IMPORTANT

SAFETY DISCLAIMER

AHRI does not set safety standards and does not certify or guarantee the safety of any products, components or systems designed, tested, rated, installed or operated in accordance with this standard/guideline. It is strongly recommended that products be designed, constructed, assembled, installed and operated in accordance with nationally recognized safety standards and code requirements appropriate for products covered by this standard/guideline.

AHRI uses its best efforts to develop standards/guidelines employing state-of-the-art and accepted industry practices. AHRI does not certify or guarantee that any tests conducted under its standards/guidelines will be non-hazardous or free from risk.

Note:

This standard supersedes AHRI Standard 820-2000.

For I-P ratings, see ANSI/AHRI Standard 820 (I-P)-2012.
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PERFORMANCE RATING OF ICE STORAGE BINS

Section 1. Purpose

1.1 Purpose. The purpose of this standard is to establish for Ice Storage Bins: definitions; test requirements; rating requirements; minimum data requirements for Published Ratings; marking and nameplate data; and conformance conditions.

1.1.1 Intent. This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

1.1.2 Review and Amendment. This standard is subject to review and amendment as technology advances.

Section 2. Scope

2.1 Scope. This standard applies to factory-made Ice Storage Bins as defined in Section 3.

2.2 Exclusion. The storage efficiency requirements do not apply to automatic dispensing machines or to cold plate drink dispensers.

Section 3. Definitions

Definitions. All terms in this document shall follow the standard industry definitions in the current edition of ASHRAE Terminology of Heating, Ventilation, Air Conditioning, and Refrigeration unless otherwise defined in this section.

3.1 Ice Storage Bin. A factory-made assembly (not necessarily shipped in one package) which consists of a non-refrigerated compartment for storage of ice.

3.2 Published Rating. A statement of the assigned values of those performance characteristics, under stated rating conditions, by which a unit may be chosen to fit its application. These values apply to all units of like nominal size and type (identification) produced by the same manufacturer. As used herein, the term Published Rating includes the rating of all performance characteristics shown on the unit or published in specifications, advertising or other literature controlled by the manufacturer, at stated rating conditions.

3.2.1 Application Rating. A rating based on tests performed at Application Rating Conditions (other than Standard Rating Conditions).

3.2.2 Standard Rating. A rating based on tests performed at Standard Rating Conditions.

3.3 Rating Conditions. Any set of operating conditions under which a single level of performance results and which causes only that level of performance to occur.

3.3.1 Application Rating Conditions. Ratings based on tests performed at conditions other than those specified in Section 5.2.1.

3.3.2 Standard Rating Conditions. Rating conditions used as the basis of comparison of performance characteristics.

3.4 "Shall" or "Should". "Shall" or "should" shall be interpreted as follows:

3.4.1 Shall. Where "shall" or "shall not" is used for a provision specified, that provision is mandatory if compliance with the standard is claimed.

3.4.2 Should. "Should" is used to indicate provisions which are not mandatory but which are desirable for good practice.
3.5 Theoretical Storage Capacity. The theoretical maximum mass of ice that the Ice Storage Bin can hold, kg.

3.6 Theoretical Storage Effectiveness. A theoretical expression of the fraction of ice that under specific rating conditions would be expected to remain in the Ice Storage Bin 24 hours after it is produced, %.

Section 4. Test Requirements

4.1 Method of Testing. Ice Storage Bins shall be tested for rating in accordance with Appendix C.

4.1.1 Equipment. Ice Storage Bins shall be tested using all components as recommended by the manufacturer. Where units are offered with legs, the unit shall be tested with the legs on.

Section 5. Rating Requirements

5.1 Published Ratings. Published Ratings shall include Standard Ratings, and may also include Application Ratings.

5.2 Standard Ratings. Standard Ratings shall be established at the Standard Rating Conditions specified in Section 5.2.1. Standard Ratings shall be verified by tests as required in Section 4.

5.2.1 Standard Rating Conditions. The conditions of test for Theoretical Storage Effectiveness are as follows:

- Ambient temperature: 32.0 °C
- Initial ice temperature: 0.0 °C

5.2.2 Values of Standard Ratings. Standard Ratings shall include the Theoretical Storage Capacity of the Ice Storage Bin and the Theoretical Storage Effectiveness as it appears in Appendix C.

5.2.2.1 Theoretical Storage Capacity. The Theoretical Storage Capacity of the Ice Storage Bin, kg, is determined by using the bin's internal volume multiplied by 80% multiplied by 480 kg/m³.

The Theoretical Storage Capacity shall be expressed in multiples of 5.0 kg.

5.2.2.2 Theoretical Storage Effectiveness. The Theoretical Storage Effectiveness shall be expressed to the nearest 1%.

5.3 Application Rating Conditions. Ratings at conditions other than those specified in Section 5.2.1 may be published as Application Ratings and shall be based on data determined by the methods of testing prescribed in Section 4.

