

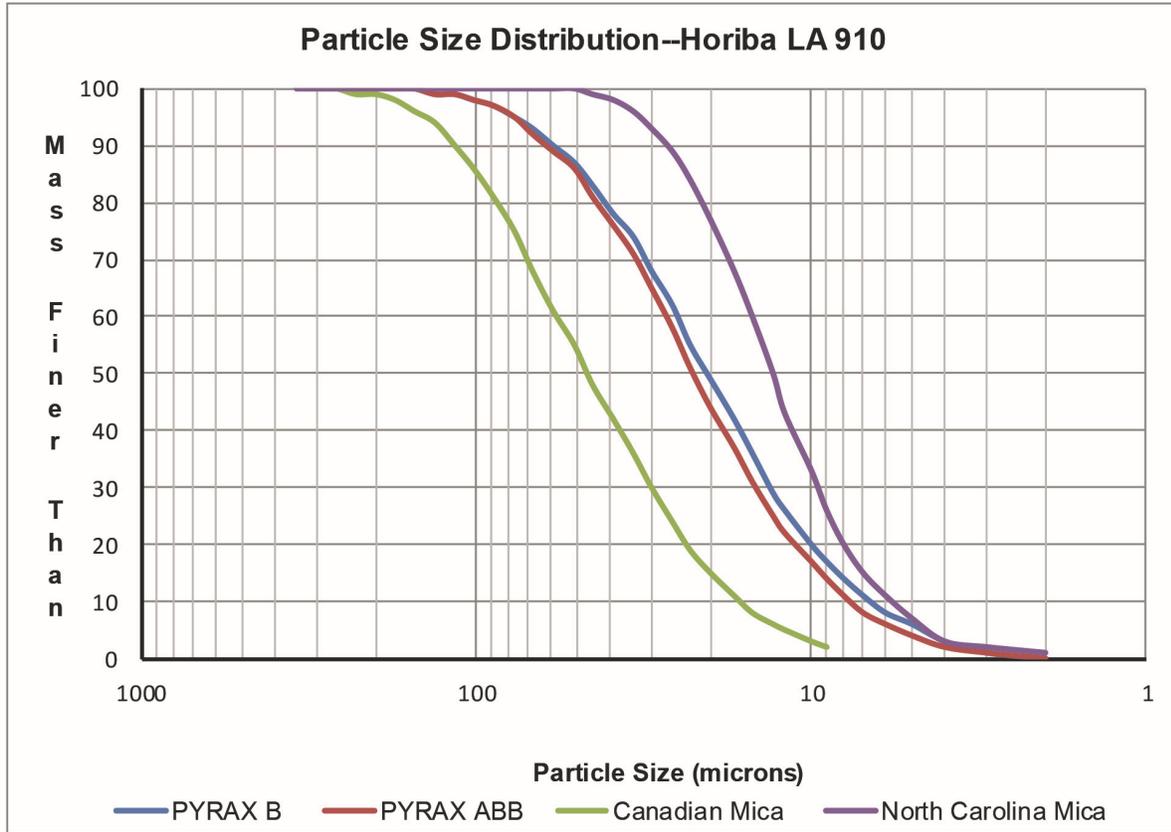
Pyrophyllite v. Mica in Ready-Mix Joint Compounds

INTRODUCTION: **PYRAX[®] B** Pyrophyllite and **PYRAX ABB** grades were compared to micas from Canada and North Carolina as platy fillers in ready-mix joint compounds. The joint compounds with the **PYRAX** products performed better than those with the micas and equivalently to a commercially available product from US Gypsum which contains mica.

DISCUSSION and RESULTS: Approximately 60% of the mica produced in the US and Canada is used in joint compounds. **PYRAX B** is also used as a replacement for mica in this application. Two micas from different sources were tested and compared to **PYRAX B** and **PYRAX ABB**. US Gypsum's Sheetrock[®] All-Purpose Ready-Mix Joint Compound was used as a comparative control.

The basic pigment properties of the two mica samples were determined and compared to **PYRAX B** and **PYRAX ABB**. The properties are summarized below:

	<u>PYRAX[®] B</u> Pyrophyllite	<u>PYRAX ABB</u>	<u>Canadian Mica</u>	<u>North Carolina Mica</u>
G.E. Brightness	82.5	79.5	24.0	64.7
L	92.4	91.4	56.5	85.0
a	-0.4	-0.4	1.4	0.2
b	2.7	3.7	10.1	6.9
+ 100 mesh	<0.01%	0.04%	0.05%	<0.01%
+200 mesh	0.5%	1.6%	11.0%	0.6%
+ 325 mesh	4.1%	11.5%	27.5%	3.6%
Oil absorption	35	28	48	24
Median Particle Size	21 µm	22 µm	47 µm	13 µm



