Crack Sealant Performance Grade Specification

Midwest Pavement Preservation Meeting
October 27, 2010

Your Destination...Our Priority
Objectives

- CS-PG Spec Background
- Provisional AASHTO Standards
- TPF-5(225) Phase II
- Mn/DOT/U Illinois Testing
- NTPEP Crack Sealant Test Sites
CS-PG Development

- Crack Sealant Consortium
- DOT/Provinces
- 6 tests
- Test Parameters
AASHTO Provisional Standards

- Apparent Viscosity
- Accelerated Aging
- Low Temp-BBR
- Tensile Strength-DTT
- Adhesion Test-DTT
- Blister Test
AASHTO Provisional Standards

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- Low Temp-BBBR
- Tensile Strength-DTT
- Adhesion Test-DTT
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Figure 31 Process for the Selection of Bituminous-Based Sealants
<table>
<thead>
<tr>
<th>Crack Sealant Performance Grade</th>
<th>SG 46</th>
<th>SG 52</th>
<th>SG 58</th>
<th>SG 64</th>
<th>SG 70</th>
<th>SG 76</th>
<th>SG 82</th>
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<td>Maximum Viscosity (Pa.s)</td>
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<td>Dynamic Shear, SC-4</td>
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<td>52</td>
<td>58</td>
<td>64</td>
<td>70</td>
<td>76</td>
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<td>Minimum Flow Coeff. (kPa.s)</td>
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<td>Minimum Shear Thinning</td>
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<td>Maximum Stiffness (MPa)</td>
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<td>Minimum Avg. Creep Rate</td>
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<td>Minimum Extendibility (%)</td>
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<td>Minimum Load (N)</td>
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Note: Crack sealant surface energy is provided by manufacturer.
TPF 5 (225) Phase II

- November 9-Kick-Off
- Lab Validation
  - Round Robin Testing-P&B
  - Training
- Field Validation
  - 8 test sections in the 4 environmental regions
Phase II

- Test Site Monitoring
  - Field rating-5 times over 4 yrs
  - Collect samples for testing
  - Crack Movement- Time Temp superposition

- Fine Tune Parameters
- Quantify Cost Effectiveness
# 2005 NTPEP Crack Sealant Performance Testing

<table>
<thead>
<tr>
<th>ID</th>
<th>Viscosity</th>
<th>Flow Coefficient</th>
<th>Shear Thinning</th>
<th>S</th>
<th>Creep Rate</th>
<th>Expendability</th>
<th>Adhesion</th>
<th>Adhesion Failure</th>
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<td>A</td>
<td>2.93</td>
<td>4867</td>
<td>0.88</td>
<td>5.2</td>
<td>0.436</td>
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<td>B</td>
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<td>11346</td>
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<td>0.450</td>
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<td>C</td>
<td>0.94</td>
<td>4326</td>
<td>0.86</td>
<td>6.8</td>
<td>0.380</td>
<td>&gt;85 NR</td>
<td>8.8%</td>
<td>24.3%</td>
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<td>2.37</td>
<td>5696</td>
<td>0.77</td>
<td><strong>53.4</strong></td>
<td>0.380</td>
<td>&gt;85 NR</td>
<td>23.8%</td>
<td>46.4%</td>
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<tr>
<td>E</td>
<td>1.53</td>
<td><strong>3762</strong></td>
<td>0.86</td>
<td>6.4</td>
<td>0.396</td>
<td>NR</td>
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<td>F</td>
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<td>5632</td>
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<td><strong>30.8</strong></td>
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<td>G</td>
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<td>H</td>
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<td><strong>41.6</strong></td>
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<td>CS-PG Spec</td>
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<td>4000+</td>
<td>0.7+</td>
<td>25-</td>
<td>0.31+</td>
<td>By Spec</td>
<td>P_max &gt;50 N</td>
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</table>
NTPEP Crack Sealant Test Decks

- **North Carolina**
  - 2009 CS/JS
  - 2010 JS

- **Vermont**
  - 2010 CS

- **Minnesota**
  - 2003 JS
  - 2005 CS
Importance of Evaluating Sealants

Comparison of Measured vs Visual Seal Failure

Test cell

Failure, %

NTPEP Measured
Visual Estimation