AASHTO NTPEP Thermoplastic Pipe Quarterly Conference Call

MINUTES

August 11, 2015

Tuesday 1PM – 3PM (EST)

Attendees:

John Schuler (VADOT); Sarc. (Liaison AASHTO); Brian Korschgen (AASHTO); Joel Sprague (TRI); Mario Paredes (TRI); Kenny Anderson (Indiana); Kean Ashurst (KYDOT); Mike Aldridge (ILDOT); Nikita Reed (FLDOT); David Meggers (KSDOT); Scott Hughes (ILDOT); Matt Mueller (ILDOT); Temple Short (SCDOT); Merrill Zwanka (SCDOT); Terry Mc Elfresh (ADS); Greg Baryluk (ADS); Brian Chestnut (Lane); Brad Young (GADOT); Dan Currence (PPI); Doug Bower (Contech); Ed Lucas (NYDOT)

All Pipe:

1. **Status of Unannounced Audits** - the following item will be implemented into the NTPEP Audit Programs, beginning in January 2016: *Follow-up on noted deficiencies found during on-site audit. A DOT representative may conduct an unannounced surveillance audit if a deficiency is found within a NTPEP compliant facility. – Any issues found by DOT should be reported to the auditor. Make sure it is understood that DOT can audit at any time not just after deficiency. Ed Lucas, concerned the DOT becomes a rep of NTPEP. Statement will be reworded and added to SP01 for ballot.*

2. **Record Testing and Production Testing** - Record testing is any testing the manufacturer does that back their Certificate values. Production testing is testing completed in production area to make sure a consistent product is being produced.

Tests that are done at the end of the production line are not conditioned according to the standards and cannot be considered as “record” test values if there is a conditioning requirement. Auditors need clarification on which tests count as record testing to meet the frequencies set out in the work plan. “The manufacturer needs to look at their processes and provide this information back to the TC.” “Recommend breaking the tests down on the frequency table: lab tests vs. production tests.” – *If manufacturers cannot meet frequency for work plan, reduce, so production testing is not used as standard test data. Production data has some value. Check tests being run, determine how manufacturers are looking at the tests. Joel and Sarc. to develop table showing condition requirements for each test (according to specs). This will be distributed back to the Committee and Industry for comments.*

3. **Stiffness/Flattening tests on perforated pipe vs. non-perforated** – related to testing of pipe for compliance to S/F requirement. Do both perforated and non-perforated need testing? –
Perforations made after production of pipe does pipe need to be tested only after perforations. Comparison between perf and non-perf indicates no significant difference and suggest auditor note how the testing is being performed (on perforated, non-perforated, or combination of samples). What is being done at a plant will be included in the audit report.

4. NTPEP Comparison Sample Testing (when failures are found) – NTPEP will work with lab to verify failures. Resampling will take place. All results will be posted in DataMine. – This will be how it goes in 2016.

HDPE Pipe:

1. Work Plan Changes -
   
   - Carbon Black: for Types S & SP - take 2 test specimens (1-from liner and 1-from pipe wall). Both must meet. Report the average. For Type C – take two and average. Plants can alternate location with shifts (Specimens are taken from inner wall then specimens are taken from outer wall). Split samples for NTPEP compliance will be taken from both inner wall and outer wall. – Will be slightly reworded to capture the essence of what is stated. This goes in the Work Plan.

   - NCLS Testing: Always test liner. No single stream resin NCLS test. What about the blend? What about PPI blends? Need final answers to both. Has PPI will provided data to indicate NCLS test is not needed for PPI approved resins? - Split/Comparison Reports from the audit will show both NCLS results (plant and Lab) for pipe liner and resin blends.

   - M294 Stiffness/Flattening test: Training video completed for the Auditors and will be reviewed shortly. Dan will work with Industry on getting the word out. – Training to begin 8-14-2015 for Auditors.

   Any changes will be made in the work plan prior to being balloted this fall.

2. NTPEP Tested Samples - Need for listing the method used in the determination of density on the report? – Will show which method on the Split/Comparison Reports from the audit.

PPP Pipe:

1. Carbon Burn for POLY - NTPEP (Auditors) wants to remove the carbon burn from split sample testing as it isn't applicable to gray PPP. We may add a new test if desired. As far as testing during the shift, if the manufacturer has somehow correlated the carbon burn to a desired amount of UV inhibitor, then what they are doing is fine for production purposes. – This will be removed from Work Plan and Audit. May have to get SOM to modify M 330.

