	-.004	-.020	-.008	.042	154	96	95	262	242
18	-.043	-.031	-.013	.048	123	48	52	146	159
19	-.040	-.041	-.023	.062	87	41	47	132	131
20	+.013	+.012	+.007	.055	107	44	41	166	157
21	-.013	-.010	-.007	.059	97	62	62	151	153
22	-.021	-.014	+.005	.046	136	54	78	224	214
23	-.051	-.026	-.008	.054	102	42	43	168	148
24	+.017	+.014	+.012	.051	113	41	41	165	164
25	+.005	-.007	-.005	.039	144	75	82	210	244
26	+.007	-.002	-.008	.056	114	65	93	182	213
27	-.020	-.018	-.014	.055	116	80	70	238	234
28	-.027	-.021	-.011	.038	144	87	83	232	219

Witnessed & Understood by me,

Date

Invented by

Chuck Ciccarelli

Date

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Bd Ref No.	Taper .055	Depth .050	(Pt w/most deviation from Specs) .027	Falling Ball Avg. (in.)	Nail Pull Avg.	Transverse (with grain) Face Up	Transverse (with grain) Down	Transverse (against grain) Face Up	Transverse (against grain) Down
29	- .006	- .013	- .015	.051	114	44	57	159	164
30	- .012	- .010	- .008	.056	101	43	47	172	158
31	- .037	- .027	- .014	.065	91	43	59	140	140
32	- .026	- .026	- .016	.058	104	48	53	154	158
33	- .023	- .016	- .002	.044	113	49	51	148	151
34	- .008	- .013	- .017	.059	91	50	49	157	141
35	+ .008	- .008	- .010	.054	112	89	81	226	230
36	+ .028	+ .024	+ .015	.055	107	43	41	140	140
37	- .041	- .026	- .015	.055	121	47	48	175	193
38	- .030	- .012	- .006	.051	119	77	72	279	251
39	- .026	- .013	- .004	.049	127	63	69	250	245
40	+ .031	+ .028	+ .021	.055	100	45	41	179	145
41	- .049	- .024	- .008	.057	100	46	43	167	177
42	- .014	- .024	- .013	.048	117	45	41	155	150
43	- .046	- .049	- .027	.047	111	55	59	143	127
44	- .035	- .035	- .022	.046	137	80	68	245	229
45	+ .014	+ .004	+ .013	.037	150	64	74	247	229
46	± .013	- .009	+ .004	.052	103	38	47	140	141
47	- .018	± .004	- .000	.046	102	43	47	164	147
48	- .022	- .027	- .025	.063	100	49	50	159	157
49	+ .009	+ .026	+ .035	.051	112	94	79	245	228
50	- .006	- .012	- .005	.045	126	69	89	167	206
51	- .029	- .012	± .005	.054	99	48	60	156	149
52	- .031	- .032	- .020	.041	113	41	53	159	160
53	- .014	- .031	- .004	.024	160	68	73	188	233
54	- .009	- .018	- .010	.040	137	74	67	214	188
55	- .017	+ .007	+ .024	.050	104	43	44	146	152
56	- .030	- .026	+ .010	.050	100	47	42	129	154
57	+ .003	+ .013	+ .023	.044	123	71	88	215	217
58	+ .001	+ .006	+ .007	.048	147	71	68	194	195
59	- .048	- .034	- .020	.055	83	46	46	159	150
60	- .041	- .046	- .022	.057	107	49	46	129	138
61	- .020	- .039	- .027	.045	95	47	50	149	131
62	- .017	- .021	- .016	.033	142	77	87	197	199
63	+ .024	+ .012	- .006	.040	124	70	64	236	249
64	+ .013	+ .004	- .005	.048	92	44	45	159	153

