Sustainable Filler Products for the Carpet Industry

B2B Fillers
POST CONSUMER CARPET BACKING

CS Fillers
POST CONSUMER GLASS

V2V Fillers
RECYCLED VINYLs
**Introductions**

- Vitro Minerals and Polar Materials are companies that specialize in recycled materials that can be used to replace mined minerals:
  - Vitro Minerals ~> Recycled glass
  - Polar Materials ~> Recycled carpet backing
  - Polar Materials ~> Recycled vinyl

- Vitro Minerals’ *CS Glass Powders* are finer and less abrasive than other glass products.
FTC Environmental Marketing Guidelines…

• Recycled content must be diverted from a solid waste stream.
• Cannot be reclaimed back into the original product with minimal processing.
• Must disclose specifics of Post Consumer and Post Industrial content.
## Alternative Recycled Fillers…

<table>
<thead>
<tr>
<th>Post Industrial</th>
<th>Post Consumer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory glass</td>
<td>Bottle glass</td>
</tr>
<tr>
<td>Fly ash</td>
<td>Carpet backing</td>
</tr>
<tr>
<td></td>
<td>Vinyl products</td>
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<td>Paper</td>
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<td>Asphaltic materials</td>
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</tbody>
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The Facts...

- Carpet recycling focused on face fiber, approximately 50% of the weight of the carpet, and all of recycle value.
- Carpet shredders generate 35-50% waste from carpet recycling — sand and short fibers — that have high disposal costs.
- Sand is sticky due to latex adhesive content and is loaded with unusable fibers.
The Numbers…
(Varies with Carpet Weights)

- New carpet is up to 50% backing.
- Backing is about 80% filler and 20% latex.
- Therefore, the quantity of filler in carpet can be as high as 30 wt%.
- NSF 140 Platinum requires 10% post consumer content.
- Can meet NSF 140 post consumer requirement with B2B-35.
The Solution – B2B Fillers

• **Polar Materials** Patent Applied For multistage processing to produce economical and effective filler using sand generated by carpet recycling.

• Processing includes integration with new filler to overcome stickiness; either limestone or PC materials.

• **B2B Fillers** can be used by carpet mills through existing silos/mix systems. No capital required.
Sustainable Filler Production Sites

- **Glass products:**
  - Jackson, TN
  - Spartanburg, SC
  - Kennesaw, Ga

- **B2B Products:**
  - Dalton, GA
  - California – 2010

- **V2V Products**
  - Wellsville, OH

- **Dalton capacity 100,000 tons/yr**
  - JV with Franklin Industrial Minerals.
Benefits of B2B...

- Achieves NSF 140 recycle content goals in the most cost effective and environmentally responsible fashion.
- Most cost-effective way to achieve increased old carpet re-use.
- Greatly improves economics of carpet recycling.
- Immediately reduces amount of carpet waste being landfilled.

A sustainable solution...
Benefits of B2B...

• B2B fillers are themselves recyclable — supports effective product end-of-life management.

• No additional capital investment required for carpet mills. B2B runs through current filler process.

• Adjustable PC content allows other PC carpet additives.

• Plants in Dalton and California will utilize backing fillers sourced locally.

A sustainable solution...
Benefits of B2B and Fine Particle Glass…

- Low abrasion

<table>
<thead>
<tr>
<th>Sample</th>
<th>Wt Loss (g)*</th>
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<tbody>
<tr>
<td>B2B-50</td>
<td>0.025</td>
</tr>
<tr>
<td>Fine glass (CS-325)</td>
<td>0.052</td>
</tr>
<tr>
<td>Fly ash-1</td>
<td>0.113</td>
</tr>
<tr>
<td>Coarse glass (GF-220)</td>
<td>0.130</td>
</tr>
<tr>
<td>Fly ash-2</td>
<td>0.156</td>
</tr>
</tbody>
</table>

* Taber Multi-media Abrader Model 5500
Tests conducted by Taber Industries
Using B2B Products...

- Viscosity
- Biocides
- Fiber content
- Processability
Use of Fine Particle Glass...

- Post consumer CS Glass is processed to a clean state.
- Ground to finer than 325 mesh to avoid abrasion.
- Surface treated to enhance properties.
- Usable in PVC plastisols, polyethylene backing, hot melt adhesives, and flooring adhesives.
Carpet Recycling Issues…

• Carpet recyclers need stable and growing outlets for fibers to recycle more carpet.

• 40% of intake for recycling can be diverted to B2B production.

• Reusing the backing component greatly improves the economics of carpet recycling.

• Landfill bans and end-of-life disposal responsibility will change the landscape.
CONSUMER

RECYCLING NETWORK

Shredders
- Fiber Sales
- Pad Mfg

Harvest Face Fiber
- Carcass
- Fiber Sales

Chemical Recovery or PVC Recovery
- New fiber or backings

Shred

B2B Sand Processing

2-billion lbs Limestone Filler

CARPET MILLS

Landfill
For Rapid Expansion of Landfill Diversion...

• Adopt B2B to improve economics of carpet recycling network.
• Encourage recycling by including a recycling surcharge.
• Place added emphasis on coal substitution for Waste to Energy.
In Appreciation…

- Latex companies for reformulating to accommodate B2B Fillers.
- Interface / Bentley Price Street first mover status.
- Mohawk Carpet for cross-licencing IP.
- Shaw for leadership in a sustainable carpet industry.
- CARE / CRI for focusing on solutions.
B2B Recycled Carpet Fillers
CS Recycled Glass Fillers
V2V Recycled Vinyl

Sustainable Filler Products for the Carpet Industry

Dalton, GA • Victorville, CA • Jackson, TN • Wellsville, OH