Addendum c to ANSI/ASHRAE Standard 30-2019

Advisory Public Review Draft

Method of Testing Liquid Chillers

First Advisory Public Review (October 2020)
(Draft shows Proposed Changes to Current Standard)

This draft has been recommended for public review by the responsible project committee. To submit a comment on this proposed standard, go to the ASHRAE website at www.ashrae.org/standards-research--technology/public-review-drafts and access the online comment database. The draft is subject to modification until it is approved for publication by the Board of Directors and ANSI. Until this time, the current edition of the standard (as modified by any published addenda on the ASHRAE website) remains in effect. The current edition of any standard may be purchased from the ASHRAE Online Store at www.ashrae.org/bookstore or by calling 404-636-8400 or 1-800-727-4723 (for orders in the U.S. or Canada).

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FOREWORD

ASHRAE Standard 30 prescribes methods for obtaining performance data relating to liquid-chilling or liquid-heating equipment using any type of compressor. The intent of this standard is to provide uniform test methods to measure the performance of this equipment by addressing the test and instrumentation requirements, test procedures, data to be recorded, and calculations to generate and confirm valid test results.

This advisory public review proposes a definition for free cooling.

[Note to Reviewers: This public review draft makes proposed independent substantive changes to the previous public review draft. These changes are indicated in the text by underlining (for additions) and strikethrough (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the previous draft are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed substantive changes.]

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Modify Section 3 Definitions, Abbreviations, and Acronyms as shown below. The remainder of Section 3 is unchanged.

free cooling: Free Cooling is the portion of the heat removed from the *liquid* supplied to the *liquid-chilling* package without the use of vapor compression cycle. The controls and other components of the liquid chilling package (example, controls, pumps, fans etc) may be active without the use of active compression. Free cooling is considered as partial *free cooling* when it done using components in the *liquid-chilling* package in addition to heat removal from a mutually exclusive vapor compression cycle. The components used in the partial *free cooling* process should also be separate from the components of the vapor compression cycle.

This standard includes *free cooling* and partial *free cooling* that is done with the components of the liquid chilling package.

Examples of this operation include:

1. *Air-side Economizer: Liquid* goes through a heat transfer surface that is part of the liquid chilling package and exposed to cold outside air temperatures in order to produce cooling capacity without the use of the *refrigerating system*. This *Free cooling* can be considered partial *free cooling* when used in conjunction with the *refrigerating system* in order to reduce the required *capacity* and *power* of the *refrigerating system* thus improving the overall efficiency of the *liquid-chilling system* at ambient temperatures below the leaving liquid temperature of the *liquid-chilling system*. Fans move outside air through the heat transfer surface, cooling the liquid inside when ambient temperatures are below the liquid temperatures. Glycol mixtures may be used in *free cooling* systems with a mixture concentration such that it is lower than the minimum ambient air temperature seen by the unit.

2. *Refrigerant-side Economizer:* Heat is transferred from the evaporator circuit to the condensing circuit utilizing refrigerant in the chiller. This is typically done by means of a compressor. However, if the outside ambient temperature or the *condenser* liquid temperature is lower than the *evaporator* leaving temperature the refrigerant in the evaporator may be at higher pressure than the condenser and move to the condenser bypassing the compressor. The condensed liquid may be driven back to the evaporator by gravity or a refrigerant pump which is part of the liquid chilling package. This eliminates the use of active compression and hence considered *free cooling.*

3. *Liquid-side Economizer:* In case of a liquid cooled *condenser* if the *condenser* entering liquid temperature is

lower than the entering liquid temperature of the *evaporator* then the two streams may be made to exchange heat in a liquid to liquid heat exchanger, which is provided as a part of the liquid chilling package, bypassing the refrigerating s*ystem*. This *free cooling* concept can be considered partial *free cooling* when used in conjunction with the *refrigerating system* in order to reduce the required *capacity* and *power* of the *refrigerating system* thus improving the overall efficiency of the *liquid-chilling system* when *condenser* entering liquid temperature is below the entering liquid temperature of the *evaporator*.