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United States Environmental Protection Agency

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The following are our comments regarding Energy Star Program Requirements Product Specifications for Laboratory Grade Refrigerators and Freezers and Ultra-Low Temperature Freezers. Draft 1 Test Method. Rev. Oct-2012.

The EPA cover memo dated September 28, 2012 mentions that Ultra-low Temperature Laboratory Grade freezers are not being considered in the scope of specifications at this time. We hope that this is an oversight given the amount of effort the DOE and stakeholders have put into developing a test standard. Many of the requested comments below deal specifically with testing methodology for Ultra-low freezers. Ultra-low freezers have been identified as one of, if not the greatest energy consumer in a typical laboratory environment, exclusion of this product segment in the Energy Star Program for Laboratory Grade Product could significantly reduce the impact of the program as it relates to reducing the energy consumption in a typical laboratory environment while still maintaining expected performance standards.

Line 14. Applicability. Definition of ULF. The current definition defines ULF as freezers that maintain storage temperatures of -70 and -80C. We would suggest that the range be extended to include possible new product and cryogenic mechanical ultra-low freezers which perform down to temperatures of up to -160C and as low as -40C to cover the entire range of product beyond the laboratory freezer specification.

Lines 103-104. Definitions: AA) Steady State. For ULF product, 0.2C average temperature of all thermocouples over a 24 hour period from one period to the next may be a difficult standard to meet for all products in this category. 0.4C may be more suitable to establish steady state at these extreme temperatures as uniformity is addressed in a separate section of the standard.

Lines 124- 149.Test Conditions: Dry bulb and wet bulb temperatures, gradients, radiant heat and lighting have little bearing for our product in this category as all freezing units have insulated sealing doors. The important specification here is to establish ambient dry bulb temperatures within +/- 1.0C during the duration of the test. Air currents should be left intact as it has a bearing on the door opening tests described in lines 269-287.

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Lines 157-160.Instrument Specifications: Calibration of the instruments used should be tested at the temperature of the products being tested. ULF units at -80 should have calibrations performed physically at -80C, not calculated from a lower temperature to ensure accuracy of the instrument which can sometimes be the case with NIST calibration labs and inaccuracies are known to occur.

Lines 186-187. General Configuration: Many newer products, especially in the ULF class have the ability to be set between energy savings and performance modes. It is proposed that both modes be tested through the entire scope of methodology.

Lines 199-208. Ambient temperatures specify the ambient temperature probe locations are to be on a vertical plane in front of the door and 36 inches away from the unit. In the case of ULF freezers and quite possibly -30 freezers , the cold air escaping the unit during the door opening tests (outlined in lines 267-287) could easily cause a downward spike in the ambient temperatures which would need to be accounted for. It is suggested that as long as ambient temperature quickly returns to conditions as outlined in the test set-up section, this should be considered as acceptable.

Lines 211-213. The majority of ULFs operate on a range from 208V to 230VAC and many have internal boost transformers. For the sake of clarification, it is suggested that the power for these units be specified as a standard 208VAC 60Hz as this is the norm for power in the US market. In the case of ULF freezers, many products employ 2 compressors. It is suggested that voltage be verified under full load with both compressors running.

Lines 215-227. In addition to the outlined probe placement procedure, it should also be noted the process on how the thermocouple probes should be routed into the units. Assuming that transmitting probes are not being used, the probes should be routed into the unit through an access port if available then the access port should be sealed to prevent air from being drawn into the unit. This is especially important with freezing units and ULFs as routing the thermocouple wires through the gasket can cause erroneous results as these units have a tenancy to draw in warm room air through even the smallest gap as the cold air contracts inside the unit.

Lines 236-261. This appears to be appropriate, even or ULF units. This procedure ensures that thermocouples are not in direct contact with shelves, walls or other components and are only measuring air temperature as intended.

Lines 267-287. Door Opening Requirements. Although not likely to occur in actual operating conditions, this methodology should assure a balanced standard for comparison.

Lines 301-309. Many lab grade freezers and refrigerators utilize a defrost system which will only trigger when absolutely necessary to prevent temperature spikes in the unit. Many are based on evaporator temperature which assumes ice accumulation and may not trigger for an extended period of time, possibly weeks.

Lines 321-333. Given the detail on how volume of a unit should be calculated, and considering the fact that these units are designed for uniform temperature operation, many units with a forced air design also recommend that product not be placed against walls or in upright units, many contain a maximum load line limit where product should not be stored above the load line. This should be taken into account as well when calculating effective capacity. In the case of ultra-low freezers, the inner doors should be taken into account and total capacity should be calculated up to the rear of the inner doors and not to the rear of the outer door.

Lines 338 to 340. CAD diagrams are available and are dimensionally accurate in our case.

Lines 368-382. Defrost Adequacy Assurance: Many lab grade units have refrigeration evaporator coils where it will be difficult to perform a visual inspection without removal of shrouds or covers. It would be beneficial in these cases to describe the methodology of how the coils are to be inspected in these cases.

Lines 396-403. Many lab grade freezers are capable of operating well at both -20 and -30C in the same model so should be considered for submission in both categories.

Lines 404-405. Weighing the averages for both -70C and -80C ignores the fact that many end users of these products have standard operating procedures, validation protocols and specific storage requirements that require either -80C or -70C storage with the majority of customers storing product at -80C. Many ultra-low freezers do not perform as well at -70C as they do at -80C related to uniformity. If it is desired to test at both temperatures, then both should be presented separately including uniformity results and the two should not be combined for the purposes of energy consumption. Customers may then make an informed decision on their specific storage requirements based on the results.

Sincerely,

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