Condensation Resistance Factor (CRF)
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The AAMA CRF test method has been in existence for nearly 30 years. It was originally published in 1972 as AAMA 1502.3. This AAMA standard and test method was developed in response to the need for a means to evaluate the relative performance of thermally improved aluminum fenestration products. The CRF is primarily intended for comparative analysis of similar products, however it is also a valuable means to project when and where condensation will occur on a fenestration product.

The CRF is a numerical index generally in the range of 30 – 80 for conventionally glazed fenestration products. The larger the CRF number the greater the resistance to condensation. In the past, AAMA defined a CRF rating of 35 as the minimum for a thermally improved window or door. The CRF for the product is determined by the lower of either the weighted frame temperature or the average glazing temperature. The formula for determining the CRF for the glass and frame is as follows:

$$CRF_{(G)} = \frac{GT - t_{II}}{t_I - t_{II}} \times 100$$

$$CRF_{(F)} = \frac{FT - t_{II}}{t_I - t_{II}} \times 100$$

CRF numbers are reported as whole numbers only. The surface temperatures utilized for determining the CRF are obtained under specified test conditions. The current AAMA test method (AAMA 1503-98) specifies a warm side temperature (t_I) of 70F and a cold side temperature (t_{II}) of 0F with a 15 MPH exterior wind. The surface temperature data derived from the AAMA CRF test may also be utilized to predict condensation for various levels of indoor humidity and ambient temperature conditions.

When water vapor in the air comes into contact with a surface whose temperature is lower than the dewpoint of the air the water vapor will condense. The amount of water vapor in the air is called the relative humidity. Controlling the relative humidity is the most effective way to avoid objectionable condensation. Project specific CRF values should be specified based on anticipated inside relative humidity and outside design temperatures. In most applications it is reasonable to allow for a small amount of condensation on the coldest days of the year.

As an example the following table indicates the differences in weighted frame temperatures for the listed ranges of CRF:

CRF	Weighted Frame Temperature (FT)	Cold Side Air (t_{II})	Warm Side Air (t_I)
35	24.5F	0F	70F
40	28.0F	0F	70F
45	31.5F	0F	70F
50	35.0F	0F	70F
55	38.5F	0F	70F