Plastic Pipe and Fittings Association
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May 2nd, 2008

To whom it may concern,

This document has been prepared by NSF International at your request. It includes a summary of ongoing overtime testing for methyl-tert-butyl ether (MTBE), up to day 21, as an extractant from cross-linked polyethylene pipe and tubing which have been tested at NSF International to the requirements of NSF/ANSI Standard 61. MTBE is considered a break down product of t-butyl peroxide, which is one of the catalysts that can be used for the cross-linking of polyethylene. It has been requested of NSF International to run overtime testing on 10 separate samples, from different PEX manufacturers, to determine actual Day 90 levels for MTBE.

When testing, the samples are conditioned for 16 days prior to the critical day water collection on day 17. For overtime exposures the water is also collected and analyzed on days 1, 2, 3, 8, 10, 21, 36, 49 and 107. Analyzing water samples from days throughout the exposure is necessary for running the regression analysis. A total of 9 overtimes were identified and used to summarize the decay pattern of MTBE. Three different regression models (Power, Exponential and Linear) were applied to the data. From these analyses it was determined that the Power model was the most appropriate model to use based upon the coefficient of determination (r^2 value) for each of the 9 independently run samples. Table 1 summarizes the range of MTBE levels, by day of exposure, for all 9 samples. Table 2 provides a summary of the overtime testing results for MTBE.

Table 1. Range of MTBE levels, by day of exposure, for all 9 samples.

Day of Exposure	MTBE (ppb)
Day 1	1.8 – 290
Day 2	1.5 – 150
Day 3	1.4 – 150
Day 8	0.55 – 76
Day 10	0.75 – 87
Day 17	0.55 – 58
Day 21	0.55 - 49

Table 2. Results of the regression analysis performed on all 9 MTBE samples.

Sample	r² value (Model)	Extrapolated lab day 107 (Day 90) level for MTBE	Predicted day that MTBE would reach 11 ppb
Sample 1 J-00056620	0.843 (Power)	12	181
Sample 2 J-00056621	0.879 (Power)	15	236
Sample 3 J-00057146	0.873 (Power)	0.26	1*
Sample 5 J-00057148	0.983 (Power)	25	679
Sample 6 J-00057149	0.924 (Power)	19	286
Sample 7 J-00057150	0.952 (Power)	0.17	1*
Sample 8 J-00057151	0.832 (Power)	0.48	1*
Sample 9 J-00057152	0.947 (Power)	0.25	1*
Sample 10 J-00057153	0.940 (Power)	0.21	1*

* Levels for MTBE were below 11 ppb by day 1.

These extraction results vary by the amount of peroxide used, the age of the tubing, and the variability that can be introduced during the manufacture of this material. Based upon these 9 test results it was determined that MTBE would decay to levels below 12 ppb in as few as 1 day to a maximum of 679 days. These results are preliminary and the model chosen may not be the most suitable model to extrapolate a Day 90 level.

If you have further questions concerning this subject, please do not hesitate to contact me.

Sincerely,

Clifton J. McLellan
Director of Toxicology Services
NSF International