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Subject: Product Specification for Commercial Refrigerators and Freezers
Eligibility Criteria, Draft 2: Version 3.0

1) Definitions:

- A. Commercial Refrigerator, Freezer, and Refrigerator-Freezer: Refrigeration equipment that: (a) is not a consumer product (as defined in §431.2 of part 430); (b) is not designed and marketed exclusively for medical, scientific, or research purposes; (c) operates at a chilled, frozen, combination chilled and frozen, ~~or variable~~ temperature; (d) displays or stores merchandise and other perishable materials horizontally, semi-vertically, or vertically; (e) has transparent or solid doors, sliding or hinged doors, a combination of hinged, sliding, transparent, or solid doors, ~~or no doors~~; (f) is designed for ~~pull-down temperature applications or~~ holding temperature applications; and (g) is connected to a self-contained condensing unit ~~or to a remote condensing unit~~.

Supporting Comments:

- 1) Although Traulsen agrees that the above definition accurately reflects the DOE's citation of 10 CFR 431.62, it does not correspond with the scope of EPA's Energy Star program for Commercial Refrigerators, Freezers and Refrigerator-Freezers.
 - a) The current EPA Energy Star program does not include cabinets without doors,
 - b) cabinets designed for pull down temperature applications or
 - c) cabinets with remote condensing units.
- 2) Traulsen believes that the use of terms or definitions not covered by the scope of the specification could cause confusion among manufacturers, consumers and agencies administering energy conservation programs.
- 3) Traulsen understands the scope of DOE's mandatory energy consumption requirements for all of CRE to be much wider than that of EPA's
- 4) The use of the descriptor "variable temperature" should falls under the cabinet classification "Convertible Temperature Equipment".

- B. Commercial Hybrid Refrigerator, Freezer, and Refrigerator-Freezer: A commercial refrigerator, freezer, or refrigerator-freezer that has two or more chilled and/or frozen compartments that are: (a) in two or more different equipment **families classes**, (b) contained in one cabinet, and (c) sold as a single unit.

Note: Equipment **families classes** are defined in 10 CFR §431.62 and 10 CFR §431.66, and include Horizontal Closed **Refrigerators and/or Freezers with Solid and/or Transparent doors (HC) (HCS/T-**-L/M)**, **Horizontal Open (HZO)**, **Semivertical Open (SVO)**, and Vertical Closed **Refrigerator and/or Freezer with Solid and/or Transparent doors (VC) (VCS/T-**-M/L)**, and **Vertical Open (VOP)**.

Supporting Comments:

- 1) Traulsen believes that the definition of a Commercial Hybrid Refrigerator, Freezer and Refrigerator-Freezer as recorded in 10 CFR 431.62 is in error. Please refer to the equipment table of 10 CFR 431.66.
 - a) Compartments can also be categorized by storage or operating temperatures, (L – Low or M – Medium).
 - b) Refrigeration system design and performance is affected by storage or operating temperature as much as a cabinet's orientation (HC)/(VC) and door type (S)/(T). Equipment Families vs. Equipment Classes.
 - c) Very few if any commercial refrigeration appliances mix vertical and horizontal compartments. The definition as it stands now only provides for the E-Star Listing of Hybrid equipment with differing door types, Solid or Transparent. If incorrect, Traulsen requests clarification and poses the following question, "how does or can it apply to equipment with two or more compartments of the same orientation and door type with differing operating temperature (L/M) ranges?" Example, Horizontal Closed (HC) cabinet with two compartments operating as a refrigerator and freezer respectively each having a transparent and/or a solid door.
 - d) Traulsen is including DOE in the distribution list of this document and requests a review of this definition. If a revision is justified for this term, it could be included in the NoPR for the current NegReg of the ASRAC for CRE. In either case Traulsen requests clarification concerning operating temperature ranges and Hybrid commercial refrigeration equipment.
- 2) For clarity and the elimination of possible confusion, Traulsen requests terms not applicable to the products covered by this specification be eliminated or deleted from the document. Example, Horizontal Open (HZO), Semivertical Open (SVO) and Vertical Open (VOP). Open type cabinets will not be covered by the Version 3.0 specification.
- 3) If the definition of a Hybrid Refrigerator, Freezer or Refrigerator-Freezer is modified and includes the operating temperature range of the equipment, Traulsen requests the category of "Equipment Family" be replaced by "Equipment Class".