The two **PYRAX**[®] Pyrophyllite products and the two micas were formulated into ready-mix joint compounds, the formula of which is given below:

<u>Ingredients</u>	<u>pounds</u>	<u>gallons</u>
Water	425	51.0
Diocetyl phthalate (plasticizer)	10	0.6
DARVAN [®] 811 Dispersing Agent ¹	7	0.6
Dolocron [®] 45-12 dolomitic limestone ²	705	30.2
Platy filler pyrophyllite or mica	140	6.0
Attagel [®] 50 attapulgite clay ³	28	1.4
Methocel [®] 240 A methyl cellulose ⁴	7	0.8
Airflex [®] 400 VAE emulsion ⁵	<u>85</u>	<u>9.6</u>
Total	1407	100.2

Raw Material Suppliers:

- ¹ Vanderbilt Minerals, LLC Norwalk, CT
- ² Mineral Technologies, Bethlehem, PA
- ³ BASF, Florham Park, NJ
- ⁴ Dow Chemical Co., Midland, MI
- ⁵ Air Products and Chemicals, Allentown, PA

The compounds were compared to US Gypsum Sheetrock[®] All-Purpose Ready-Mix Joint Compound for ease of application and coverage, sandability, drying rate, dry color, etc. The tape was applied to a butt joint between two sections of wallboard and in a corner. The taped joints were then painted with two coats of Zinsser Bulls Eye 1-2-3[®] interior/exterior latex primer and top-coated with one coat of Behr Premium[®] interior latex flat paint.

The following observations were made (see photographs at end of this Report):

Butt Joint: First coat of joint compound—after sanding

USG Sheetrock: goes on quickly, covers well, dries with pinholes.

PYRAX[®] B Pyrophyllite: smooth, easy to work, covers quickly, dries fast.

PYRAX ABB: easy to work, applies easily, dries quickly.

Canadian Mica: pasty, hard and sticky to tool, covers well, only one coat is required because of the dark color.

North Carolina Mica: thinner consistency, hard to work with, dries with holes.

Butt Joint: Second coat of joint compound—after sanding

USG Sheetrock: covers well, edge is smooth.

PYRAX B: harder to sand at the edge of the compound than USG Sheetrock, takes a long time to get a smooth edge.

PYRAX ABB: hard to sand, edge is smooth.

Canadian Mica: hard to sand, but not as hard as **PYRAX B** or **PYRAX ABB**

North Carolina Mica: hard to sand edges, but they are smooth once sanded.

Brightness and Color of Dried and Sanded Joint Compounds

	<u>G.E. Brightness</u>	<u>L</u>	<u>a</u>	<u>b</u>	<u>ΔE</u>
USG Sheetrock [®]	75.3	88.9	-0.5	3.5	
PYRAX[®] B Pyrophyllite	75.8	89.3	-0.2	3.7	2.02
PYRAX ABB	77.0	90.0	-0.3	3.7	0.54
Canadian Mica	49.8	75.7	0.5	7.5	13.83
North Carolina Mica	73.1	88.5	-0.1	4.7	1.33

Butt Joint: Painted with two coats of primer and one of interior latex flat

USG Sheetrock: covered well.

PYRAX B: covered well.

PYRAX ABB: covered well.

Canadian Mica: covered well.

North Carolina Mica: covered well.

Brightness and Color of Area Painted Over Joint Compounds

	<u>G.E. Brightness</u>	<u>L</u>	<u>a</u>	<u>b</u>	<u>ΔE</u>
USG Sheetrock	90.3	95.1	-0.6	0.5	
PYRAX[®] B Pyrophyllite	88.0	94.3	-0.7	1.0	0.35
PYRAX ABB	89.5	94.9	-0.8	0.7	0.95
Canadian Mica	88.0	94.5	-0.3	1.4	1.12
North Carolina Mica	90.5	95.7	-0.7	1.3	1.00

Corner Joint: First coat of joint compound—after sanding

USG Sheetrock: covers well, edges are smooth, sands easily, crack entire length of seam.

PYRYAX® B Pyrophyllite: covers well, harder to sand than USG Sheetrock, edges take a longer time to smooth out.

PYRAX ABB: covers well, hard to sand, edges take a long time to smooth out.

Canadian Mica: easy to sand, edges are smooth, wide crack entire length of seam

North Carolina Mica: covers well, hard to sand the edge.

Corner Joint: Second coat of joint compound—after sanding

USG Sheetrock: sands easily, not much time required, crack filled in.

PYRAX B: hard to sand along edges, takes a longer time to sand.

