



January 13, 2014

Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program
Mailstop EE-2J
1000 Independence Avenue, SW
Washington, DC 20585-0121

Re: Test Procedure for Commercial Refrigeration Equipment [Docket No. EERE-2013-BT-TP-0025/RIN 1904-AC99]

Dear Ms. Edwards:

These comments are submitted by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) in response to the U.S. Department of Energy's (DOE) notice of proposed rulemaking (NOPR) appearing in the Federal Register on October 28, 2013. The document pertains to the test procedure for commercial refrigeration equipment (CRE).

AHRI is the trade association representing manufacturers of heating, cooling, water heating, and commercial refrigeration equipment. More than 300 members strong, AHRI is an internationally recognized advocate for the industry, and develops standards for and certifies the performance of many of the products manufactured by our members. In North America, the annual output of the HVACR industry is worth more than \$20 billion. In the United States alone, our members employ approximately 130,000 people, and support some 800,000 dealers, contractors and technicians.

We believe that some issues exist within the NOPR and changes are necessary in order to ensure that the test procedure revisions are practical and do not adversely impact existing energy conservation standards. We have the following specific comments:

Section 1 – TDA Calculation

Interpretation 2 of AHRI Standard 1200-2010 clarifies that, for a refrigerator or freezer with multiple glass doors, the length measurement for Total Display Area (TDA) should be taken from inside wall to inside wall, including the door mullions and door frames. On page 64309 of the NOPR, DOE states the following:

“DOE finds that Interpretation 2 is inconsistent with the way DOE determines TDA for the purposes of compliance with energy conservation standards.”

We completely disagree with DOE's assessment on Interpretation 2. We are certain that DOE accounted for door mullions and door frames within the TDA calculation during the analyses associated with the energy conservation standards that went into effect on January 1, 2012 and the energy conservation standards NOPR that was issued by DOE on September 11, 2013.

AHRI Standard 1200 uses length measured from internal end to internal end, including door mullions and door frames. If DOE revises its test procedure to exclude the widths associated with door mullions and door frames from the TDA calculation (as proposed in the October 28, 2013 NOPR), the allowable energy of all cases will be reduced by over 10%. We have evaluated the display cases that are currently available within the industry and were unable to find any cases that have a TDA of 13 ft² per door with a door size of 30"x67", unless the total length of the case accounts for door mullions and door frames.

We believe that the test procedure should be simple enough to calculate the length. Additionally, unlike solid features such as deck pans and honeycombs, consumers do not generally view door mullions and door frames as being permanent impediments to the projected visible area; these materials do not have an adverse impact on the visibility of a product within the refrigerated space. DOE is introducing an added level of complexity to the test procedure by proposing the exclusion of the widths associated with door mullions and door frames. Exhibit 1 illustrates that:

- DOE used the method outlined in Interpretation 2 of AHRI Standard 1200-2010 to calculate length and TDA in the 2008 and 2013 engineering analyses; these values were used to create the current VCT.XX.X equipment standard levels and proposed levels respectively.
- The effect of changing the method of how TDA is measured within the current test procedure NOPR is significant deviation from the historical practice that DOE has followed in its engineering analyses for the CRE energy conservation standards. The change clearly alters the TDA-normalized measured efficiency (kWh/day/ft²) for several CRE products. Hence, we do not agree with DOE's following assertion on page 64299 of the test procedure NOPR:

"DOE does not believe that the test procedure clarifications proposed in this NOPR would affect the measured energy use of any covered CRE under the current DOE test procedure."

DOE also adopts a similar position on page 55899 of its energy conservation standards NOPR that was issued in the Federal Register on September 11, 2013:

"The issues that will be addressed in the test procedure rulemaking are consistent with the analysis in this NOPR."

If DOE changes the length calculation method in the test procedure rulemaking, DOE would have to amend the applicable energy conservation standards accordingly. The amended energy conservation standards would not only reduce the allowable energy of all cases by over 10%, but would also adversely impact manufacturers' sales due to the creation of a negative customer perception. Over the years, manufacturers have used DOE's energy conservation standards as a benchmark to market their products. Should DOE amend the CRE energy conservation standards, manufacturers would be compelled to market their products per the amended energy conservation standards, but those products would be far less appealing to customers; customer perception has been built around existing energy conservation standards that account for the width of door mullions and door frames.

At the public meeting on December 5, 2013, DOE staff sought comments from stakeholders on various TDA calculation scenarios. We have the following comments on those scenarios:

1. DOE should account for door mullion and door frame widths up to 5 inches within the TDA calculation. We believe that widths up to 5 inches would not impede the projected visible area for consumers in any manner. For non-visible areas that have widths greater than 5 inches, the length calculation should only include 5 inches of that non-visible portion, so that the TDA calculation can account for the consumer's vantage point based on the consumer being positioned on one side of the case. As an example, in the case of scenario 3 (slide 70 of DOE's public meeting presentation), assuming that length B-(C+D) totals 15 inches, at least 5 inches of that length should be factored into the TDA calculation.
2. For scenarios 1 and 2 (slides 68-69), we believe that length "A" (inside wall to inside wall of refrigerated volume) is appropriate, provided that the widths associated with the non-visible areas do not exceed 5 inches.
3. Length "A" is appropriate for scenario 4 (slide 71).