Terms Requiring Defining:

- 1) Drawer Cabinet: A commercial refrigerator, freezer or refrigerator-freezer in which one or more drawers are used to access the chilled or frozen compartment or a portion of the chilled or frozen compartment. On equipment with more than one compartment, only one compartment needs to be accessible with the use of a drawer.
- 2) Prep Table Cabinet: A commercial refrigerator, freezer or refrigerator freezer in which a food condiment rail designed to hold open perishable food is located above the storage compartment or compartments, chilled or frozen. The condiment rail is designed to hold perishable food product between 33F and 41F.
- 3) Service Over Counter Cabinet: ?

Current Wording:

- L. Convertible Temperature Equipment: Commercial refrigeration equipment that is designed to operate as a freezer or refrigerator, allowing a user to adjust a single compartment operating temperature from -5°F (freezer) up to 40°F (refrigerator) or any setting in between.

Revised Wording:

- L. Convertible Temperature Equipment: Refrigeration equipment or part there of that: (a) is not a consumer product (as defined in §431.2 of part 430); (b) is not designed and marketed exclusively for medical, scientific, or research purposes; (c) has one or more compartments that operates at a chilled, frozen, or variable temperature condition between chilled (approximately +38F) and frozen (approximately 0F); (d) displays or stores merchandise and other perishable materials horizontally, semi-vertically, or vertically; (e) has hinged transparent and/or solid doors; (f) with a user adjustable application temperature set point within the operating range of +38F and 0F; and (g) is connected to a self-contained condensing unit.

Supporting Comments:

- 1) The operating temperature range may need to be expanded. Example +50F and -10F.
- 2) Convertible temperature equipment is normally designed for the lowest operating temperature condition.
- 3) Two or more thermostats may control the operating temperature of the controlled compartment with a simple switch activating the desired thermostat.

M. Door Angle:

- ~~a. For equipment with a flat door, the angle between a vertical line and the line formed by the plane of the door, when the equipment is viewed in cross section; and~~
- ~~b. For equipment with curved doors, the angle formed between a vertical line and the straight line drawn by connecting the top and bottom points where the display area transparent joins the cabinet, when the equipment is viewed in cross section.~~

Supporting Comment:

The need to calculate door angle is not a necessary requirement in defining “included” or “excluded” products of the Version 3.0 specification or the testing of same. To eliminate confusion, Traulsen recommends the elimination of this term and its definition.

2) Scope:

A. Included Products:

- d) Horizontal Closed Transparent Self Contained Medium Temperature (H~~W~~C~~T~~ SC)

Supporting Comment:

Correction of the designating acronym, “HCT SC).

Traulsen requests that EPA wait before issuing the final Draft specification until DOE completes or adjourns the ASRAC group negotiating rules concerning CRE – commercial refrigeration equipment. As EPA wishes to harmonize programs, definitions, test specifications, certification and compliance criteria, it would prove helpful if the language of the DOE program were complete and available.

3) Qualification Criteria:

