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ASHRAE TC 8-6 Standards Subcommittee Comments on Cooling Tower Measures

Please see attached letter from the ASHRAE TC 8.6 Standards Subcommittee on the Pre-Rulemaking Cooling Tower Measures proposed for Title 24 2025.

Thank you.

Frank Morrison
Chair, TC8.6 Standards Subcommittee

Additional submitted attachment is included below.

5 September 2023

To: CEC Docket 22-BSTD-01
(https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=22-BSTD-01)

Re: **ASHRAE TC8.6 Standards Subcommittee Comments on Pre-Rulemaking Cooling Tower Proposals**

These comments are being submitted by the ASHRAE TC8.6 Standards Subcommittee in response to the Pre-Rulemaking Proposals on Cooling Towers presented in the Workshop on August 23, 2023 and based on the Final Cooling Towers CASE Report dated August 2023.

ASHRAE Technical Committee (TC) 8.6 is concerned with open and closed-circuit cooling towers, evaporative condensers, adiabatic condensers and fluid coolers, spray ponds, and other contact type liquid-to-air heat rejection equipment along with their application and impact on complete HVAC, Industrial, and Refrigeration systems, including the associated energy and water usage as well as water treatment requirements.

Please feel free to visit our Committee's website at:

https://tc0806.ashraetcs.org/

Note that the TC8.6 Subcommittee had previously submitted detailed comments on the Draft CASE Report. Our members appreciate the CASE Team's reanalysis and resulting changes to the original proposals in the Final Case Report. We continue to support the California Energy Commission's goals to save energy and water which match well with the Technical Committee's goals. We provide further comments to the proposals presented in the Pre-Rulemaking Workshop below in the spirit of considering the interests of all stakeholders and ensuring truly workable long-term solutions that benefit society while avoiding unintended negative consequences.

Our further comments and recommendations are as follows:

Cooling Tower Minimum Efficiency

While the Subcommittee appreciates the reduction in the proposed prescriptive minimum efficiency for axial fan open circuit cooling towers, these levels still remove too many models from consideration. After reviewing the Final Case Report, the Subcommittee believes it is in the best interest of all parties to maintain the current prescriptive minimum of 60 gpm/hp.

Our position is based on the following:

- Maintaining a meaningful number of cooling tower models on the market to allow System Designers adequate freedom to properly select and layout cooling towers,

especially on larger projects, while focusing on the efficiency of the full system, not just a small but particularly important key component.

- Removal of an excessive number of models from the market can be considered a restraint of trade, especially when the models that are removed are already more thermally efficient than most, if not all, competing technologies. Maintaining the current prescriptive minimum efficiency would eliminate this concern.
- Evaporative heat rejection uses approximately half of the energy of an air-cooled system. Increasing the cost and size of cooling towers can lead to a market shift to less efficient cooling types which would increase both energy use and emissions in California, negating much, if not all the expected savings. While the reduction in the required efficiency levels from those in the Draft CASE Report are appreciated, maintaining the current prescriptive minimum would avoid any potential market shifts.
- Cooling tower thermal design is very close to "Max Tech." Claims in the Final Case Report that this will encourage "innovation" in the Industry are unlikely to be fruitful, especially given the increases that are being requested of the Industry (up to 50% over the current prescriptive limit).
- As most projects do not have unlimited layout space for either larger cooling tower cells or additional cells, System Designers will be forced to place cooling tower cells closer together, increasing the potential for recirculation which can reduce some if not all the gain from the increase in efficiency called for in the proposal. As increasing the "box size" of the cooling tower and lowering the fan motor size is the primary means of increasing efficiency, the fan discharge velocity is reduced, further increasing the potential for recirculation. This is why cooling tower manufacturers will only recommend higher efficiency cooling towers when the project site will allow the proper layout spacing to ensure full thermal capacity per manufacturer's guidelines. This is difficult to achieve in prescriptive language.
- The CEC should consider that by removing a large number of models from the market, the remaining models increase in greater "steps" of efficiency. Often the next viable model over a particular minimum efficiency requirement is 10% to 20% or more higher than required due to the fewer number of available models. Thus the CEC could easily justify / claim that a higher level of efficiency is achieved with a lower prescriptive minimum. Manufacturers have granted access to CEC staff for their selection programs so this phenomenon can be easily checked.
- The Subcommittee would like to remind the CEC that the use of the efficiency metric (gpm/hp) is valid only at the thermal condition of 95°F entering water, 85°F leaving water, and 75°F entering air wet bulb. This metric is useful as a comparison point between cooling tower models. The metric cannot be used to set the fan horsepower for a cooling tower at any other thermal condition or be used in Energy Models at other than the stated temperature conditions.
- Lastly, the Subcommittee continues to be aware that by generating an energy model and following a performance-based approach, the requirements of the first two measures can be overridden. However, this path adds cost, time, and effort when designing a water-

cooled system and as such cooling towers should be able to be applied properly using the prescriptive path without these unfair burdens.

Blowdown Controls

The requirement for a confirmation test for the blowdown controls and the high-water alarm, while adding cost and effort when using water-cooled systems, will help to ensure that water treatment systems are in place and functioning properly. The concept of an initial target cycles of concentration based on the method found in ASHRAE Standard 189.1 is a definite improvement over the originally proposed method using LSI. The Subcommittee also appreciates the Case Team's cooperation and engagement, specifically Meg Waltner, that enabled stakeholders to arrive at a workable solution. The proposal will save water while helping to protect water-cooled systems from unintended scaling and corrosion and the associated loss of efficiency. The Subcommittee will continue to follow the development of this proposal closely through the CEC process and reserves the right to provide additional input to CEC Staff should the need arise.

The ASHRAE TC 8.6 Subcommittee on Standards appreciates the opportunity to comment on the both the Final CASE Report and the Pre-Rulemaking proposals as well as the Case Team's response to our original comments on the Draft CASE Report on Cooling Towers.

Please feel free to contact the Subcommittee with any questions regarding our comments and recommendations.

Best regards,

Frank T. Morrison
Chair, Standards Subcommittee
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cc: Haile Bucaneg, CEC Senior Mechanical Engineer (Haile.Bucaneg@energy.ca.gov)
Stephen Kline, Chair, ASHRAE TC 8.6
ASHRAE TC8.6 Standards Subcommittee