**Specific Heat test method in Heat Flow Meters (HFM) for building and cold chain applications**

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Thermal characterization is necessary for any phase change material, to understand the thermal performance and predict the efficiency of that material. PCMs are generally characterized starting with Differential scanning calorimetry (DSC) on lab scale, to measure the phase transition temperature, enthalpy and supercooling. However, the sample size is very small (5-10 mg), which may lead to less nucleation and differences in thermal lag from temperature gradients. For that reason, additional testing must be done using the Temperature – history method where the sample size is larger compared to DSC. Dr. Jan Kosny, Dr. David Yarbrough and Dr. Kenneth Wilkes used heat flow meters to develop a dynamic specific heat test method to test the PCM behavior. This test was specially developed for PCM and later adopted as ASTM C1784 standard. Initial testing done through this method were even presented in the thermal conferences in the past. Heat flow meters provide two values, heat flow per square area (J/m2) and specific heat (Cp) (J/m3K). Volumetric enthalpy change ( h(volume), J/m3) can be calculated by using h(area) and thickness of the sample and mass enthalpy change ( h(mass), J/Kg) can be calculated by dividing the h(volume). This method was preferred for a variety of reasons, its large volume testing capacity compared to DSC, showing the phase change behavior of the packed PCM either in pouches, panels or PCM wall boards. Industry interest for this specific heat test method of PCM has increased because of its results (phase transition temperature and energy storage data) giving real time efficiency of the product in building and cold chain applications. In DSC, the cooling cycle (solidification) which is done to check for supercooling behavior of PCM is not reliable because of less nucleation sites (small volume). It can still be used for estimation of enthalpy and phase transition behavior. This presentation will show results of the dynamic specific heat test method for some of the commercial PCM products presently running in the market in comparison with the DSC results. A custom salt hydrate PCM formulation developed in our lab was packed in channel boards and the products were tested by this method to understand performance of the entire system with step temperature changes for melting and cooling cycles.