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# VANDERBILT

## Vanderbilt Report

### Pyrophyllite v. Mica in Ready-Mix Joint Compounds

#### INTRODUCTION

**PYRAX® B** and **PYRAX WA** Pyrophyllites were compared to micas from Canada (Suzorite® 80SF) and North Carolina (Mineralite® 3X) as platy fillers in ready-mix joint compounds. The joint compounds with the **PYRAX** products performed better than those with the micas and equally 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** has been used to a limited extent as a replacement for mica in this application. Two micas from different sources were tested and compared to **PYRAX B** and **PYRAX WA**. US Gypsum's Sheetrock® All-Purpose Ready-Mix Joint Compound was used as a comparative control.

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

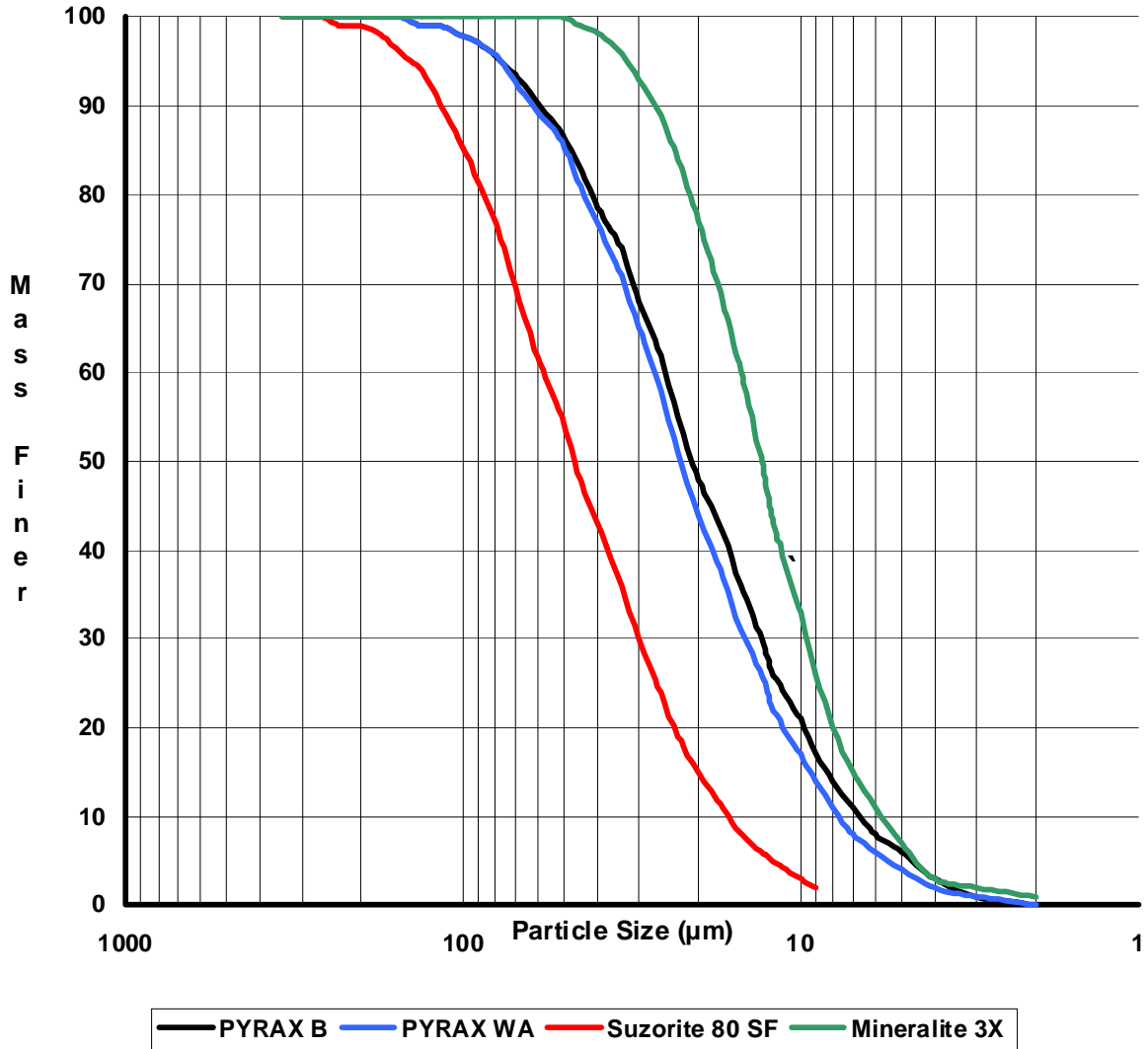
	<b>PYRAX B</b>	<b>PYRAX WA</b>	<b>Suzorite 80SF Canadian Mica</b>	<b>Mineralite 3X North Carolina Mica</b>
<b>G.E. Brightness</b>	82.5	79.5	24.0	64.7
<b>L</b>	92.4	91.4	56.5	85.0
<b>a</b>	-0.4	-0.4	1.4	0.2
<b>b</b>	2.7	3.7	10.1	6.9
<b>+ 100 mesh</b>	<0.01%	0.04%	0.05%	<0.01%
<b>+200 mesh</b>	0.46%	1.59%	11.02%	0.62%
<b>+ 325 mesh</b>	4.13%	11.46%	27.47%	3.59%
<b>Oil absorption</b>	35	28	48	24
<b>Median Particle Size</b>	20.7 µm	22.4 µm	46.8 µm	13.2 µm

