INTERPRETATION
AHRI STANDARDS 550/590 (I-P)-2018 AND 551/591 (SI)-2018
PERFORMANCE RATING OF WATER-CHILLING AND HEAT PUMP WATER-HEATING PACKAGES
USING THE VAPOR COMPRESSION CYCLE

July 30, 2019

References: Appendix F, Section F3

Question: In the Equations for atmospheric pressure correction it lists the $Q_{ev,100\%}$. It is not clear in the standard if this is the rated 100% capacity at the nominal rating conditions or the measured. Also not clear when running 125 °F ambient at full load if the $Q_{ev,100\%}$ is the capacity at 95 °F or 125 °F

\[
D_Q = AQ \cdot p^2 + BQ \cdot p + CQ
\]  
\[F1\]

\[
D_\eta = A_\eta \cdot p^2 + B_\eta \cdot p + C_\eta
\]  
\[F2\]

\[
(CF_Q)_{P=P_{test}} = 1 + \left( \frac{Q_{ev,\text{Load}}}{Q_{ev,100\%}} \right) \cdot (D_Q - 1) \cdot \exp\left\{ -0.35 \cdot \left[ (D_\eta \cdot \eta_{test,100\%}) - 9.6 \right] \right\}
\]  
\[F3\]

\[
(CF_\eta)_{P=P_{test}} = 1 + \left( \frac{Q_{ev,\text{Load}}}{Q_{ev,100\%}} \right) \cdot (D_\eta - 1) \cdot \exp\left\{ -0.35 \cdot \left[ (D_Q \cdot \eta_{test,100\%}) - 9.6 \right] \right\}
\]  
\[F4\]

\[
Q_{\text{corrected,standard}} = Q_{\text{test}} (CF_Q)_{P=P_{test}}
\]  
\[F5\]

\[
\eta_{\text{corrected,standard}} = \eta_{\text{test}} (CF_\eta)_{P=P_{test}}
\]  
\[F6\]

Answer: For AHRI Standards 550/590 and 551/591, Equations F3 and F4, $Q_{ev,100\%}$ and $\eta_{test,100\%}$ are test results at full load rating point for Standard Rating Conditions, or full load ratings for Application Rating Conditions.