Section 2 – Condensate Pan Heaters and Pumps

DOE should not require that manufacturers make representations of the performance of basic models as tested with condensate pan heaters or pumps in place. Remote cases are primarily designed to have floor drains. Condensate pan heaters or pumps are usually added in the field to fulfill specific needs of commercial customers. Although condensate pan heaters and pumps can be added to most basic models offered by manufacturers, it is unreasonable for DOE to expect a manufacturer to run tests with condensate pan heaters and pumps in order to certify all its basic models. This would significantly increase the testing burden on the manufacturers to account for features that are included in less than 5% of the total remote cases sold within the U.S. DOE needs to recognize that the addition of these features to a CRE is customer driven. The DOE test procedure should focus only on the representative equipment, which happens to be equipped with floor drains.

It is important to note that although the spreadsheet tool associated with DOE's September 11, 2013 energy conservation standards NOPR accounted for condensate pan heater power for several self-contained equipment classes, the spreadsheet did not account for condensate pan heater power for any remote condensing equipment classes; Table 5A.2.2 within Appendix 5A of the September 11, 2013 NOPR's technical support document (TSD) confirms this fact. We fail to understand how DOE can expect that manufacturers would be able to make accurate representations of the performance of their basic models, as tested with condensate pan heaters or pumps, when DOE itself failed to account for these features for remote condensing equipment classes within the September 11, 2013 energy conservation standards NOPR.

Section 3 – Definition of "Door"

We do not agree with DOE's proposed definition of "door" to be inclusive of drawers. DOE should create a separate definition to account for drawers as they inherently provide a utility that is different than doors. Alternatively, DOE could amend the current definition for doors by replacing "door" with "door/drawer". In addition, as currently drafted, the definition of door would

also include night curtain, which AHRI believes was not DOE's intent. Night curtains should be excluded.

Section 4 – Definition for Closed Transparent and Closed Solid Doors

DOE's proposed definitions for closed transparent and closed solid doors are not complimentary to one another. In other words, a unit with 50 percent of the outer door surface area transparent would not fall into either definition. In addition, we believe that that the 75 percent threshold surface area needed to qualify a basic model as equipment with transparent door is not appropriate.

Given the lower insulation value of insulated glass and the potential need for anti-sweat heat on the doors, the definition of closed transparent doors should be such that it does not overly penalize these types of units. AHRI recommends that closed transparent be defined as equipment with doors and in which 25 percent or more of the outer surface area of all doors on the unit are transparent. Conversely, closed solid should be defined as equipment with doors and in which more than 75 percent of the outer area of all doors on the unit are not transparent.

Section 5 – Variable Temperature Equipment

We do not agree with DOE's assertion that equipment capable of operating within multiple equipment classes would have to be tested and certified as each of these equipment classes in order to demonstrate compliance with DOE's energy conservation standards. For equipment that is capable of operating within multiple equipment classes, DOE should require that the equipment be tested and certified at only the harshest test condition instead of all possible test conditions. For example, if a unit is designed and optimized to be a commercial freezer but can perform as both a commercial refrigerator and a commercial freezer, it should be tested at the freezer rating conditions and the unit should be certified as a commercial freezer.

Concluding Remarks

AHRI appreciates the opportunity to provide these comments. Based on the reasons outlined in this letter, we believe that changes are necessary to this CRE NOPR in order to ensure that an appropriate test procedure is developed without adversely impacting the current and future energy conservation standards. If you have any questions regarding this submission, please do not hesitate to contact me.

Sincerely,

Aniruddh Roy
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Exhibit 1 – Methodology for Measuring Total Display Area - Docket Number EERE-2013-BT-TP-0025

From "2008-12-31 Engineering Analysis Spreadsheet.xls" in Docket Number EERE-2006-STD-0126-0080:

Calculation
for DOE and User Inputs

Start Here Introduction Results Calculation Equipment Assumptions Model Design

VCT.RC.L Change

Display
 DOE Calculation
 User Calculation

This worksheet shows detailed calculations of energy consumption and cost for the current equipment class. Two sets of calculations are presented: one using DOE's default values and one using user-input values. Switch between the two with the "Display" radio buttons. Case design specifications are presented, followed by a matrix of design options used in the model. Each row in the calculation represents a different step in the calculation of cost or energy consumption. Each column represents a different design option level, from baseline up to the maximum technology level (max tech). Columns above the max tech level repeat the max tech configuration and are grayed out. View the Model sheet for a schematic representation of the model linked to specific calculations.