\*Suzorite 80SF is a product of Zemex Industrial Minerals.  
Mineralite 3X is a product of Mineral Mining Company.

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### Particle Size Distribution Horiba LA 910



The two **PYRAX**<sup>®</sup> 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
Dioctyl phthalate (plasticizer)	10	0.6
<b>DARVAN</b> <sup>®</sup> 811 dispersing agent <sup>1</sup>	7	0.6
Dolocron <sup>®</sup> 45-12 dolomitic limestone <sup>2</sup>	705	30.2
Platy filler pyrophyllite or mica	140	6.0
Attagel <sup>®</sup> 50 attapulgitic clay <sup>3</sup>	28	1.4
Methocel <sup>®</sup> 240 A methyl cellulose <sup>4</sup>	7	0.8
Airflex <sup>®</sup> 400 VAE emulsion <sup>5</sup>	<u>85</u>	<u>9.6</u>
<b>Total</b>	1407	100.2

*Raw Material Suppliers:*

<sup>1</sup> R.T. Vanderbilt Company, Inc., Norwalk, CT

<sup>2</sup> Mineral Technologies, Bethlehem, PA

<sup>3</sup> BASF, Florham Park, NJ

<sup>4</sup> Dow Chemical Co., Midland, MI

<sup>5</sup> Air Products and Chemicals, Allentown, PA

The compounds were compared to US Gypsum Sheetrock<sup>®</sup> 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<sup>®</sup> interior/exterior latex primer and top-coated with one coat of Behr Premium<sup>®</sup> 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**: smooth, easy to work, covers quickly, dries fast

**PYRAX WA**: easy to work, applies easily, dries quickly

Suzorite<sup>®</sup> 80 SF: pasty, hard and sticky to tool, covers well, only one coat is required because of the dark color

Mineralite<sup>®</sup> 3X 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 WA**: hard to sand, edge is smooth

Suzorite 80 SF: hard to sand, but not as hard as **PYRAX B** or **PYRAX WA**

Mineralite 3X: hard to sand edges, but they are smooth when 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	
<b>PYRAX® B</b>	75.8	89.3	-0.2	3.7	2.02
<b>PYRAX WA</b>	77.0	90.0	-0.3	3.7	0.54
Suzorite® 80 SF	49.8	75.7	0.5	7.5	13.83
Mineralite® 3X	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 WA**: covered well  
 Suzorite 80 SF: covered well  
 Mineralite 3X: 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	
<b>PYRAX B</b>	88.0	94.3	-0.7	1.0	0.35
<b>PYRAX WA</b>	89.5	94.9	-0.8	0.7	0.95
Suzorite 80 SF	88.0	94.5	-0.3	1.4	1.12
Mineralite 3X	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**: covers well, harder to sand than USG Sheetrock, edges take a longer time to smooth out

