Crack Sealant Performance Grade Specification

Midwest Pavement Preservation Meeting
October 27,2010

Your Destination...Our Priority

Objectives

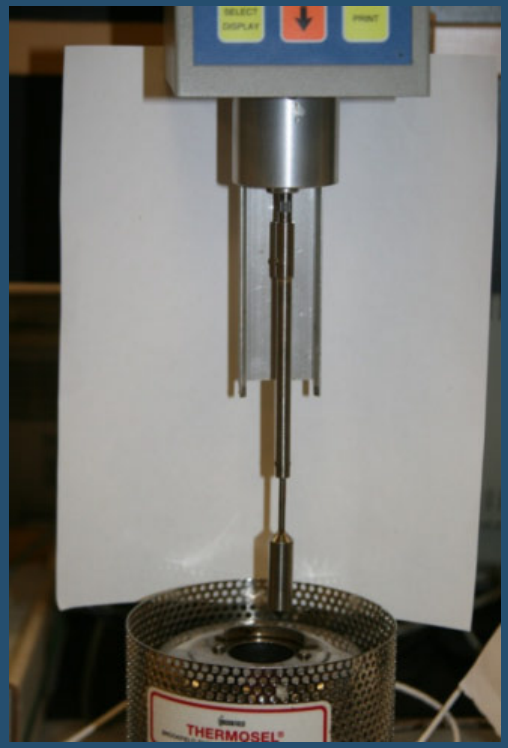
- CS-PG Spec Background
- Provisional AASHTO Standards
- TPF-5(225) Phase II
- Mn/DOT/U Illinois Testing
- NTPEP Crack Sealant Test Sites

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



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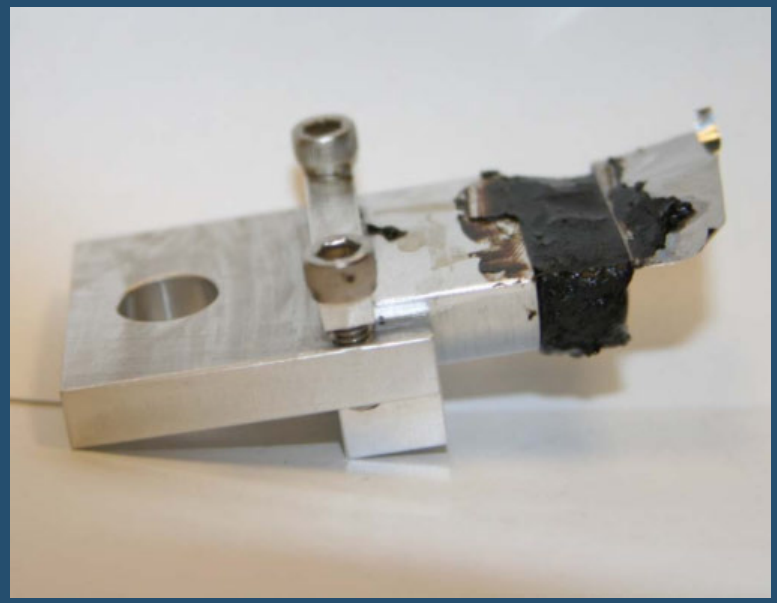

