ADDENDA

ANSI/ASHRAE Addendum d to
ANSI/ASHRAE Standard 30-2019

Method of Testing Liquid Chillers

Approved by ASHRAE and the American National Standards Institute on February 29, 2024.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (www.ashrae.org/continuous-maintenance).

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b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard, or
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FOREWORD

Addendum d aligns the stability requirements in the standard with the measurements supporting the purpose of the test. The purpose of the test includes measurement of thermal capacity and energy efficiency. The standard currently requires stability for flow rate and the entering and leaving temperatures, which does not ensure stability of the capacity. Addendum d replaces the stability criteria for the entering liquid with stability of the temperature difference used to calculate capacity. The addendum also allows for a greater tolerance for stability at capacities lower than the rated capacity of the unit.

The entering air mean wet-bulb temperature requirements that were published in Addendum b have been relaxed to those of the 2017 edition.

Informative Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum d to Standard 30-2019

Modify Table 6-6 as shown.

Table 6-6 Definition of Operating Condition Tolerances and Stability Criteria g

Measurement or Calculation Result		Applicable Operating Modes	Values Calculated from Data Samples		Operating Condition Tolerance Limits	Stability Criteria
			Mean	Std. Dev.		
Net capacity (cooling or heating)		Cooling, heating, heat recovery	$\overline{Q}$	—	Unit with continuous unloading: Part-load test capacity shall be within 2% of the target part-load capacity [a]. $\frac{\lvert\overline{Q} - Q_{target}\rvert}{Q_{100\%}} \le 2.000\%$	No requirement
					Units with discrete capacity steps: Part-load test points shall be taken as close as practical to the specified part-load rating points as stated in the test plan.	
Evaporator	Entering liquid temperature	Cooling	$\overline{T}$	s_T	No requirement	No requirement
	Leaving liquid temperature				$\lvert\overline{T} - T_{target}\rvert \le 0.28\ \Delta°C\ [0.50\ \Delta°F]$	$s_T \le 0.10\ \Delta°C\ [0.18\ \Delta°F]$
	Liquid temperature difference [h]		$\overline{\Delta T}$	$s_{\Delta T}$	No requirement	$\frac{s_{\Delta T}}{\Delta T} \le 1.500\% \left(\frac{Q_{100\%}}{Q_{target}}\right)$
Condenser	Entering liquid temperature		$\overline{T}$	s_T	$\lvert\overline{T} - T_{target}\rvert \le 0.28\ \Delta°C\ [0.50\ \Delta°F]$	$s_T \le 0.10\ \Delta°C\ [0.18\ \Delta°F]$
	Leaving liquid temperature				No requirement	No requirement

a. The ±2.0% tolerance shall be calculated as 2.0% of the full load rated capacity ~~(kW)~~. For example, a nominal 50.0% part-load point shall be tested between 48.0% and 52.0% of the full-load capacity ~~to be used directly for IPLV.SI and NPLV.SI calculations~~. Outside this tolerance, interpolation shall be used.

b. The heat portion shall apply when the unit is in the heating mode, except for the first ten minutes after terminating a defrost cycle. The defrost portion shall include the defrost cycle plus the first ten minutes after terminating the defrost cycle.

c. When computing average air temperatures for heating mode tests, omit data samples collected during the defrost portion of the cycle.

d. For electrically driven machines, voltage and frequency shall be maintained at the nameplate rating values within tolerance limits and stability criteria on voltage and frequency when measured at the locations specified in Section 6.3.1.7. For dual nameplate voltage ratings, tests shall be performed at the lower of the two voltages.

e. For steam turbine and gas turbine drive machines the pressure shall be maintained at the nameplate rating values within the tolerance limits.

f. For speed-controlled compressors, the speed shall be maintained at the nameplate rating value within the tolerance limits.

g. Refer to Table 10-1 for definition of the unit symbols ΔºC and ΔºF. Refer to Section 5.2 for the definition of "mean" (denoted by the overline) and sample standard deviation (denoted by *s*).

h. $\overline{\Delta T}$ represents the average of the liquid temperature difference of each data sample. $S_{\overline{\Delta T}}$ represents the sample standard deviation of the liquid temperature difference of each data sample.