Witnessed & Understood by me,

Date

Invented by

Chick Accardi

Date

GP0023761

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Bd. Ref No.	Taper Depth (per inch of board deviation from Specs) .055	.050	.027	Falling Ball Avg. (in.)	Nail Pull Avg.	Transverse (with grain) Face Up	Face down	Transverse (against grain) Face Up	Down
65	- .031	- .009	- .009	.044	98	47	46	145	145
66	+ .022	+ .016	+ .003	.042	132	99	74	231	217
67	+ .018	- .016	- .010	.038	132	38	43	137	155
68	+ .030	- .006	+ .005	.037	101	102	79	203	205
69	+ .048	+ .033	+ .018	.038	125	69	62	185	203
70	- .015	- .014	+ .024	.047	93	68	70	193	203
71	- .033	- .035	- .019	.041	117	71	78	237	247
72	- .019	- .033	- .016	.058	96	57	48	140	141
73	- .052	- .014	- .014	.045	109	50	48	164	144
74	+ .028	+ .023	+ .016	.035	126	43	47	152	142
75	- .028	- .025	- .020	.042	99	42	43	150	146
76	+ .039	+ .014	+ .018	.055	97	47	44	149	154

✓ measured out of humid room

Bd Ref No.	Core Hardness	Humid Deflection (for 1/8 in)	Face Paper Appearance	End Grinding	End Calcination (in) Face	Back	Humid (in) Face	Bond (Avg.) Back	Special 5/8" Type X Fire Test min	sec
1	19	.8	Fair	Poor	4.0	4.0	4.0	2.92		
2	26	2.3	Average	Fair	2.0	1.5	4.0	4.0		
3	29	1.5	Good	Fair	1.5	0.5	0.33	0.25		
4	17		Good	Fair	0.75	0.25	4.0	4.0	3	37
5	22	3.0	Average	Fair	0	0	2.83	2.5		
6	33		Fair	Poor	0	0	0.67	0.33	2	51
7	38		Average	Fair	0	0	0	0	4	43
8	33	3.3	Poor	Fair	0.25	1.0	0	0		
9	34		Good	Excellent	0	0	0.5	0	3	52
10	24	2.0	Average	Average	0	0.75	4.0	4.0		
11	31		Fair	Fair	0	0	4.0	3.0	1	48
12	18	4.0	Good	Fair	0	0	0.42	0.42		
13	20	✓ 2.0	Good	Average	1.0	0.5	3.67	4.0		
14	32	✓ 1.5	Excellent	Good	0	0	4.0	0.58		
15	30		Good	Average	0	0	0	0.08	2	31
16	27	2.8	Average	Good	0	0	0.33	0	[illegible]	
17	35		Average	Good	0.5	4.0	0	0.35	4	20
18	30	3.0	Good	Good	0	0	0	0.08		
19	24	✓ 3.3	Fair	Average	0	0	4.0	3.33		
20	21	✓ 3.5	Average	Good	0	0	0.25	0.33		

Witnessed & Understood by me, Date

Invented by Chick Ciccarelli Date

GP0023762

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Board Ref. Number	GP Plant	Manufacturer	5/8 in	1/2 in	Code Number	Board Wt lbs/1000 sq ft	Caliper Thickness	Board Width in.	Shoulder in.	Penetrometer
73	Grand Rapids	USG		✓	03229891/4	1836	.495	48.03	.000	5.3
74		GP		✓	040577GEJ	1781	.489	47.94	.021	4.0
75		Goldbond		✓	3/7LN17	1727	.496	48.10	.008	3.3
76		GP		✓	031177GTA	1750	.488	48.00	.017	4.5