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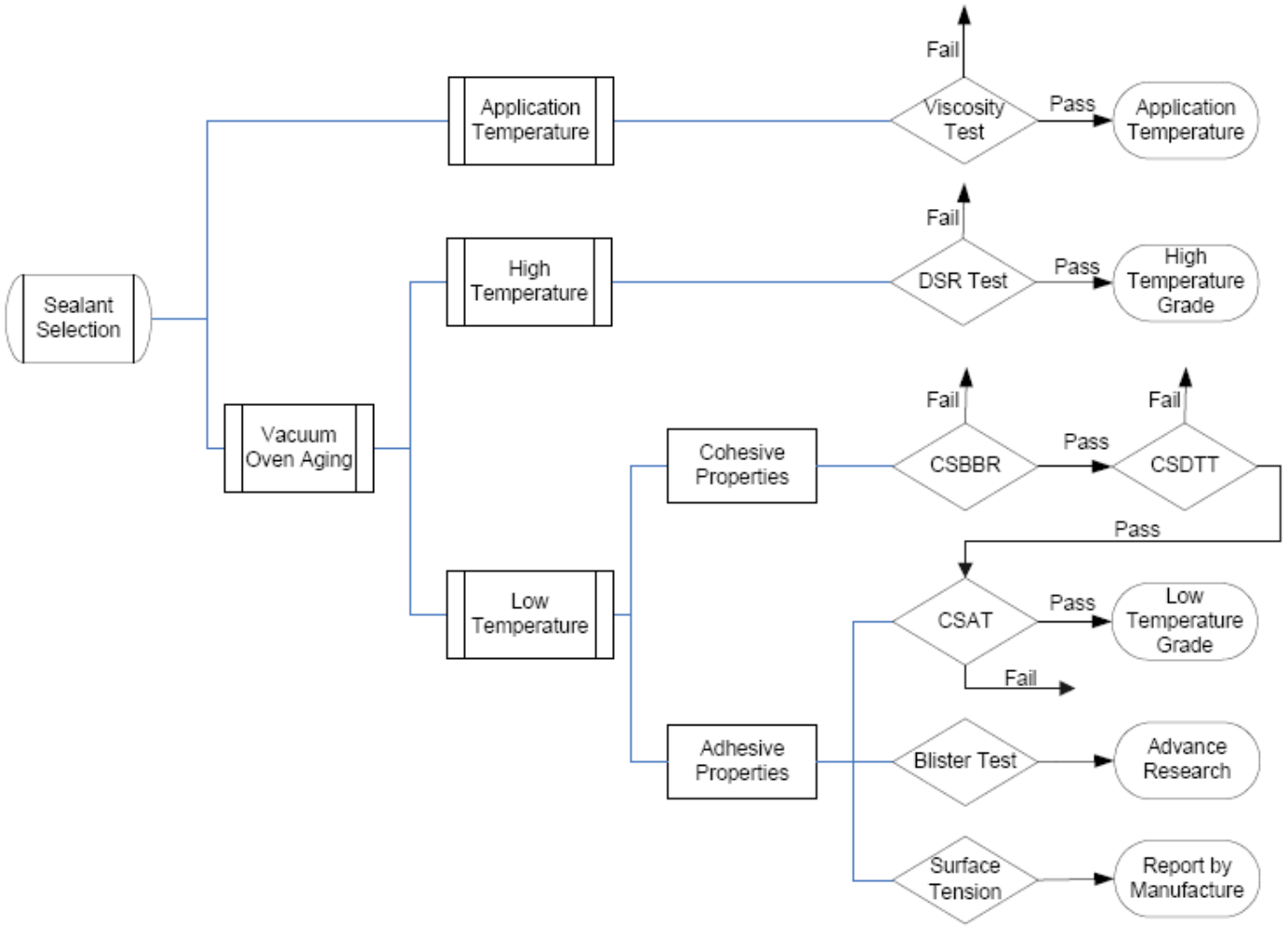


Figure 31 Process for the Selection of Bituminous-Based Sealants

Table 5 Crack Sealant Performance Grade

Crack Sealant Performance Grade	SG 46	SG 52	SG 58	SG 64	SG 70	SG 76	SG 82
	-46 -40 -34 -28 -22 -16 -10	-46 -40 -34 -28 -22 -16 -10	-46 -40 -34 -28 -22 -16 -10	-46 -40 -34 -28 -22 -16 -10	-46 -40 -34 -28 -22 -16 -10	-46 -40 -34 -28 -22 -16 -10	-46 -40 -34 -28 -22 -16 -10
Apparent Viscosity, SC-2	Installation Temperature						
Maximum Viscosity (Pa.s)	3.5						
Minimum Viscosity (Pa.s)	1						
Vacuum Oven Residue (SC-3)							
Dynamic Shear, SC-4	46	52	58	64	70	76	82
Minimum Flow Coeff. (kPa.s)	4						
Minimum Shear Thinning	0.7						
Crack Sealant BBR, SC-5	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4
Maximum Stiffness (MPa)	25						
Minimum Avg. Creep Rate	0.31						
Crack Sealant DTT, SC-6	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4
Minimum Extendibility (%)	85 85 70 55 40 25 10	85 85 70 55 40 25 10	85 85 70 55 40 25 10	85 85 70 55 40 25 10	85 85 70 55 40 25 10	85 85 70 55 40 25 10	85 85 70 55 40 25 10
Crack Sealant AT, SC-7	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4	-40 -34 -28 -22 -16 -10 -4
Minimum Load (N)	50						