5.4 Tolerance. To comply with this standard, Published Ratings shall be based on data obtained in accordance with the provisions of Sections 4 and 5 of this standard, and shall be such that any production unit, when tested, will have a Theoretical Storage Capacity no lower than its Published Rating and a Theoretical Storage Effectiveness not less than 95% of its Published Rating.

Section 6. Minimum Data Requirements for Published Ratings

6.1 Minimum Data Requirements for Published Ratings. Published Ratings shall include all Standard Ratings. All claims to ratings within the scope of this standard shall include the verbiage “Rated in accordance with AHRI Standard 820 (SI)”.

All claims to ratings outside the scope of this standard shall include the verbiage “Outside the scope of AHRI Standard 820 (SI)”. Wherever Application Ratings are published or printed, they shall include a statement of the conditions at which the ratings apply.
Section 7. Marking and Nameplate Data

7.1 Marking and Nameplate Data. As a minimum, the nameplate shall display the manufacturer's name and model designation.

Section 8. Conformance Conditions

8.1 Conformance. While conformance with this standard is voluntary, conformance shall not be claimed or implied for products or equipment within the standard’s Purpose (Section 1) and Scope (Section 2) unless such product claims meet all of the requirements of the standard and all of the testing and rating requirements are measured and reported in complete compliance with the standard. Any product that has not met all the requirements of the standard shall not reference, state, or acknowledge the standard in any written, oral, or electronic communication.
APPENDIX A. REFERENCES - NORMATIVE

A1 Listed here are all standards, handbooks, and other publications essential to the formation and implementation of the standard. All references in this appendix are considered as part of this standard.


APPENDIX B. REFERENCES - INFORMATIVE

B1 Listed here are standards, handbooks and other publications which may provide useful information and background but are not considered essential. References in this appendix are not considered part of the standard.

APPENDIX C. METHOD OF TEST OF ICE STORAGE BINS – NORMATIVE

C1 Purpose and Scope.

C1.1 Purpose. The purpose of this appendix is to specify the method to be used when testing Ice Storage Bins, to specify the type of instrumentation and test apparatus required in testing, to specify methods of calculating results and to specify data to be recorded.

C2 Instrumentation and Apparatus. Measurements of the internal dimensions, to determine the internal volume of the Ice Storage Bin, shall be accurate to within 1mm.

The allowable tolerances on test conditions and performance measurements for Ice Storage Bins are specified in Table C1:

<table>
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<tr>
<th>Item</th>
<th>Tolerance</th>
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<tr>
<td>Dimensions</td>
<td>±1 mm</td>
</tr>
<tr>
<td>Ambient air temperature</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>Ice temperature</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>Ice mass</td>
<td>±1.0%</td>
</tr>
<tr>
<td>Meltage-water mass</td>
<td>±1.0%</td>
</tr>
<tr>
<td>Elapsed time</td>
<td>±60 s</td>
</tr>
</tbody>
</table>

C3 Test Method.

C3.1 Measured Volume. Measure the internal dimensions and calculate the volume of the Ice Storage Bin.

C3.2 Theoretical Storage Effectiveness.

The unit undergoing test shall be exposed to the ambient temperature for at least 2 hours prior to the addition of ice.

A quantity of cube-ice equal to the Theoretical Storage Capacity, at the specified initial ice temperature, shall be added to the Ice Storage Bin through the ice-maker opening.

The ice-maker opening shall be sealed closed with rigid foam insulation having a thermal resistance of RSI 5.3.

Meltage water from the bin drain shall be captured and weighed 2 hours after the bin was filled and again after an additional 4 hours have elapsed.

C4 Data to be Recorded.

C4.1 Ice Storage Bin manufacturer and brand name
C4.2 Model number and serial number
C4.3 Internal dimensions, mm
C4.4 Initial weight of ice, kg
C4.5 2-hour (stabilization) meltage weight, kg
C4.6 4-hour (test) meltage weight, kg
C4.7 Ambient temperature, C
C4.8 Initial ice temperature, C
C5 Calculations.

C5.1 Theoretical Storage Capacity. The Theoretical Storage Capacity, \( kg \), is determined as follows:

\[
c_t = A \cdot v_m \cdot B
\]

Where:

- \( A \) = Assumed 80\% factor (to account for space between varying ice shapes) = 0.8
- \( B \) = Assumed density of ice (average density for cubed ice) = 480 kg/m\(^3\)
- \( c_t \) = Theoretical Storage Capacity, kg
- \( v_m \) = Measured volume is the gross internal volume ignoring baffles of the Ice Storage Bins, m\(^3\)

C5.2 Theoretical Storage Effectiveness. The Theoretical Storage Effectiveness shall be determined as follows:

\[
es = \left( \frac{W_i - M_2 - 6M_4}{W_i - M_2} \right) \cdot 100\%\]

Where:

- \( e_s \) = 24-hour Theoretical Storage Effectiveness, %
- \( M_2 \) = Meltage weight from hour 0 to 2 in test, kg
- \( M_4 \) = Meltage weight from hour 2 to 6 in test, kg
- \( W_i \) = Initial weight of ice, kg

Note: \( 6 \cdot M_4 \) represents the calculated 24-hour meltage total.