Bd. Ref. Number	Taper Depth (Point w/most deviation fm Specs) .055	.050	.027	Falling Ball Avg (in.)	Nail Pull Avg	Transverse (with grain) Face Up	Face Down	Transverse (ag. grain) Face Up	Face Down
1	- .042	- .034	- .019	.064	88	43	46	169	156
2	- .011	- .010	- .012	.053	99	45	46	157	148
3	- .024	- .022	- .017	.055	101	47	44	150	145
4	- .016	- .018	- .013	.051	118	77	85	203	215
5	- .013	- .023	- .017	.064	85	49	56	145	150
6	- .018	- .021	- .016	.050	109	80	89	182	227
7	- .014	+ .002	+ .011	.039	175	58	68	233	251
8	+ .026	+ .018	+ .006	.047	117	41	41	161	169
9	+ .013	+ .033	+ .005	.050	120	91	107	220	253
10	- .030	- .032	- .017	.059	96	47	56	147	138
11	- .018	- .023	- .018	.054	106	71	82	195	178
12	- .019	- .013	+ .002	.059	93	39	47	151	146
13	- .013	- .022	- .030	.064	92	43	48	149	141
14	- .024	- .016	- .019	.053	104	50	46	173	173
15	- .028	- .035	- .022	.056	110	60	58	215	196
16	+ .019	+ .002	- .004	.043	132	54	56	142	175
17	- .004	- .010	- .008	.042	154	96	95	262	247
18	- .043	- .031	- .013	.048	123	48	52	146	159
19	- .040	- .041	- .022	.062	87	41	47	132	131
20	+ .013	+ .012	+ .007	.055	107	44	41	166	157
21	- .013	- .010	- .009	.059	97	62	62	151	153
22	- .021	- .014	+ .005	.046	136	59	78	224	214
23	- .051	- .026	- .008	.054	102	42	43	168	148
24	+ .017	+ .014	+ .012	.051	113	41	41	165	164
25	+ .005	- .007	- .005	.039	144	75	82	210	244
26	+ .007	- .002	- .008	.056	114	65	93	182	213
27	- .020	- .018	- .014	.055	116	80	70	238	234
28	- .027	- .021	- .011	.038	144	87	83	232	219

Witnessed & Understood by me,

Date

Invented by Dick Ciccarelli

Date

GP0023760

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Bd Ref No.	Taper .055	Depth .050	(Pt w/most deviation from Specs) .027	Falling Ball Avg (in.)	Nail Pull Avg	Transverse (with grain) Face Up	Transverse (with grain) Down	Transverse (against grain) Face Up	Transverse (against grain) Down
29	- .006	- .013	- .015	.051	114	44	57	159	164
30	- .012	- .010	- .008	.056	101	43	47	172	158
31	- .037	- .027	- .014	.065	91	43	59	140	140
32	- .026	- .026	- .016	.058	104	48	53	154	158
33	- .023	- .016	- .002	.044	113	49	51	148	151
34	- .008	- .013	- .017	.059	91	50	49	157	141
35	+ .008	- .008	- .010	.054	112	89	81	226	230
36	+ .028	+ .024	+ .015	.055	107	43	41	140	140
37	- .041	- .026	- .015	.055	121	47	48	175	193
38	- .030	- .012	- .006	.051	119	77	72	279	251
39	- .026	- .013	- .004	.049	127	63	69	250	245
40	+ .031	+ .038	+ .021	.055	100	45	41	179	145
41	- .044	- .034	- .008	.057	100	46	43	167	177
42	- .014	- .024	- .013	.048	117	45	41	155	150
43	- .046	- .049	- .027	.047	111	55	59	143	127
44	- .035	- .035	- .022	.046	137	80	68	245	229
45	+ .014	+ .004	+ .013	.037	150	64	74	247	229
46	± .013	- .009	+ .004	.052	103	38	47	140	141
47	- .018	± .004	- .000	.046	102	43	47	164	147
48	- .022	- .027	- .025	.063	100	49	50	159	157
49	+ .009	+ .026	+ .035	.051	112	94	79	245	228
50	- .006	- .012	- .005	.045	126	69	89	167	206
51	- .029	- .012	± .005	.054	99	48	60	156	149
52	- .021	- .032	- .020	.041	113	41	53	159	160
53	- .014	- .021	- .004	.024	160	68	73	188	233
54	- .009	- .018	- .010	.040	127	74	67	214	188
55	- .017	+ .007	+ .024	.050	104	43	44	146	152
56	- .030	- .026	+ .010	.050	100	47	42	129	154
57	+ .003	+ .013	+ .023	.044	123	71	88	215	217
58	+ .001	+ .006	+ .007	.048	147	71	68	194	195
59	- .048	- .034	- .020	.055	83	46	46	154	150
60	- .041	- .046	- .022	.057	107	49	46	129	138
61	- .020	- .039	- .037	.045	95	47	56	149	131
62	- .011	- .021	- .016	.033	142	77	87	197	199
63	+ .024	+ .012	- .006	.040	124	70	64	236	249
64	+ .013	+ .004	- .005	.048	93	44	45	159	153