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

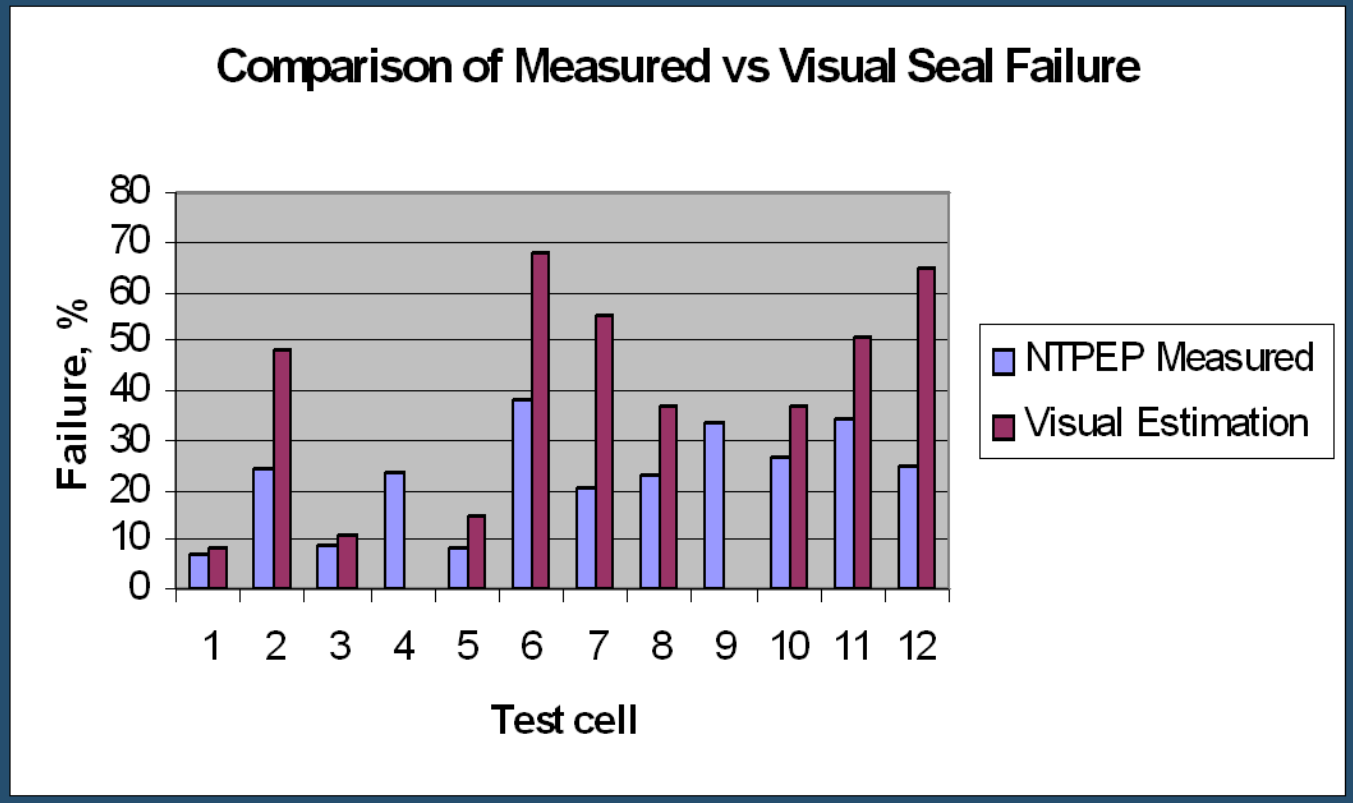
2005 NTPEP Crack Sealant Performance Testing

		Tracking (High Temp)		BBR (Low Temp)		DTT (Low Temp)	DTT Adhesion	Adhesion Failure	
ID	Viscosity	Flow Coefficient	Shear Thinning	S	Creep Rate	Expendability		2008	2009
A	2.93	4867	0.88	5.2	0.436	>90	NR	**7.2%**	**20.0%**
B	3.19	11346	0.88	7.2	0.450	>85	NR	24.3%	44.0%
C	0.94	4326	0.86	6.8	0.380	>85	NR	**8.8%**	**24.3%**
D	2.37	5696	0.77	**53.4**	0.380	>85	NR	23.8%	46.4%
E	1.53	**3762**	0.86	6.4	0.396		NR	**8.5%**	**18.2%**
F	2.20	5632	0.82	**30.8**	0.439	>85	NR	38.0%	50.4%
G	2.35	**3284**	0.83	**36.9**	0.310	>85	NR	20.5%	43.2%
H	2.82	**2765**	0.88	7.6	0.343		NR	22.8%	39.6%
I	2.88	9726	0.94	**41.6**	0.347	**15-37**	NR	33.6%	50.4%
J	**3.88**	20942	0.91	15.6	0.328	>85	NR	26.6%	41.7%
K	2.35	7387	0.92	**44.1**	0.326	**2.47**	NR	34.6%	43.8%
L	2.02	9446	0.82	**56.3**	0.327	**2.36**	NR	27.8%	31.8%
CS-PG Spec	**1-3.5**	**4000+**	**0.7+**	**25-**	**0.31+**	**By Spec**	**P_{max} >50 N**	**10%**	**25%**

NTPEP Crack Sealant Test Decks

- North Carolina
  - 2009 CS/JS
  - 2010 JS
- Vermont
  - 2010 CS
- Minnesota
  - 2003 JS
  - 2005 CS

Importance of Evaluating Sealants



Questions?

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