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Guidance Type: Certification and CCMS, Test Procedures

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Product: Refrigerators, refrigerator-freezers, and freezers

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Q: When testing using the Appendix A test procedure for refrigerators and refrigerator-freezers, or the Appendix B test procedure for freezers, are manufacturers required to report use of a non-standard temperature sensor location if a sensor is moved only to achieve the required air gap and the compartment's interior arrangements conform to the specifications cited in the test procedure?

A: Reporting in the certification report of the use of a non-standard temperature sensor location is not required if the sensor was only moved in order to achieve the 1-inch air gap required by section 5.5.4 of AHAM HRF-1-2008 and the interior arrangement of the unit under test otherwise conforms in all respects to those shown in Figure 5-1 and Figure 5-2 of AHAM HRF-1-2008.

The DOE test procedures for residential refrigerators, refrigerator-freezers, and freezers found in appendices A and B to subpart B of 10 CFR part 430 currently require that if the interior arrangements of the unit under test do not conform with those shown in Figures 5-1 and 5-2 of HRF-1-2008, the unit must be tested by relocating the temperature sensors from the locations specified in the figures to avoid interference with hardware or components within the unit, in which case, the specific locations used for the temperature sensors shall be noted in the test data records maintained by the manufacturer in accordance with 10 CFR 429.71, and the certification report shall indicate that non-standard sensor locations were used. See Section 5.1 of both Appendix A and Appendix B.

In the most recent revision to these test procedures, which was published on April 21, 2014 (79 FR 22349), DOE added a requirement in section 5.1(b) of both procedures that if any temperature sensor is relocated by any amount from the location prescribed in Figures 5-1 or 5-2 of HRF-1-2008 in order to maintain a minimum 1-inch air space from adjustable shelves or other components that could be relocated by the consumer, this constitutes a relocation of temperature sensors that shall be recorded in the test data and reported in the certification report.

Since publication of the final rule, DOE has become aware that a conflict may exist for certain models in the AHAM test procedure incorporated by reference. Specifically, the 1-inch air gap requirement in section 5.5.4 appears to conflict with the required temperature sensor locations on the diagram in Figure 5-1, which addresses fresh food compartments, and Figure 5-2, which addresses freezer compartments. Due to the separate requirements applicable to each compartment type, the specific issues involving the spacing requirements are discussed separately here:

1) *Fresh food compartments.* For products with fresh food compartment arrangements consistent with (c), (d), (g), and (h) in Figure 5-1, placement of the bottom temperature sensor must be 1 inch above the

compartment's bottom shelf. However, the 1-inch measurement is taken from the center of the sensor's thermal mass to the shelf rather than from the lower edge of the thermal mass to the shelf, meaning that if placed as required in the diagram, the bottom of the thermal mass would be 0.5 inches from the shelf and in violation of the 1-inch air gap required in section 5.5.4 (assuming the thermal mass has a 1-inch diameter). Because the bottom shelf for products with such an arrangement is fixed in place, it is impossible to comply with both the sensor placement and the 1-inch air gap requirements. DOE requires maintenance of the 1-inch air gap in these cases. Because the sensor must be moved vertically from the location specified in Figure 5-1 in order to achieve the required 1-inch air gap, DOE would not view this as a "relocation" due to the factors cited in section 5.1(b) of the DOE test procedure in Appendix A (e.g., interference with movable hardware) – accordingly, this sensor positioning would not be reported as a non-standard location in the certification report.

2) *Freezer compartments.* Products with freezer compartments consistent with any of the configuration types illustrated in Figure 5-2 must have the bottom sensor placed 0.75 inches from the bottom of the compartment. Because the specified dimensions of the required packages are 5 x 4 x 1.5 inches, the 0.75-inch spacing reflects the location of the sensor if the sensor is placed at the center of a frozen package, as required by section 5.5.5.3 of AHAM HRF-1-2008 for manual defrost freezers, and the package is placed at the bottom of the compartment. In this case, the 1-inch air gap requirement does not apply. Thus, the standard location for the sensor in that situation is 0.75 inches from the bottom of the compartment consistent with the Figure 5-2 requirements, making the reporting of such placement as a non-standard location unnecessary.

For automatic defrost freezers or the freezer compartment of automatic defrost refrigerators or refrigerator-freezers, testing with the compartment loaded with frozen packages is not required. Thus, placement of the bottom sensor with a 1-inch air gap between the sensor's thermal mass and the bottom of the compartment is required. Figure 5-2 specifies that the center of the thermal mass is to be positioned 0.75 inches from the bottom of the compartment. In such cases, the 1-inch air gap requirement controls, and the sensor must be repositioned vertically from the location specified in Figure 5-2 in order to achieve the required 1-inch air gap. As for fresh food compartments, this situation also would not be required to be reported as a non-standard location in the certification report.

Comments: DOE sought comments from the public on this guidance, which are available for viewing in docket EERE-2014-BT-GUID-0028 at www.regulations.gov. DOE received a single comment, from the Association of Home Appliance Manufacturers (AHAM), which expressed agreement with the guidance and requested that DOE issue final guidance consistent with the draft version.