This final document represents the definitive view of the agency on the questions addressed and may be relied upon by the regulated industry and members of the public.

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Q: When calculating volume under Appendices A1 and B1, how should parties address (1) through-the-door water and ice dispensers and (2) partitions and fixed projections?

The current DOE test procedure for refrigerators and refrigerator-freezers is found in the Code of Federal Regulations at 10 CFR 430, subpart B, appendix A1, while the test procedure for freezers is found at 10 CFR 430, subpart B, appendix B1. This document refers to these appendices as "Appendix A1" and "Appendix B1," respectively.

Q1: How should parties address through-the-door water and ice dispensers when measuring cabinet volume under Appendices A1 and B1?

A1: Through-the-door water and ice dispensers allow consumers to obtain water and/or ice from a refrigeration product without opening the door. An ice dispenser generally dispenses ice through a chute into cups or other containers that are placed in a recess built into one of the doors at the front of the product. Many ice dispensers also have features to dispense chilled water. Because a through-the-door ice dispenser includes a recess built into one of the product's doors, the insulation in the region of the dispenser must extend into the interior of the cabinet. This insulation extension is commonly referred to as the "insulating hump." These dispensers can affect volume calculations because the hardware associated with these features occupies space and the recess reduces internal volume by displacing the insulation inwards.

Appendices A1 and B1 both incorporate by reference certain sections of ANSI/AHAM Standard HRF-1-1979, *Household Refrigerators, Combination Refrigerator-Freezers, and Household Freezers* (HRF-1-1979), including sections that address volume calculations. Section 5.3 of Appendix A1 indicates that volume shall be measured in accordance with section 3.20 and sections 4.2 through 4.3 of HRF-1-1979. Similarly, section 5.3 of Appendix B1 cites section 3.20 and sections 5.1 through 5.3 of HRF-1-1979 for measurement of volume.

Section 4.2.1.1(a) of HRF-1-1979 (and section 5.2.1.1(a) for freezers) indicates that the volume occupied by special features must be included when calculating a product's volume. That section and the accompanying illustrations (Figure Nos. 4.1 through 4.17 for refrigerators and refrigerator-freezers and 5.1 through 5.14 for freezers) provide no additional instructions regarding how to calculate the volume associated with through-the-door ice and/or water dispensers.

AHAM published an updated version of HRF-1 in 2007. The 2007 version, ANSI/AHAM Standard HRF-1-2007, *Energy, Performance and Capacity of Household Refrigerators, Refrigerator-Freezers and Freezers* (HRF-1-2007), provides more explicit instructions regarding the calculation of volume of products equipped with through-the-door ice and/or water dispensers. Specifically, sections 4.2.1.1(a) and 5.2.1.1(a) of HRF-1-2007 indicate that the volume occupied by all parts of the apparatus that are components of its design should be included in the total volume, including the conveying chute, the insulating hump, and the volume of the cavity (recess) extending to the door front surface (even though that volume is forward of the door liner). Section 4.2.1.1(a) explains how to calculate the volume of the recess, and it also refers to a Figure 4-18, which illustrates how to calculate the volume for the through-the-door feature. DOE expects that manufacturers and test laboratories could use this guidance to calculate refrigerator and refrigerator-freezer volume under the requirements of Appendix A1 and the corresponding similar guidance for freezers in section 5.2.1.1(a) for calculating freezer volume under the requirements of Appendix B1.

As mentioned, the sections of HRF-1-1979 that are incorporated by reference into DOE's test procedures for refrigeration products require that the volume occupied by special features be included in the volume. However, these sections do not clarify how to calculate this volume for through-the-door ice and/or water dispenser features. HRF-1-2007 offers one possible solution for how to treat these features. DOE recognizes that Appendices A1 and B1 (including the sections of HRF-1-1979 incorporated by reference) do not provide a specific approach for addressing these components. The current requirements set out in Appendices A1 and B1 do not conflict with the approach described in HRF-1-2007. Therefore, DOE is permitting manufacturers and test laboratories to calculate the volume of these features using the approach described in HRF-1-2007, section 4.2.1.1(a) (and illustrated by Figure 4-18). Parties using this method must then use the same values to calculate and report the adjusted volume of a given basic model.

DOE notes that the methods for calculating volume changed significantly in AHAM's latest version of HRF-1, AHAM Standard HRF-1-2008, *Energy and Internal Volume of Refrigerating Appliances* (HRF-1-2008). Specifically, much less of the volume associated with different parts of the through-the-door ice and/or water dispenser is included in the measured volume (see section 4.2.2 and Figures 4-2 and 4-3 of HRF-1-2008). The volume calculation methods of HRF-1-2008 are incorporated by reference in the DOE test procedures that manufacturers must follow when demonstrating compliance with DOE standards starting September 15, 2014 (i.e., 10 CFR 430, subpart B, appendices A and B). Hence, this guidance will no longer be applicable after this date, or for any testing conducted using Appendices A or B.

Q2: How should parties factor partitions and fixed projections into volume measurements under Appendices A1 and B1?

A2: Appendix A1 incorporates by reference HRF-1-1979 section 4.2.1.2(c) and Appendix B1 incorporates section 5.2.1.2(c). These sections indicate that the volume occupied by partitions and projections that are within the doors enclosing a compartment and that do not serve as shelves—and collectively exceed a volume of 0.05 cubic feet (1.4 liters)—should be excluded when calculating volume measurement.

Likewise, HRF-1-1979 section 4.2.1.2(e), also incorporated by reference in Appendix A1, indicates that the volumes occupied by fixed projections such as control knobs, shelf hangers, shelf and pan rails, and thermostat escutcheons collectively exceeding 0.05 cubic feet (1.4 liters) per compartment should also be excluded. Section 5.2.1.2(e), incorporated by reference for Appendix B1, has the same provisions for freezers.

The implication of these requirements is that the volume of these items must exceed 0.05 cubic feet (1.4 liters) *per compartment* to be excluded from the volume measurement. However, these sections of HRF-1-1979 do not explain what comprises a "compartment." This issue could be important for refrigeration products with multiple compartments. For instance, for a product with two fresh food compartments, this provision could be interpreted to mean that the 0.05 cubic foot (1.4 liter) threshold applies to the sum of these volumes for each of the fresh food compartments individually rather than the sum of the volumes of the items taken for both fresh food compartments together. In order to assure consistency among products with different numbers of compartments, the summation should be performed for all of the fresh food compartments together and separately for all of the freezer compartments. This would be done separately for (a) the partitions and projections within the doors and (b) the fixed projections.

Hence, when measuring the refrigerated volume of a refrigerator with a freezer compartment or of a refrigerator-freezer, four sets of volume summations, as applicable, would be compared with the 0.05 cubic foot (1.4 liter) threshold: (1) door partitions and projections in the total fresh food space, (2) fixed projections in the total fresh food space, (3) door partitions and projections in the total freezer space, and (4) fixed projections in the total freezer space.