Sustainable Filler Products for the Carpet Industry

C2C Fillers
POST CONSUMER CARPET BACKING

CS Fillers
POST CONSUMER GLASS
Introductions

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

- Vitro Minerals’ *CS Glass Powders* are finer and less abrasive than other glass products.
**Broadloom Carpet Composition**

- 1.8B square yards sold in 2002
- average weight = 4.4 lb/square yard

**FACE FIBER**
- Nylon 6.6
- Nylon 6
- Polypropylene
- Polyester

**POLYPROPYLENE BACKING**
- 50%

**LATEX + CaCO₃** (calcium carbonate)
- 38%

Polyurethane
PVC
Polyethylene
EVA
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 almost 40% 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 C2C-35.
The Solution – C2C 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 glass.**
- **Process includes sterilization of recycled carpet portion.**
- **C2C Fillers can be used by carpet mills through existing silos/mix systems. No capital required.**
The Solution – C2C Fillers

- C2C fillers have been extensively tested in several latexes — mill trials successful.

<table>
<thead>
<tr>
<th>GRADE</th>
<th>MIX MINERAL</th>
<th>PC CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2C 200</td>
<td>PC Glass</td>
<td>100%</td>
</tr>
<tr>
<td>C2C 50</td>
<td>Limestone</td>
<td>50%</td>
</tr>
<tr>
<td>C2C 35</td>
<td>Limestone</td>
<td>35%</td>
</tr>
<tr>
<td>C2C 20</td>
<td>Limestone</td>
<td>20%</td>
</tr>
</tbody>
</table>
C2C Production

- Currently two production plants: Jackson, TN; Spartanburg, SC
- Production:
  - Dalton, GA – summer ’09
  - California – fall ‘09.
- Dalton capacity 100,000 tons/yr
  JV with Franklin Industrial Minerals.
Benefits of C2C…

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

A sustainable solution…
Benefits of C2C...

• C2C fillers are themselves recyclable — supports effective product end-of-life management.

• No additional capital investment required for carpet mills. C2C 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...
Carpet Recycling Issues…

• Carpet recyclers need stable outlets for fibers in order to generate our sand feedstock.
• WTE should be a default destination for fiber when other fiber markets fluctuate.
• Polar’s technology allows for large scale re-use of 35% of carpet weight recycled.
• Sand disposal costs disappear.
• Carpet that has nylon fiber harvested is especially rich in sand feedstock if the remaining carcass is shredded.
C2C Recycled Carpet Fillers
CS Recycled Glass Fillers

Sustainable Filler Products for the Carpet Industry

THESE PRODUCTS ARE AVAILABLE TODAY!