2. UV determination for POLY Pipe – M330 states:
   
   6.2. Color and Ultraviolet Stabilization for Pipe and Fittings—The pipe shall be colored or black. Black polypropylene compounds shall have between 2.0 and 4.0 percent carbon black.
Colored polypropylene compounds shall be protected from Ultraviolet (UV) degradation with UV stabilizers. How to determine this? Or do we even need to? – OIT frequency (verify it is being done quarterly) and “How UV Stabilizers are monitored” will be noted in the audit report. May have to get SOM to modify M 330.

PVC:

1. **Heat Reversion** – Discuss test and interpretations - *Not a lot of information out there.* Determine contaminants, level of mold stress in material. Very subjective test.
2. **Acetone Immersion** - Discuss test and interpretations  - *Bonding strength between inner and outer pipe walls.* No significant information on alternative test. No references to corrugated PVC. Evaluate how to handle work plan with respect to these tests, Ask SOM to address the situation in M 304.

Both tests will be removed from the Split/Comparison Reports from the audit, but will be witnessed and verified during the audit.

Open Discussion:

1. Define “Annual” for Work Plan, Audits, SP01, etc. - *Strike the word “annual” and define as necessary in the pertinent documents.*
2. Steel Reinforced Pipe - *Need to finish clean work plan for ballot. Temple Short (SCDOT) is the Chair for this group.*
3. Next Call to finalize draft of Work Plan changes: **Tuesday - OCTOBER 6th**
UV for POLY Pipe:
Here's what we know. The most COMMON UV inhibitor is hindered amine light stabilizers (HALS). Instead of exotic, this is the journeyman's product for use for UV protection, the patent is over and the cost is low. Indeed, this test is REQUIRED as a before and after UV exposure evaluation in the geomembrane specifications. IMPORTANTLY, the OIT test does NOT see HALS, which are activated at a lower temperature. In other words, you NEED HP-OIT, and not OIT, in order to see and measure the indexed response from HALS.

Acetone Immersion/Heat Reversion for PVC Pipe:

We did a little digging regarding ASTM F1057 Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique and ASTM D2152, Standard Test Method for the Degree of Fusion for Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion. Below is a brief narrative for your review. Let me know if you have any questions.

Both heat reversion and acetone immersion tests have been in use since at least 1967 to test the quality of PVC pipes (Citation 1). The literature references both tests, but there is not any information on the actual origin of either test. NCHRP’s Updated Test and Design Methods for Thermoplastic Drainage Pipe (Citation 2) states that heat reversion tests are more demanding of extrusion quality than the acetone immersion test, and heat reversion should be incorporated to augment the acetone immersion test. Shah describes the mechanics of heat reversion, “All plastics manufacturing process introduce some degree of stress in the finished product. The stresses in molded parts are commonly referred to as molded-in (residual) stresses. By reversing the process, by reheating the molded or extruded product, the presence of stress can be determined.” (Citation 3)

Haworth and Stephenson refer to the “phenomenon of heat reversion,” then go on to describe two different test methods for reversion. The standard technique involving exposure of a PVC pipe to high temperatures in an oven for a specific amount of time followed by measurement of deformation is discussed, but thermomechanical analysis (TMA) is also suggested. According to Haworth and Stephenson, “thermomechanical analysis can be applied to uPVC profile specimens to analyze continuous changes in dimensions with temperature in response to a preselected heating rate.” Two advantages of using TMA over the standard technique are the ability to measure shrinkage over a continuous temperature range, as well as being able to receive a more complete understanding of the heat reversion effect. (Citation 4)

There is even less literature regarding acetone immersion tests. An article in Limitations of Test Methods for Plastics, published by ASTM, concludes that “the acetone-immersion test is beset with difficulties . . . [and] . . . it seems appropriate that this test be relegated solely to forensic and experimental use” for multiple reasons. This article puts forth four criteria to categorize a quality test as meaningful, and the acetone immersion test fails to meet even one of them. (1) Acetone immersion does not “accurately identify a significant problem” because inadequately fused PVC pipe is no longer a significant problem. At the time of publishing, acetone immersion tests had a pass rate of 99.9%. (2) Acetone immersion “is not a test that uniquely identifies a problem that other test would overlook,” because ASTM pipe standards D2665, F480, and F1760 exclude acetone testing with no apparent consequence. (3) Acetone immersion testing must be performed in a lab and therefore cannot be performed on line at the time of manufacture. (4) Although acetone immersion testing can be performed quickly and simply, acetone is a hazardous material that poses a safety risk to personnel. (Citation 5)

Citations
INDOT: The heat reversion test is just another way of annealing the plastic materials after the processing/molding process. Although I would think there is less stress induced in the extrusion process vs the injection molding technique. Also, PVC is not a semi-crystalline material so it would have relatively low as molded stress.