Witnessed & Understood by me, | Date | Invented by Chick Accardi | Date

GP0023761

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Bd. Ref No.	Taper Depth (pt w/ most deviation from Specs) .055	.050	.027	Falling Ball Avg (in.)	Nail Pull Avg	Transverse (with grain) Face Up	Face down	Transverse (against grain) Face Up	Down
65	- .031	- .009	- .009	.044	98	47	46	145	145
66	+ .022	+ .016	+ .003	.042	132	99	74	231	217
67	+ .018	- .016	- .010	.038	132	38	43	137	155
68	+ .030	- .006	+ .005	.037	101	102	79	203	205
69	+ .048	+ .033	+ .018	.038	125	69	62	185	203
70	- .015	- .014	+ .024	.047	93	68	70	193	203
71	- .033	- .035	- .019	.041	117	71	78	237	247
72	- .019	- .033	- .016	.058	96	57	48	140	141
73	- .052	- .014	- .014	.045	109	50	48	164	144
74	+ .028	+ .023	+ .016	.035	126	43	47	152	142
75	- .028	- .025	- .020	.042	99	42	43	150	146
76	+ .039	+ .014	+ .018	.055	97	47	44	149	154

✓ measured out of humid room

Bd Ref No.	Core Hardness	Humid Deflection (in/8 in)	Face Paper Appearance	End Grinding	End Calcination (in) Face	Back	Humid Bond (in) (Avg) Face	Back	Special 5/8" Type x	Fire Test
									min	sec
1	19	.8	Fair	Poor	4.0	4.0	4.0	2.92		
2	26	2.3	Average	Fair	2.0	1.5	4.0	4.0		
3	29	1.5	Good	Fair	1.5	0.5	0.33	0.25		
4	17		Good	Fair	0.75	0.25	4.0	4.0	3	37
5	22	3.0	Average	Fair	0	0	2.83	2.5		
6	33		Fair	Poor	0	0	0.67	0.33	2	51
7	38		Average	Fair	0	0	0	0	4	43
8	33	3.3	Poor	Fair	0.25	1.0	0	0		
9	34		Good	Excellent	0	0	0.5	0	3	52
10	24	2.0	Average	Average	0	0.75	4.0	4.0		
11	31		Fair	Fair	0	0	4.0	3.0	1	48
12	18	4.0	Good	Fair	0	0	0.42	0.42		
13	20	✓ 2.0	Good	Average	1.0	0.5	3.67	4.0		
14	32	✓ 1.5	Excellent	Good	0	0	4.0	0.58		
15	30		Good	Average	0	0	0	0.08	2	31
16	27	2.8	Average	Good	0	0	0.33	0	[illegible]	[illegible]
17	35		Average	Good	0.5	4.0	0	0.35	4	20
18	30	3.0	Good	Good	0	0	0	0.08		
19	24	✓ 3.3	Fair	Average	0	0	4.0	3.33		
20	21	✓ 3.5	Average	Good	0	0	0.25	0.33		