PYRAX ABB: hard to sand along edges, takes a long time to sand.

Canadian Mica: covers well, sands easily.

North Carolina Mica: had to work with, hard to sand the edge.

Corner Joint: Painted with two coats of primer and one of interior latex flat

USG Sheetrock: covered well.

PYRAX B: covered well.

PYRAX ABB: covered well.

Canadian Mica: covered well.

North Carolina Mica: covered well.

The results of these tests show that **PYRAX B** and **PYRAX ABB** are both good replacements for mica in ready mix joint compound. The only inferior aspect of **PYRAX** is its more difficult sanding. The color of the painted wall was not adversely affected by the dark color of some of the joint compounds.

EXPERIMENTAL: The ready-mix joint compounds were prepared according to the formula given in the **DISCUSSION** and **RESULTS** section.

The taping tests were run as follows. For the butt joint tests, 6" x 12" sections of wallboard were fastened on a larger section of ¾" plywood using sheet rock screws. For the corner tests, 6" x 12" sections of wallboard were fastened onto ¾" plywood at a 90° angle to produce an inside corner. The joint compounds were applied over paper tape, air-dried and then sanded. This step was repeated with a second coat of joint compound. The screws were also covered with compound and sanded. One half of the test boards were coated with two coats of Zinsser Bulls Eye 1-2-3® interior/exterior latex primer followed by one coat of Behr Premium® interior latex flat white paint. The G.E. Brightness and L a b colors were measured over the unpainted and painted areas.

CONCLUSION: This study shows that **PYRAX B** and **PYRAX ABB** are good alternatives to mica as platy fillers for ready-mix joint compounds. Ready-mix joint compounds made with **PYRAX B** or **PYRAX ABB** are somewhat harder to sand than those made with mica, but the other properties are equivalent.

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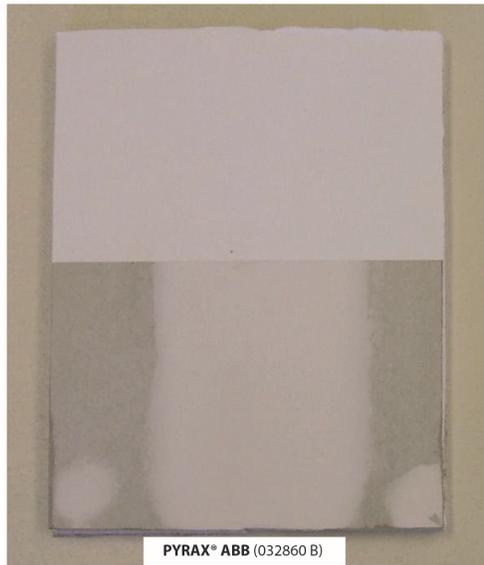
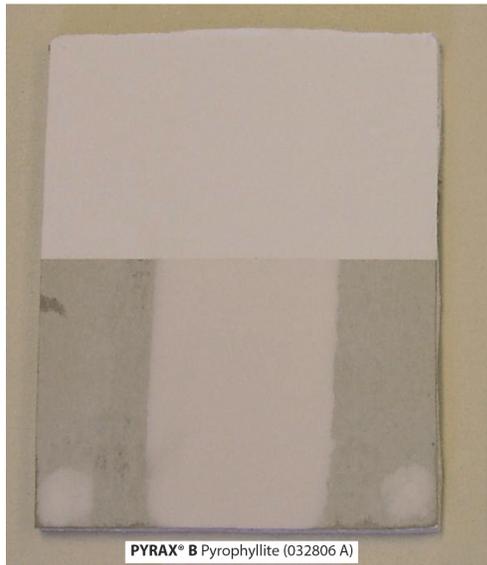
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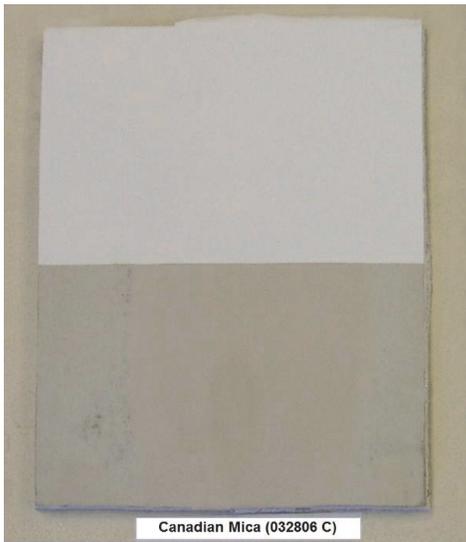
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Butt Joint Tape



Butt Joint Tape



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