**PYRAX WA**: covers well, hard to sand, edges take a long time to smooth out  
 Suzorite 80 SF: easy to sand, edges are smooth, wicrack entire length of seam  
 Mineralite 3X: 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 long time to sand  
**PYRAX WA**: hard to sand along edges, takes a long time to sand  
 Suzorite 80 SF: covers well, sands easily  
 Mineralite 3X: 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 WA**: covered well  
 Suzorite 80 SF: covered well  
 Mineralite 3X: covered well

The results of these tests show that **PYRAX® B** and **PYRAX WA** are both good replacements for mica in ready mix joint compound. The only inferior aspect of using **PYRAX** is the 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 WA** are good alternatives to mica as platy fillers for ready-mix joint compounds. Ready-mix joint compounds made with **PYRAX B** or **PYRAX WA** are somewhat harder to sand than are the mica compounds, but the other properties are equivalent.

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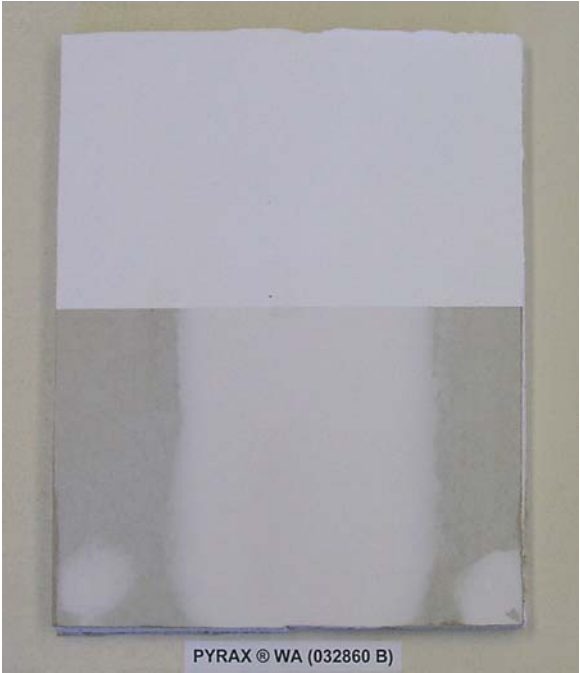
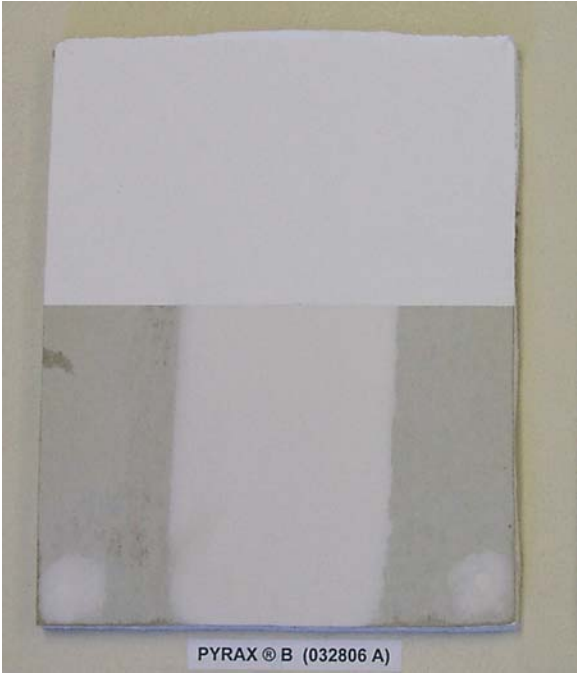
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# Butt Joint Tape



# Butt Joint Tape

