March 18, 2020

Ms. Tanja Crk
U.S. Environmental Protection Agency (EPA)
Climate Protection Partnership Division
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Subject: ENERGY STAR® Version 3.0 Commercial Dishwashers Limited Topic Proposal

Dear Ms. Crk:

This letter comprises the comments of the Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric (SDG&E), and Southern California Edison (SCE) in response to the United States (U.S.) Environmental Protection Agency (EPA) Limited Topic Proposal on Version 3.0 of the Commercial Dishwashers Product Specification.

The signatories of this letter, collectively referred to herein as the California Investor-Owned Utilities (CA IOUs), represent some of the largest utility companies in the Western U.S., serving over 32 million customers. As energy companies, we understand the potential of appliance efficiency standards to cut costs and reduce consumption while maintaining or increasing consumer utility of the products. We have a responsibility to our customers to advocate for standards that accurately reflect the climate and conditions of our respective service areas, so as to maximize these positive effects.

The CA IOUs appreciate this opportunity to provide comments on EPA's Version 3.0 of the Commercial Dishwashers Product Specification Limited Topic Proposal. We applaud EPA's collaboration with the commercial food service industry and the American Society for Testing and Materials (ASTM) F26 Committee in refining the ASTM F1691 and F1920 test procedures. Alongside the test procedures, we support the assertation that the adjustment of the test procedure measured values for washing energy via the enclosed offset equation is an appropriate method to align the measurement of energy recovery equipped commercial dishwashers with product performance in the field. We further recommend an alternate approach to applying the offset equation that would further improve the accuracy of this adjustment. In support of our positions, we strongly urge EPA to consider the following comments.

1. **The CA IOUs support several of EPA's proposed revisions to the commercial dishwasher specification.**

    - ***Revised definition of "Heat Recovery Machine"***
      We confirm that the measurement of inlet water flow for both cold and hot water inlets are prescribed in ASTM F1696 and F1920 and are therefore a useful quantitative proxy for ensuring a heat recovery equipped machine is operating in heat recovery mode during washing performance testing. This serves an important purpose in ensuring that machines are only credited when they are capable of operating in energy recovery mode. Previous efforts to determine if a machine was an energy recovery machine (specifically in the Version 3, Draft 2 Specification) included the suggestion of additional measurements outside of the ASTM

test procedures, this made repeatability difficult. By using information that is automatically available, this ensures a product can be properly identified consistently without introducing additional complexity.

- ***Updated reference to ASTM F1920 test procedure***
  We agree that aligning F1696 and F1920 on the inlet water temperature will benefit the consistent measurement of energy recovery dishwashers and applaud the F26 committee for balloting this update.

- ***Qualified Product List display of washing energy performance***
  The CA IOUs note that currently, washing performance (in kilowatt-hour/cycle) is extremely rare information to find on the market for a given commercial dishwasher. This is valuable information for all sides of the market, including end users, program implementers, advocacy organizations, and regulators. We commend EPA for making this information more readily available to the food service industry.

2. The CA IOUs support the proposed Primary Hot Water Energy Offset Calculation; however, we recommend application of this equation on conventional machines.

The CA IOUs note that the proposed energy offset equation using an efficiency of 80 percent for building water systems will be more representative of in-field performance than the unmodified test procedure measurement of energy recovery machines. This is also a refinement of the primary domestic hot water energy calculation in ASTM F1690 and ASTM F1920. These methods currently rely on an assumed efficiency of 65 percent, which may be too low in field applications. Therefore, we are supportive of this modification of the washing energy consumption value (in kilowatt-hour/cycle). Consumers will benefit from the increased comparability of these performance measurements and will be better able to make purchase decisions based on realistic energy cost savings and payback.

However, we request clarification on the intended application of this offset equation. The most practical application of this energy offset is the opposite of the existing proposal, where the energy offset equation should be applied to conventional dishwashers. The primary reason for this reversal of application order is the fact that the temperature differential for an energy recovery machine is an unmeasured quantity, whereas the water inlet temperature for a conventional machine is recorded during ASTM testing.