Table 6-6 Definition of Operating Condition Tolerances and Stability Criteria [g] *(Continued)*

Measurement or Calculation Result		Applicable Operating Modes	Values Calculated from Data Samples		Operating Condition Tolerance Limits	Stability Criteria
			Mean	Std. Dev.		
Evaporator	Entering liquid temperature [b]	Heating, heat recovery	$\bar{T}$	s_T	Heating portion: No requirement Defrost portion: $\lvert\bar{T} - T_{target}\rvert \le 1.11$ Δ°C [2.00 Δ°F]	Heating portion: $s_T \le 0.10$ Δ°C [0.18 Δ°F] Defrost portion: $s_T \le 0.28$ Δ°C [0.50 Δ°F]
	Leaving liquid temperature [b]				Heating portion: $\lvert\bar{T} - T_{target}\rvert \le 0.28$ Δ°C [0.50 Δ°F] Defrost portion: No requirement	~~Heating portion: $s_T \le 0.10$ Δ°C [0.18 Δ°F]~~ Heating portion: No requirement Defrost portion: No requirement
Condenser	Leaving liquid temperature				$\lvert\bar{T} - T_{target}\rvert \le 0.28$ Δ°C [0.50 Δ°F]	$s_T \le 0.10$ Δ°C [0.18 Δ°F]
	Entering liquid temperature				No requirement	No requirement
	Liquid temperature difference [h]		$\overline{\Delta T}$	$s_{\Delta T}$	No requirement	$\frac{s_{\Delta T}}{\overline{\Delta T}} \le 1.500\%\left(\frac{Q_{100\%}}{Q_{target}}\right)$
Evaporator or condenser	Entering air mean dry-bulb temperature [e,b]	Cooling, heating (nonfrosting)	$\bar{T}$	s_T	$\lvert\bar{T} - T_{target}\rvert \le 0.56$ Δ°C [1.00 Δ°F]	$s_T \le 0.42$ Δ°C [0.75 Δ°F]
		Heating (frosting) [c]			Heating portion: $\lvert\bar{T} - T_{target}\rvert \le 1.1$ Δ°C [2.00 Δ°F]	Heating portion: $s_T \le 5.6$ Δ°C [1.00 Δ°F]
					Defrost portion: No requirement for $\bar{T}$	Defrost portion: $s_T \le 1.39$ Δ°C [2.50 Δ°F]
	Entering air mean wet-bulb temperature [e,b]	Cooling, heating (nonfrosting)			$\lvert\bar{T} - T_{target}\rvert \le 0.56$ Δ°C [1.00 Δ°F]	$s_T \le 0.28$ Δ°C [0.50 Δ°F]
		Heating (frosting) [c]			Heating portion: $\lvert\bar{T} - T_{target}\rvert \le 0.83$ Δ°C [1.50 Δ°F]	Heating portion: $s_T \le 0.42$Δ°C [0.75 Δ°F]
					Defrost portion: No requirement for $\bar{T}$	Defrost portion: No requirements

[. . .]

a. The ±2.0% tolerance shall be calculated as 2.0% of the full load rated capacity ~~(kW)~~. For example, a nominal 50.0% part-load point shall be tested between 48.0% and 52.0% of the full-load capacity ~~to be used directly for IPLV.SI and NPLV.SI calculations~~. Outside this tolerance, interpolation shall be used.

b. The heat portion shall apply when the unit is in the heating mode, except for the first ten minutes after terminating a defrost cycle. The defrost portion shall include the defrost cycle plus the first ten minutes after terminating the defrost cycle.

c. When computing average air temperatures for heating mode tests, omit data samples collected during the defrost portion of the cycle.

d. For electrically driven machines, voltage and frequency shall be maintained at the nameplate rating values within tolerance limits and stability criteria on voltage and frequency when measured at the locations specified in Section 6.3.1.7. For dual nameplate voltage ratings, tests shall be performed at the lower of the two voltages.

e. For steam turbine and gas turbine drive machines the pressure shall be maintained at the nameplate rating values within the tolerance limits.

f. For speed-controlled compressors, the speed shall be maintained at the nameplate rating value within the tolerance limits.

g. Refer to Table 10-1 for definition of the unit symbols Δ°C and Δ°F. Refer to Section 5.2 for the definition of "mean" (denoted by the overline) and sample standard deviation (denoted by s).

h. $\overline{\Delta T}$ represents the average of the liquid temperature difference of each data sample. $s_{\overline{\Delta T}}$ represents the sample standard deviation of the liquid temperature difference of each data sample.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

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ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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