

**INTERPRETATION IC 90.1-2004-15 OF
ANSI/ASHRAE/IESNA STANDARD 90.1-2004
Energy Standard for Buildings Except Low-Rise Residential Buildings**

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Request from: Dan Hansen (E-mail: dhansen3@trane.com), The Trane Co., 7100 S. Madison, Willowbrook, IL 60527.

Reference: This request for interpretation refers to the requirements presented in ANSI/ASHRAE/IESNA Standard 90.1-2004, Section 6.4.1.2 and Tables 6.8.1C and 6.8.1H through J, regarding centrifugal chiller efficiencies.

Background No. 1: A centrifugal chiller has been selected that is within the operating conditions outlined in Table 6.8.1J and within the ranges for temperatures in Section 6.4.1.2.

The Test Procedure noted in Table 6.8.1C is ARI 550/590 and Chapter 12 (Normative References) of 90.1-2004 references "ARI/550/590-98 with Addenda through July 2002."

Section 5.6.1 of the ARI 550/590 test procedure is labelled Allowable Tolerances and gives an equation that allows, but does not require, tolerances.

The chiller in question will have a witnessed performance test at the factory. The test will have a 0% tolerance.

Interpretation No. 1: The interpretation is that, while tolerance is allowed, it is not required in the test procedure. Therefore this centrifugal chiller with 0% tolerance is required to meet the efficiency levels, both full load and part load, per the appropriate table (6.8.1C, H, I or J) of 90.1-2004.

Question No. 1: Is this interpretation correct?

Answer No. 1: No

Comment No. 1:

The performance tolerances are integral to the ARI 550/590 Standard and the related certification program. The standard not only has tolerance allowances for capacity and efficiency, but also for temperature measurements and flow conditions for the testing facility (control and accuracy considerations). The ASHRAE 90.1 tables are set up based on standard rating conditions for equipment in order to achieve a consistent approach to qualifying performance. A customer is free to choose the purchase specifications for his/her specific project requirements, but that does not change the criteria required for compliance with the 90.1 Standard.

Background No. 2: If the answer to the first interpretation is "No," another interpretation is requested. ASHRAE 90.1's scope covers equipment and systems in the vast majority of commercial buildings. If the zero tolerance performance is not required to meet the requirements

of the appropriate table (6.8.1 C, H, I or J), it is certainly the committee's intent that some level of efficiency must be met. To do otherwise would create huge loopholes by allowing very inefficient equipment to be installed simply by requiring a tolerance different than the maximum allowable tolerance as specified in ARI 550/590 Section 5.6.1.

Interpretation No. 2: The interpretation is that, if a tolerance is specified and different than that specified by Section 5.6.1 of ARI 550/590, to comply with the standard's requirements the chiller must be rated using the tolerances in Section 5.6.1 of ARI 550/590, and meet the requirements, both full and part load, of the appropriate Table 6.8.1 C, H, I or J.

Question No. 2: Is this interpretation correct?

Answer No. 2: Yes

Comment No. 2: The ARI 550/590 standard and related certification program set tolerance limitations for both test measurements and performance reporting. The 90.1 Standard references ARI 550/590 Standard and therefore requires related equipment performance to be determined in accordance with the ARI 550/590 test procedure. Performance calculated using the methods in the ARI 550/590 Standard for the exact chiller configuration (impeller, motor, gear, heat exchangers, and starter, etc.) would be acceptable for demonstrating efficiency compliance with ASHRAE 90.1.

Neither Standard permits users to specify alternate tolerance levels. It is a customer prerogative to request other conditions or tolerances for purchase specifications.