Tech Tip # 113

Pool Dehumidifier Efficiency Ratings and Compliance to ASHRAE 90.1

Keywords: LEED; MRE; EER; SEER; ASHRAE 90.1

Introduction:

Energy codes require a minimum SEER or EER rating for air conditioning systems.

Energy Efficiency Ratio (EER) is a ratio of the Cooling Capacity in Btuh/h to the Power input values in watts.

Seasonal Energy Efficiency Ratio (SEER) is the total heat removed from the space during the annual cooling season, expressed in Btu's, divided by the total electrical energy consumed by the air conditioner or heat pump during the same season, expressed in watt-hours.

Minimum EER's and SEER's have been established for the industry for air conditioners and heat pumps that are designed primarily for sensible temperature control. Based on these requirements you have seen through the years the sensible to total equipment ratings change from a 75% sensible and 25% latent to 85% sensible and 15% latent. This change has allowed the industry to see higher EER and SEER ratings.

The main purpose of a dehumidifier is to remove moisture therefore more latent capacity is required in the piece of equipment than what a standard air conditioner or heat pump has today. In order to do this the evaporator coil must be colder than a standard air conditioning system which in turn requires more energy. This is the major reason why dehumidifiers are considered special purpose air conditioners and are not required to meet the minimum energy ratings.

Section 6.4 of ASHRAE 90.1 is specific to HVAC equipment and system equipment efficiencies, verification, and labeling requirements. The section indicates that the requirements apply to specific equipment indicated in the tables in the standard.

- Air Conditioners and Condensing Units
- Heat Pumps
- Water-Chilling Packages
- Packaged Terminal and Room Air Conditioners and Heat Pumps
- Furnaces, Duct Furnaces, and Unit Heaters
- Boilers
- Heat Rejection Equipment

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Although in some respects a dehumidifier may be considered air conditioning equipment or contain a heat pump cycle for heating, the tables indicate minimum performance in reference to specific standards. For air conditioners and heat pumps the standard referenced is AHRI 210/240 or AHRI 340/360 depending on the unit capacity. These standards do not apply to refrigeration based dehumidifier due to both the specifics of the AHRI standards and the testing conditions.

Conditions indicated in the AHRI standards referenced above do not apply to indoor pool dehumidification equipment. The Standard Rating Conditions listed in these standards are 80°F dry bulb and 67°F wet bulb coincident with an Outdoor Section condition of 95°F dry bulb and 75°F wet bulb. AHRI has a Standard 910 which is specifically for Indoor Pool Dehumidifiers which are rated at different conditions and lists a different energy rating method.

The ASHRAE 90.1 standard specifically indicates that equipment not listed in the tables referenced may be used. This provides the opportunity to utilize specialized equipment such as refrigeration based dehumidifiers to optimize the HVAC system as a whole.

A refrigeration based dehumidifier is specially designed and operates differently than a standard unitary air conditioner. The conditions, rating requirements, and method of testing in the AHRI 910 standard are specific to the design and operation of Indoor Pool Dehumidifiers. As the testing methods are standardized and the certification programs are enacted Desert Aire will certify and list the ratings of Pool Room Dehumidifiers. It is highly likely that the AHRI 910 standard will become integral to ASHRAE 90.1 minimum requirements in the future with minimum MRE values listed however at this time no minimum values have been listed or reference in this standard.

Desert Aire has recognized through the years that this has created confusion in the industry and has been a proponent through its involvement in ASHRAE and AHRI to establish a rating for dehumidifiers. Desert Aire has been deeply involved in developing AHRI Standard 910 Indoor Pool Dehumidifiers This standards has established a Moisture Removal Efficiency (MRE) for the refrigeration based dehumidification industry. This is the Moisture Removal Capacity, (MRC) expressed in lb/h divided by the Total Energy Input expressed in kW. New rating conditions have been established for each of this product which is at the normal operating range of a pool dehumidifier than the standard air conditioning rating point.

We encourage the engineering community to request MRE ratings for the dehumidifiers they are specifying instead of SEER and EER ratings. All of Desert Aire literature includes the AHRI MRE ratings at the conditions listed in these standards.