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After the last STP meeting, a Working Group was formed to determine the next steps in developing a methodology for evaluating the performance of polymeric materials at elevated temperatures using DMA or other methods. The group was to review the initial work done by UL's Research and Development Department and to suggest additional work, if necessary, to help develop the appropriate test protocol and acceptance criteria for this methodology. Finally, the group would present a proposal to STP 746 regarding the testing of the performance of polymeric materials at elevated temperatures using DMA or other methods.

Since the meeting, the Working Group has met several times. Our focus was to discuss the possible use of DMA in three possible application areas: thermal endurance, creep, and performance at temperature.

Beginning with thermal endurance, it was generally agreed that DMA does not address thermo-oxidative degradation, which is the basis of Long-Term Heat Aging. Further, there was discussion that the creation of "master curves" assumes that the system is stable (i.e., it is **NOT** degrading). Finally, there was discussion that DSC, TGA, FTIR (i.e., analytical) methods may be useful to predict oxidative events, but not as a complete replacement of the current procedure.

Discussions concerning using DMA for creep began with acknowledging that UL 746A/746C provides no pre-selection methodologies, nor interpretive statements on how to utilize a pre-selection result in end-product acceptance. Members of the group reviewed an old (circa 1970) Modern Plastics Encyclopedia for their presentation of isochronous creep and isothermal stress-strain curves. It was agreed that DMA is better than a flex test (or other static test), but is not definitive answer, and that usage would rely on the ability to accurately interpret results of DMA testing into a "real world" application.

Lastly, it was noted that DMA does not provide rupture data during the evaluation of performance at temperature. It can, however, provide modulus information

After consideration of the information provided above, and discussions with others within the companies of the Working Group members, the following conclusions were reached:



Thermal Endurance – DMA is not an appropriate method for developing this type of data

Creep – Has most development potential, but is outside the scope of this group, and does not have sufficient industry support

Performance at Temperature – Provides incomplete information, which can be complementary but is not better than existing data

At this time, the Working Group feels that no further meetings are necessary and is disbanding, as it has complied with the scope of the investigation. It is not possible at this time to present any proposals to the STP for the modification of any UL Standards, since it was concluded that using DMA for evaluating the performance of polymeric materials at elevated temperatures is not an appropriate substitute or alternative to existing UL Standards. If the STP feels that development of methodologies for utilizing DMA for evaluation of creep should be pursued, a new Working Group should be formed.

Respectfully submitted,

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