EVO Therm
Warm Mix Asphalt Technology

Asphalt Innovations™
A MeadWestvaco Business
Evotherm
What is it?

• Chemical additive package
• Optimized to deliver
  - Mixing
  - Coating
  - Workability
  - Compaction
  - Adhesion
Evotherm Emulsion
How does it work?

- **Evotherm Emulsion Technology (ET)**
  - High-residue asphalt emulsion
  - Delivered at 0.5% by emulsion weight
Evootherm DAT
How does it work?

• Evootherm Dispersed Asphalt Technology (DAT)
  - Same chemistry as Evootherm ET
  - Chemical concentrate directly injected into asphalt line at plant
  - DAT concentrate delivered at ~5% by asphalt weight
Evotherm Composition

Evotherm ET
- 5% Evotherm Solution
- 5% Asphalt Cement

Evotherm DAT
- 3% Evotherm Solution
- 2% Asphalt Cement
Evotherm
How does it work?

- **Effective temperature range**
  - Mix temperature
    - 250-170°F
  - Compaction temperature
    - 235-160°F
Typical Application Temperature

~100°F less than Hot Mix
Where are we now?

- **45 Projects in 2007**;
  - 70+ projects to date
- **>80,000 tons in 2007**;
  - 100,000+ tons to date
- **Evootherm paved in 17 states**;
  - 5 Canadian provinces
  - France, Spain, South Africa, Mexico, & China
Recent Evotherm Developments

- New Chemistries
  - 6 different options available
- Dosage rate optimization
  - Original dosage rate - 11oz/Ton
  - Current dosage rate - 5 oz/Ton
- Water-free Evotherm
- Longer binder life
Binder Hardening

- Virgin AC
- Recovered AC
- 2 years

Graph showing the comparison between Hot Mix and Evotherm in terms of Pen values for Virgin AC, Recovered AC, and after 2 years.
<table>
<thead>
<tr>
<th>1”</th>
<th>2”</th>
<th>2”</th>
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<tbody>
<tr>
<td>HMA Control PG 67-22</td>
<td>Evotherm PG 76-22</td>
<td>Evotherm PG 67-22</td>
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<tr>
<td>9.5 mm NMAS</td>
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<tr>
<td>N1</td>
<td>N2</td>
<td>N1</td>
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- **600,000 ESALs**
- **E9**
- **$N_{design} = 80$ for all mixes**
### NCAT Test Track

**1”**
- HMA Control PG 67-22
- Evotherm PG 67-22

**2”**
- 19.0 mm NMAS w/ Evotherm PG 67-22

**2”**
- 19.0 mm NMAS w/ Evotherm PG 67-22

- 9.5 mm NMAS
- 3.9 mm
- 3.1 mm

- 5,600,000 E9 ESALs
- \( N_{design} = 80 \) for all mixes