Efficiency meets fast fusing

Eastman Effusion™ plasticizer for flooring
Eastman Effusion™ plasticizer is a unique, fast-fusing solution that enables increased production line speeds and lower processing temperatures, allowing you to reduce your energy costs. Ideal for resilient sheet flooring, luxury vinyl tile, vinyl composite tile, and PVC-backed carpet applications, Effusion is both highly efficient and effective at lowering fusion temperatures. And it outperforms traditional “fast fusers,” such as butylbenzyl phthalate (BBP), making Effusion a viable non-phthalate alternative . . . and possibly the only plasticizer you’ll need in applications where fusion speed is paramount. When compared to traditional fast-fusing plasticizers, Effusion provides similar low-temperature processing of PVC, yet it is more efficient at lowering hardness (Table 1).

### Table 1

<table>
<thead>
<tr>
<th>Property</th>
<th>Eastman Effusion 36 phr</th>
<th>BBP 40 phr</th>
<th>Benzoate plasticizer 40 phr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.5 phr TXIB*</td>
<td>7.5 phr TXIB</td>
<td>7.5 phr TXIB*</td>
</tr>
<tr>
<td>Fusion temperature, °C</td>
<td>103</td>
<td>103</td>
<td>103</td>
</tr>
<tr>
<td>Tensile strength, MPa</td>
<td>16.2</td>
<td>16.5</td>
<td>16.8</td>
</tr>
<tr>
<td>Elongation at break, %</td>
<td>252</td>
<td>244</td>
<td>260</td>
</tr>
<tr>
<td>Modulus at 100% elongation, MPa</td>
<td>9.0</td>
<td>9.4</td>
<td>9.1</td>
</tr>
<tr>
<td>Shore A hardness</td>
<td>72</td>
<td>72</td>
<td>73</td>
</tr>
<tr>
<td>Tear resistance, kN/m</td>
<td>65</td>
<td>67</td>
<td>63</td>
</tr>
<tr>
<td>Tear energy, N·mm</td>
<td>2597</td>
<td>2529</td>
<td>2674</td>
</tr>
<tr>
<td>Brittleness temperature, °C</td>
<td>-14</td>
<td>-6</td>
<td>-6</td>
</tr>
</tbody>
</table>

*Eastman TXIB™ formulation additive

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### Applications

- Resilient sheet flooring
- Luxury vinyl tile
- Vinyl composite tile
- PVC-backed carpet applications
Blend to optimize

Effusion can be blended with other plasticizers, such as Eastman 168™ non-phthalate plasticizer, allowing flooring manufacturers to customize and optimize formulations to specific processing needs. Plastisols made by blending these two plasticizers, for example, exhibit lower initial and aged viscosities as shown in Figure 1, while imparting similar mechanical properties when compared to other fast fusers (Table 2).

Blending plasticizers can also give brand owners more options when trying to target a replacement of traditional phthalate plasticizers. For instance, specific blends of Eastman 168 and Effusion can give equivalent processing and performance properties to phthalate plasticizers as shown in Figures 2 and 3.

**Table 2**

<table>
<thead>
<tr>
<th>Property</th>
<th>Eastman 168/Effusion 70/30 at 60 phr</th>
<th>Eastman 168/BBP 70/30 at 60 phr</th>
<th>Eastman 168/benzoate 70/30 at 60 phr</th>
<th>Eastman 168 at 60 phr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusion temperature, °C</td>
<td>128</td>
<td>131</td>
<td>134</td>
<td>148</td>
</tr>
<tr>
<td>Tensile strength, MPa</td>
<td>17.4</td>
<td>17.2</td>
<td>17.5</td>
<td>17.9</td>
</tr>
<tr>
<td>Elongation at break, %</td>
<td>299</td>
<td>304</td>
<td>298</td>
<td>321</td>
</tr>
<tr>
<td>Modulus at 100% elongation, MPa</td>
<td>9.4</td>
<td>8.5</td>
<td>8.6</td>
<td>9.1</td>
</tr>
<tr>
<td>Shore A hardness</td>
<td>67</td>
<td>67</td>
<td>67</td>
<td>71</td>
</tr>
<tr>
<td>Tear resistance, kN/m</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>64</td>
</tr>
<tr>
<td>Tear energy, N*mm</td>
<td>1191</td>
<td>1250</td>
<td>1123</td>
<td>1136</td>
</tr>
<tr>
<td>Britleness temperature, °C</td>
<td>−45</td>
<td>−36</td>
<td>−39</td>
<td>−47</td>
</tr>
</tbody>
</table>
Your next step: contact us

Whether your formulation requires a fast-fusing plasticizer to achieve extremely low fusion temperatures or you’re looking to blend a fast fuser with a general-purpose plasticizer, Eastman Effusion is your non-phthalate solution. And when you switch, an Eastman technical specialist will be by your side to help make your transition seamless.

To find out more about Eastman Effusion as a fast-fusing non-phthalate plasticizer for flooring, call your Eastman representative today or visit www.EastmanPlasticizers.com.

Performance benefits

- Excellent solvating ability in PVC
- Lower temperature processing of PVC
- Faster line speeds
- Wider processing windows
- Lower density when compared to other plasticizers in the market, which can be a benefit when selling by volume

- Excellent viscosity stability when formulated with general-purpose plasticizers, such as Eastman 168
- Improved in-process heat stability vs. BBP
- Greater efficiency at lowering hardness
  - Reduction of plasticizer usage in formulation
  - Better low-temperature flexibility

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