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Attention: **Brandon Wallace**
Subject: **R-values of Hebel AAC products**

Dear Mr. Wallace,

In response to your e-mail dated December 07, 2009, please find below the **static thermal resistance values** ("static R values") of a 1" thick sample of Hebel AAC tested at per ASTM C518-04 "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus":

- AAC-2: 0.2335 m^2-K/W (1.3257 ft^2-h-°F/BTU)
- AAC-4: 0.1929 m^2-K/W (1.0956 ft^2-h-°F/BTU)
- AAC-6: 0.1795 m^2-K/W (1.0195 ft^2-h-°F/BTU)

Subsequently, **static R-values** of 6", 8", 10" and 12" AAC products would be 6.1172, 8.1562, 10.1953 and 12.2344 ft^2-h-°F/BTU respectively.

However, laboratory testing using ASTM protocol assume that temperatures at both sides of an element are constant and remain constant for a period of time, unlike what actually occurs in normal conditions. In actual conditions, the temperature levels on both sides of building elements may change during a 24-hour period; in many cases, the exterior temperature may experience large temperature swings. These changes may cause a reversal in direction of the heat flow or at the least, "delay" the heat flow to the point where it substantially reduces the heat transfer to the inside of the building envelope. In this case, the combination of the heat capacity and the thermal resistance of AAC exceed the performance of a high "steady state" R-value. This dynamic process is known as the "mass-enhanced" R-value. The degree of benefit of thermal mass depends on climate, building type, and use.

This thermal performance has been corroborated by research carried out at different institutions such as Oak Ridge National Laboratory (dependency of US Department of Energy), Arizona State University Partnership for Advancing Technology in Housing (AzPATH, led and funded by HUD/FHA). As a result of this research, *DBMS* (*Dynamic Benefit of Massive Systems*) values have been obtained. These values are "multipliers" of the steady-state R-values which helps defining the "equivalent" R-value when incorporating this mass-enhanced thermal performance. I'm attaching a summary of DBMS values for 20 cities in the US; although it might not be as comprehensive as one would like, it serves as a reference for cities with similar climate conditions. Looking at this chart, you can observe than coastal cities like San Diego, CA and Miami, FL have *DBMS* values that increase their steady-state R-values in 50-70%.

I hope this information satisfies your inquiries. Should you have the need for any additional information, please do not hesitate to contact me.

Best Regards,

Emilio Carranza
Technical Manager