C. Determining Maximum Daily Energy Consumption for Commercial Hybrid Refrigerator, Freezer, and Refrigerator-Freezer:

<u>Example One</u>	<u>Example Two</u>	<u>Example Three</u>	Supporting Comments: Traulsen requests EPA review the computations of MDEC value for each of the equipment configurations at the left. This request is made in reference to item 1B above under "Definitions" -Commercial Hybrid Refrigerator, Freezer, and Refrigerator-Freezer. Traulsen also requests a confirmation on the definition of "Equipment Families" and Equipment Classes" with respect to the example model configurations presented. Traulsen very much appreciates the confirmation of these terms as what may seem logical to us, may not in the end be correct. <u>Equipment Family?</u> <u>Equipment Class?</u> <u>MDEC (KWhr/day) calculations?</u> <u>Definition of Hybrid Equipment?</u>
<p>Compartment-1 Refrigerator Transparent VCT. SC. M</p> <p>0 < V < 15 0.10V+1.07 15 ≤ V < 30 0.15V+0.32 30 ≤ V < 50 0.06V+3.02 50 ≤ V 0.08V+2.02</p> <p>Compartment-2 Refrigerator Solid VCS. SC. M</p> <p>0 < V < 15 0.02V+1.60 15 ≤ V < 30 0.09V+0.55 30 ≤ V < 50 0.01V+2.95 50 ≤ V 0.06V+0.45</p>	<p>Compartment-1 Freezer Transparent VCT. SC. L</p> <p>0 < V < 15 0.56V+1.61 15 ≤ V < 30 0.30V+5.50 30 ≤ V < 50 0.55V-2.00 50 ≤ V 0.32V+9.49</p> <p>Compartment-2 Freezer Solid VCS. SC. L</p> <p>0 < V < 15 0.25V+1.55 15 ≤ V < 30 0.20V+2.30 30 ≤ V < 50 0.25V+0.80 50 ≤ V 0.14V+6.30</p>	<p>Compartment-1 Refrigerator Transparent VCT. SC. M</p> <p>0 < V < 15 0.10V+1.07 15 ≤ V < 30 0.15V+0.32 30 ≤ V < 50 0.06V+3.02 50 ≤ V 0.08V+2.02</p> <p>Compartment-2 Freezer Transparent VCT. SC. L</p> <p>0 < V < 15 0.56V+1.61 15 ≤ V < 30 0.30V+5.50 30 ≤ V < 50 0.55V-2.00 50 ≤ V 0.32V+9.49</p>	
MDEC = C-1 + C-2	MDEC = C-1 + C-2	MDEC = C-1 + C-2	
Hybrid: Yes _____ No _____	Hybrid: Yes _____ No _____	Hybrid: Yes _____ No _____	
<u>Example Four</u>	<u>Example Five</u>	<u>Example Six</u>	
<p>Compartment-1 Refrigerator Solid VCS. SC. M</p> <p>0 < V < 15 0.02V+1.60 15 ≤ V < 30 0.09V+0.55 30 ≤ V < 50 0.01V+2.95 50 ≤ V 0.06V+0.45</p> <p>Compartment-2 Freezer Solid VCS. SC. L</p> <p>0 < V < 15 0.25V+1.55 15 ≤ V < 30 0.20V+2.30 30 ≤ V < 50 0.25V+0.80 50 ≤ V 0.14V+6.30</p>	<p>Compartment-1 Refrigerator Transparent VCT. SC. M</p> <p>0 < V < 15 0.10V+1.07 15 ≤ V < 30 0.15V+0.32 30 ≤ V < 50 0.06V+3.02 50 ≤ V 0.08V+2.02</p> <p>Compartment-2 Freezer Solid VCS. SC. L</p> <p>0 < V < 15 0.25V+1.55 15 ≤ V < 30 0.20V+2.30 30 ≤ V < 50 0.25V+0.80 50 ≤ V 0.14V+6.30</p>	<p>Compartment-1 Refrigerator Solid VCS. SC. M</p> <p>0 < V < 15 0.02V+1.60 15 ≤ V < 30 0.09V+0.55 30 ≤ V < 50 0.01V+2.95 50 ≤ V 0.06V+0.45</p> <p>Compartment-2 Freezer Transparent VCT. SC. L</p> <p>0 < V < 15 0.56V+1.61 15 ≤ V < 30 0.30V+5.50 30 ≤ V < 50 0.55V-2.00 50 ≤ V 0.32V+9.49</p>	
MDEC = C-1 + C-2	MDEC = C-1 + C-2	MDEC = C-1 + C-2	
Hybrid: Yes _____ No _____	Hybrid: Yes _____ No _____	Hybrid: Yes _____ No _____	

4) Test Requirements:

Will EPA accept the use of an AEDM as negotiated by DOE for commercial refrigeration equipment in establishing the energy usage data for any one model? Will EPA allow the use of the measured DEC value on cabinets with the "Same refrigeration system" but with few doors and/or less internal volume? This scenarios is for cabinets with similar construction and layout, but with somewhat different DEC values (>5.0% variance) if each model were tested separately. Traulsen would test or evaluation the worst case model.