Applying the energy offset equation in full to energy recovery dishwashers would be providing a 70 °F temperature offset. We are not aware of industry data that would suggest that a typical energy recovery machine under ASTM test conditions would achieve this level of preheating. Past discussions with manufacturers have suggested that this temperature increase is more typically 35 °F to 60 °F, with some machines as low as 30 °F. Application of this proposed equation to conventional machines would instead increase the washing energy datapoint of these units to the appropriate amount for the ASTM measured inlet temperature, now that building supplied energy is accounted for. This resulting metric will compare all machine performance at a nominal inlet temperature of 70 °F.

3. The CA IOUs recommend additional data reporting for drain water tempering.

The CA IOUs note that all water connected devices are metered in the ASTM F1696 and F1920 test procedures[1] and drain water tempering devices are typically built into commercial dishwasher products due to many local code ordinances requiring tempering.[2] Therefore, a connected drain water tempering device would also be metered during ASTM F1696 and ASTM F1920 washing performance testing. Drain water tempering is the source of considerable water consumption depending on outlet temperature, user washing behaviors, and required maximum temperature to meet local plumbing code ordinances. A calculation based on Food Service Technology Center (FSTC) testing of an Ecodrain A1000[3] demonstrated a tempering water need of 0.09 – 0.32 gallons tempering water per gallon of machine inlet water on typical rack conveyor machines when washing five sets of five racks, corresponding to a potential savings of 50,000 – 80,000 gallons / year[4].

We recommend that the water consumption by a drain water tempering device used to achieve an outlet temperature of 140 °F, is added as a Qualified Products List entry. This temperature is a common municipal ordinance temperature, and per the International Plumbing Code, wastewater exceeding 140 °F must be into plumbing rated at or above this wastewater temperature[5]. If this value is not directly available, it can be calculated from the outlet water volume during a cycle, and the outlet water temperature. Note that the tempering device would be connected to the non-heated water inlet, which has a specified water temperature of 70 °F. This would support future conservation efforts and further enable consumers to select both energy and water efficient equipment. We note that drain water heat recovery reduces or in some cases eliminates the need for drain water tempering under normal operation (excluding recirculating tank dump), so providing this information highlights the two-fold energy and water conservation benefit of drain water heat recovery to consumers.

---

[1] ASTM F1696-15 9.8: "Install a separate water meter for each water machine connection including any cold water connections."
[2] N. Tallos, HPAC Engineering, The importance of Drain-Water Tempering, 2012 https://www.hpac.com/archive/article/20927153/the-importance-of-drainwater-tempering.
[3] FSTC, Ecodrain A1000 Heat Recovery Unit: https://ecodrain.com/media/uploads/ecodrain_a1000_heat_recovery_unit.pdf
[4] FSTC Table 5 provides water consumption and drain in temperature, supply in temperatures for each conveyor type dishwasher (A, B and C). For this calculation, all water consumed by dishwashers is estimated to be drained throughout the test, as drain water volume was note measured. Tempering water, to reduce the outlet temperature to 138 °F, is calculated by the equation: $(T_{dish}*V_{dish} + T_{dwt}*V_{dwt})/(V_{dish}+V_{dwt}) = TF$. Where TF is 138 °F, dish is dishwasher, and dwt is tempering device. We use this equation to calculate the total tempering water for the full five batches of five racks and divide by dishwasher water consumed to obtain tempering gallons per gallon of inlet water. Results are: 0.13, 0.09, 0.32 gallon per gallon, respectively. We note that all three dishwashers when operating in drain water energy recovery mode were below the 138 °F temperature used as the target tempering temperature.
FSTC Table 8 provides estimated daily water consumption for each machine, which are multiplied by 365 to obtain gallons per year estimates. These dishwashers use approximately 355,000; 255,000; 245,000 gallons per year, respectively. Estimated avoided tempering water use is therefore: 47,000; 24,000; 80,000 gallons per year, respectively.
[5] IPC 2015, 702.5 Temperature Rating.

In conclusion, we would like to reiterate our support to EPA's Limited Topic Proposal on commercial dishwashers. We thank EPA for the opportunity to be involved in this process and encourage EPA to carefully consider the recommendations outlined in this letter.

Sincerely,

Patrick Eilert
Manager, Codes & Standards
Pacific Gas and Electric Company

Michelle Thomas
Manager, Energy Codes & Standards and ZNE
Engineering Services
Southern California Edison

Kate Zeng
ETP/C&S/ZNE Manager
Customer Programs
San Diego Gas & Electric Company