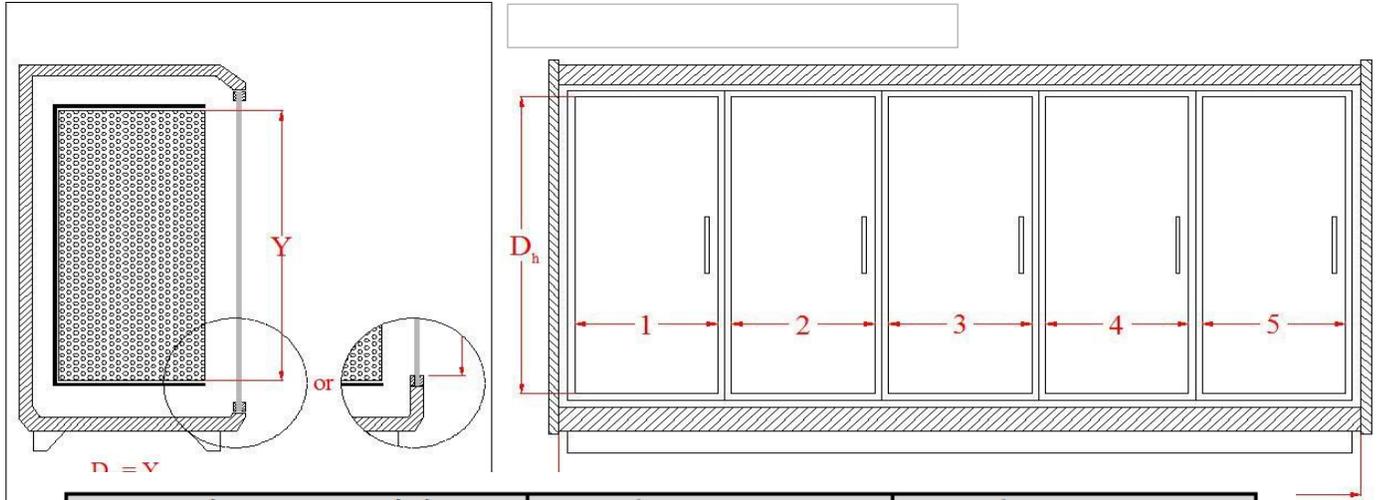
Case Design Specifications	Value	Equipment Class
Core Case Cost [\$]	\$2,345.00	VCT.RC.L
Case Length [ft]	12.74	
Case Gross Refrigerated Volume [ft ³]	133.50	
Case Total Display Area [ft ²]	65.00	
Number of Doors [#]	5	
Single Door Area [ft ²]	13.0	
Non-Door Glass Area [ft ²]	0.0	
Non-Door Anti-Sweat Power [W]	0.0	
Wall Area [ft ²]	200.0	
Insulation Thickness [in]	2.00	
Case Interior Surface Area [ft ²]	145.0	

From "CRE2_Engineering_Spreadsheet_10-7-2013_Public.xlsm" in Docket Number EERE-2010-BT-STD-0003:

Calculation
(Using DOE Inputs)

Case Design Specifications	Value	Equipment Class
Core Case Cost [\$]	\$2,703.00	VCT.RC.L
Case Length [ft]	12.74	
Case Gross Refrigerated Volume [ft ³]	133.50	
Case Total Display Area [ft ²]	65.00	
Number of Doors [#]	5	
Single Door Area [ft ²]	13.0	
Non-Door Glass Area [ft ²]	0.0	
Non-Door Anti-Sweat Power [W]	0.0	
Wall Area [ft ²]	200.0	
Insulation Thickness [in]	2.00	
Case Interior Surface Area [ft ²]	145.0	
Air Curtain Angle From Vertical [°]	0.0	
Infiltrated Air Mass Flow [lb/hr]	30.00	

Figure D12 from AHRI 1200-2013 and a front view of VCT.XX.X equipment illustrating the two different methods of measuring TDA:



DOE's Engineering Analysis	Manufacturer A - VCT.RC.L	Manufacturer B - VCT.RC.L
From Engineering analysis spreadsheet	From published data	From published data
30" x 67" Doors	30" x 67" Doors	30" x 67" Doors
$D_h = 5.10$ ft	$D_h = 5.26$ ft	$D_h = 5.21$ ft
$L = 12.74$ ft	$L_{AHRI} = 12.5$ ft	$L_{AHRI} = 12.78$ ft
Case TDA = 65.00 ft²	Case TDA_{AHRI} = 65.76 ft²	Case TDA_{AHRI} = 66.55 ft²
Standard level = 39.01 kWh/day	Standard level = 39.44 kWh/day	Standard level = 39.88 kWh/day
	$L_{DOE} = 10.83$ ft	$L_{DOE} = 11.41$ ft
	Case TDA_{DOE} = 56.98 ft²	Case TDA_{DOE} = 59.44 ft²
	Standard level = 34.52 kWh/day	Standard level = 35.90 kWh/day
	A reduction of 12.5%	A reduction of 10.0%

The above spreadsheet clearly indicates that DOE used the AHRI method of calculating TDA in the DOE engineering analyses for determining the CRE standard levels for 2012 and the proposed standard levels for 2017. Changing the method of calculating TDA drastically reduces the standard level by 10.0 to 12.5 percent for VCT.RC.L equipment.