Witnessed & Understood by me,	Date	Invented by	Date
		Chick Ciccarelli	

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Bd Ref No.	Core Hardness	Humid Deflection (# 1/8 in)		Face Paper Appearance	End Grinding	End Calcination (in) Face	Back	Humid (in) Bond (Avg) Face	Back	Special Type	5/8" Fire Test
										Min	Sec
21	23	✓	2.8	Excellent	Good	.25	.25	3.67	3.67		
22	42			Good	Good	.5	.5	0.08	0.08	3	40
23	33	✓	1.5	Excellent	Good	0	0	0	0.25		
24	26	✓	3.0	Average	Average	0	0	0.92	2.5		
25	38			Good	Average	1.	.25	0	0	4	41
26	23			Average	Good	0	0	4.0	3.33	1	13
27	30			Good	Good	0	0	0	0	3	47
28	44			Good	Average	0	0	0.08	0.58	4	46
29	24	✓	2.5	Excellent	Fair	0	0	1.58	0		
30	26	✓	3.5	Poor	Average	0	.25	0.17	0		
31	18		2.5	Average	Poor	4	.25	4.0	3.67		
32	20	✓	1.0	Excellent	Excellent	2.5	0	1.83	0.25		
33	35	✓	3.3	Average	Good	.25	0	0.83	0.25		
34	22	✓	3.0	Average	Average	2.	1.5	0	0.33		
35	30			Excellent	Excellent	2.	.5	0	0	4	37
36	25	✓	1.5	Good	Fair	.25	.25	0.17	0		
37	37	✓	1.3	Average	Average	0	0	1.25	1.0		
38	34			Average	Good	0	0	0	0	2	48
39	31			Average	Poor	0	1.	0.25	0.17	3	08
40	25	✓	1.0	Excellent	Fair	0	0	2.5	1.75		
41	25	✓	1.0	Average	Average	1.	.75	2.83	2.42		
42	31	✓	1.0	Good	Average	0	0	0	0		
43	33	✓	1.5	Average	Average	0	0	0	0.83		
44	26			Average	Average	0	0	0	0	3	42
45	38			Good	Good	1.	.5	0	0.08	5	33
46	26	✓	2.5	Good	Average	.75	.25	2.0	0.75		
47	28	✓	2.5	Average	Average	2.5	1.5	1.58	2.08		
48	22	✓	.8	Good	Good	.5	0	4.0	2.0		
49	32			Good	Excellent	0	0	1.08	1.67	3	51
50	23			Poor	Fair	1.	0	2.0	0.75	1	24
51	25	✓	2.8	Average	Average	4	4.	4.0	3.83		
52	29	✓	3.5	Good	Good	.25	0	2.42	1.42		
53	33			Average	Average	0	0	0.17	0.42	2	8
54	30			Fair	Average	0	0	0	0.17	1	56
55	22	✓	2.5	Average	Good	0	0	0.17	0		
56	23		3.3	Good	Poor	0	0	2.67	1.17		

Witnessed & Understood by me. ✓ measured out of humid room

Date

Invented by Chick Ciccarelli

Date

GP0023763

TITLE Competitive Board Survey

Project No. 2

Book No. 134

Bd Ref No.	Core Hardness	Humid Deflection (#1 8 in)	Face Paper Appearance	End Grinding	End Face	Calcination (in) Back	Humid (in) Face	Bond (Avg) Back	Special Type X	5/8" Fire Test
57	29		Fair	Good	0	0	0.42	1.5	13	57
58	32		Good	Good	0	0	1.83	0.75	4	56
59	22	✓ 2.8	Good	Good	0	0	0.42	1.67		
60	26	✓ 2.8	Good	Poor	0	0	0.17	0.25		
61	23	2.8	Average	Good	0	0	0	1.40		
62	36		Fair	Fair	0	0	0	0	4	53
63	28		Poor	Average	0	0	0.25	0.33	3	17
64	22	2.0	Average	Average	0	0	0.75	1.25		
65	23	1.5	Good	Fair	.75	.25	2.0	4.0		
66	32		Average	Fair	0	.25	0	0.5	5	
67	35	2.8	Average	Fair	2.	4.	0.08	2.75		
68	22		Poor	Average	4.	3.	4.0	4.0	5	25
69	28		Average	Fair	0	0	0.08	0.25	3	41
70	29		Good	Fair	0	0	2.0	2.5	3	39
71	32		Fair	Good	2.5	0	2.83	2.83	3	59
72	20	1.0	Average	Average	1.5	0	3.67	0.83		
73	27	1.5	Average	Poor	0	0	0	0.25		
74	28	2.5	Average	Fair	0	0	4.0	4.0		
75	26	2.0	Fair	Poor	1.	0	0.25	0.17		
76	24	2.0	Fair	Fair	0	0	4.0	4.0		

✓ measured out of humid room

Witnessed & Understood by me,	Date	Invented by	Date
		Chick Ciccarelli	

Project No. 2

TITLE Paper weight - gypsum wallboard (Competitive Survey) Book No. 134 66

The average face paper weight (ivory) and grey back paper weight were measured for G-P board from Brunswick, Fort Dodge, and Grand Rapids Plants. The Brunswick G-P board paper weights were averaged out of 7 board samples. The Fort Dodge G-P paper weights were averaged for 5 board samples. The Grand Rapids measurements were done and averaged for 5 G-P boards.

