Mass Loss Task Group
Update

Andrew Hanz
MTE Services Inc.
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Membership and Progress

• Members
  – Mike Anderson
  – Andrew Cascione
  – Codrin Daranga
  – Stacey Glidden
  – Brett Lambden
  – Hassan Tabatabaee

Activities

Goal

Improve Understanding of Mass Loss Parameter

- Reasons specification was included and origins of 1.0% maximum limit.
- Survey of mass loss for current PG XX-34 grades and softer. Both unmodified and modified.
- Evaluation of test procedure. Including variability and effect of test temperature.
- TGA analysis: Effect of temperature ramp rate and volatile loss vs. mass loss.
Survey of Mass Loss Parameter

Questions

• Q1: Is mass loss a concern for your products?

• Q2: Please list the unmodified and modified grades supplied with a low temperature grade of -34 or softer.

• Q3: Would you be willing to provide mass loss and certification data for the grades listed in question 1?

• Q4a: Would you be willing to submit samples of unmodified grades for testing?

• Q4b: Would you be willing to submit samples of modified grades for testing? Samples will be blinded by Asphalt Institute and shipped to MTE.

Tests include: RTFO mass loss at different temperatures, TGA, mixing and compaction temperature evaluation, and rheological evaluation after extended aging.
Survey of Mass Loss Parameter

Administration

• Web-based Survey will be administered.
• Testing details provided in survey.
• Any samples collected will be administered by Asphalt Institute to maintain anonymity of suppliers.
• Materials used in study will be determined based on survey response.
Evaluation of Test Procedure

1. Effect of Test Temperature
   b. More data at 163±5°C needed.

2. Single Lab Variability
   a. Preliminary data (MTE) was more precise than precision limits in T240. Reported in September 2017.

3. Multi-lab Variability
   b. CSBG 2018 Q1 Sample. PG 58H-34. Analysis Pending
# WCTG Results

**PG 58V-34**

<table>
<thead>
<tr>
<th>Binder</th>
<th>N</th>
<th>Mean</th>
<th>SE Mean</th>
<th>StDev</th>
<th>Min</th>
<th>Q1</th>
<th>Med</th>
<th>Q3</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG 58H-34 (WI)</td>
<td>34</td>
<td>-0.833</td>
<td>0.0276</td>
<td>0.161</td>
<td>-1.32</td>
<td>-0.895</td>
<td>-0.853</td>
<td>-0.751</td>
<td>-0.300</td>
</tr>
</tbody>
</table>

**COV = 19.3%**

**Current Tolerance in CSBG = 20%**
WCTG Results
PG 58V-34 vs. Other Asphalts

Boxplot of Mass Loss

Binder Mass Loss

-0.8
-0.6
-0.4
-0.2
0.0

PG 58H-34 (WI) PG 64-28 CO PG 64-28 NV Binder PG 64-28M PG 76-22M
Further Analysis

TGA

Tested in oxygen environment
Discussion

• Mass loss parameter measurement requires review.
  – Sensitivity to Test Conditions: Temperature, temperature ramp rate.
  – Variability depends on magnitude of measurement.
  – 20% tolerance implemented by CSBG seems appropriate.

• Testing in oxidative and inert environment to quantify volatile loss (Planche, Eurobitume 1989)

• Preliminary discussion indicates mass loss is not an issue for most suppliers within the task group.
  – One supplier communicated issues that started last fall.
ETG Feedback

• Comments on Workplan
• Approval to send survey.
• Overlap with NCHRP efforts?

References:
Thank You

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