

**INTERPRETATION IC 90.1-2010-14 OF  
ANSI/ASHRAE/IESNA STANDARD 90.1-2010  
Energy Standard for Buildings Except Low-Rise Residential Buildings**

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**Reference:** This request for interpretation refers to the requirements presented in ANSI/ASHRAE/IESNA Standard 90.1-2010, Sections 6.4 and Table 6.8.1C relating to mandatory equipment efficiency requirements for chillers.

**Background:** The current standard has ambiguity about whether fluid chilling equipment applied as heating equipment (e.g. a heat pump or a heat recovery device) must meet the efficiency requirements for cooling equipment. Applied as a heat pump means that the chiller is being loaded and/or dispatched based on heating requirements, and the cooling conditions resulting from that process are not controlled. Applied as a heat recovery device means that the heat rejected by the chiller is being sent to an eligible heating sink, but the chiller is being loaded and/or dispatched based on cooling requirements. An eligible heat sink is a place where the temperature is lower than the temperature being created by the chiller operating as a heat recovery device. Keeping the grade of heat high enough to be useful to the heating process makes the chiller work harder than it if were rejecting heat to ambient temperature.

Machine changes for creating higher heating temperatures can make it difficult to meet the pure cooling efficiency requirements and the part load rating factor is not very applicable since the condenser relief assumed in the part load equation is not occurring when heating. For centrifugal chillers this is accommodated with the derate equations. For positive displacement chillers this is not available. The scope change for positive displacement chillers in 90.1-2010 sought to address this when it exempted high volume index chillers (those making 32°F glycol or colder) from needing to comply. A similar limit is not there for high volume index chillers being applied as heat pumps.

The 2011 update to AHRI 550/590 (that has not yet been referenced by 90.1) added test procedures and conditions for these applications for chillers. However, no efficiency requirements corresponding to these standardized test conditions have been developed. Heat recovery chillers are outside the scope of the AHRI certification program.

The other scope change for centrifugal chillers in 90.1-2010 added higher leaving condenser temperatures to the range of scope of the standard. These temperatures can be necessary in extreme climates using wide condenser ranges, but are also seen when the chiller is applied in heat recovery or heat pump applications.

**Interpretation No. 1:** Positive displacement chillers applied as heat pumps are not subject to the efficiency requirements in Table 6.8.1C.

**Question No. 1:** Is this interpretation correct?

**Answer No. 1:** No

**Comments No. 1:** Not all heat pump applications fall outside of the AHRI water temperature conditions. If they are outside the scope of AHRI water temperature conditions, then Table 6.8.1C would not apply.

**Interpretation No. 2:** Positive displacement chillers with heat recovery are not subject to the efficiency requirements in Table 6.8.1C.

**Question No. 2:** Is this interpretation correct?

**Answer No. 2:** No

**Comments No. 2:** Not all heat recovery applications fall outside of the AHRI water temperature conditions. If they are outside the scope of AHRI water temperature conditions, then Table 6.8.1C would not apply.

**Interpretation No. 3:** Centrifugal chillers applied as heat pumps are not subject to the efficiency requirements in Table 6.8.1C as amended by the adjustment equations in 6.4.1.2.1.

**Question No. 3:** Is this interpretation correct?

**Answer No. 3:** No

**Comments No. 3:** Not all heat pump applications fall outside of the 6.4.1.2.1 water temperature conditions. If they are outside these water temperature conditions, then the efficiency requirements in Table 6.8.1C as amended by the adjustment equations in 6.4.1.2.1 would not apply.

**Interpretation No. 4:** Centrifugal chillers applied in a system where the condenser heat is recovered are not subject to the efficiency requirements in Table 6.8.1C as amended by the adjustment equations in 6.4.1.2.1.

**Question No. 4:** Is this interpretation correct?

**Answer No. 4:** No

**Comments No. 4:** Not all heat recovery applications fall outside of the 6.4.1.2.1 water temperature conditions. If they are outside these water temperature conditions, then the efficiency requirements in Table 6.8.1C as amended by the adjustment equations in 6.4.1.2.1 would not apply.