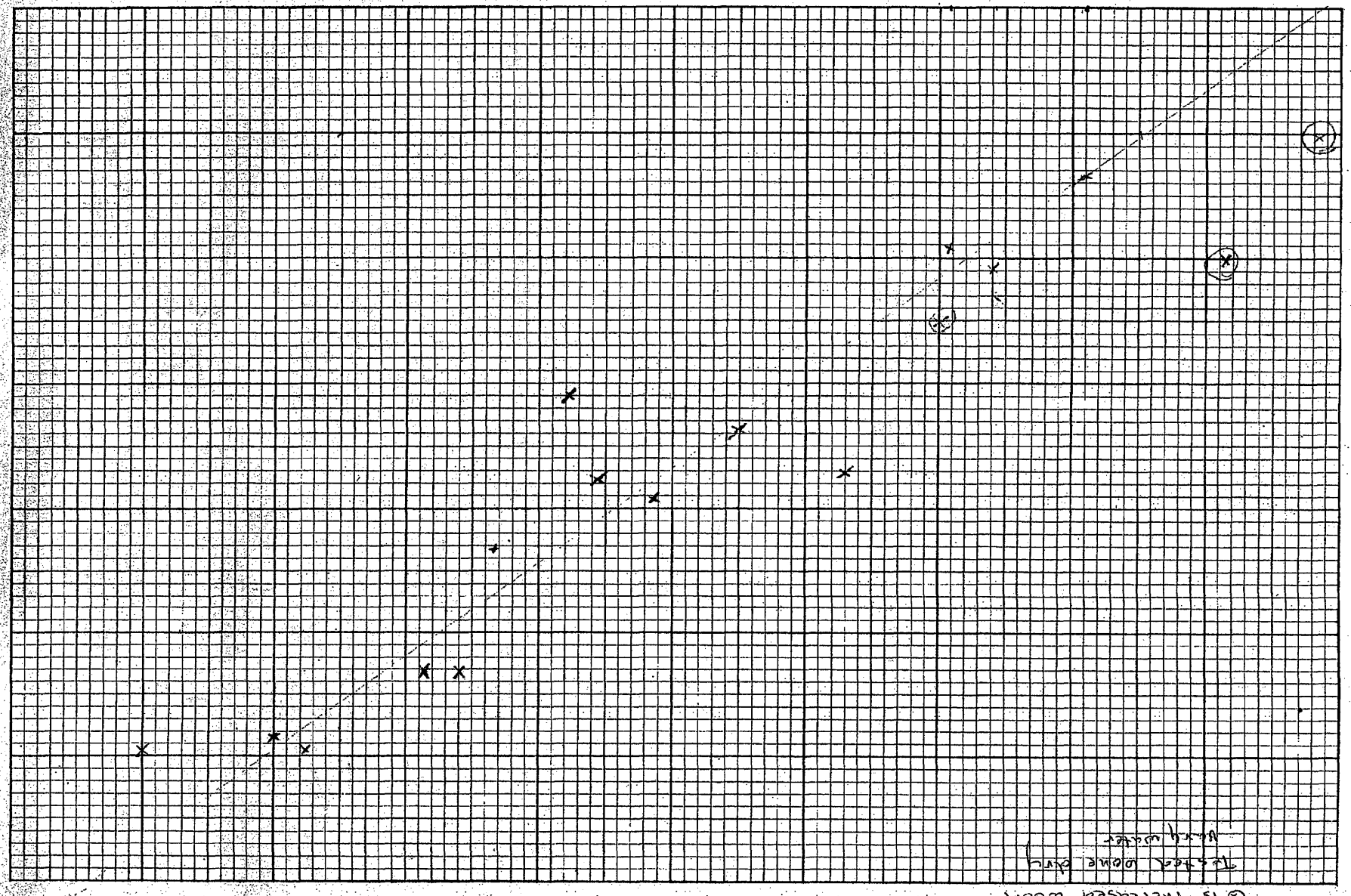
Average Weight per 1000 for paper:

	Brunswick	Fort Dodge	Grand Rapids
Ivory face paper -	60.7	63.2	60.6
Grey back paper -	60.2	63.1	60.9

Witnessed & Understood by me,	Date	Invented by	Date
		Chuck Ciccarelli	

GP0023765

K&E 10 X 10 TO THE INCH 46 0782
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.



GP0023766