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Adiabatic Condenser Rating Condition

See attached for comment. Same comment submitted via email.

Additional submitted attachment is included below.

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October 1, 2017

Mark Alatorre, P.E., and Commission Staff
California Energy Commission
Re: Docket 17-BTSD-01
1516 Ninth Street, MS 37
Sacramento CA 95814
docket@energy.ca.gov

RE: Draft 2019 Standards Chapter 3-120

Baltimore Aircoil Company (BAC), appreciates this opportunity to comment on Section 120 of the 2019 Draft Title 24 Code. We strongly believe that hybrid adiabatic condensers in the considered applications offer significant energy savings potential for California and we look forward to engaging throughout the code development process.

As there are many refrigeration installations equipped with BAC's TrilliumSeries™ hybrid adiabatic condensers currently in operation in California, nationally, and internationally, we have data and experience that we believe will be useful in setting code requirements for this product category. Our overarching position is that the Code should reasonably encourage the further introduction of hybrid condensers given their energy savings potential, and – at a minimum – not unfairly disadvantage this technology vis-à-vis inapplicable requirements for traditional air and evaporative cooling systems.

In that regard, we would like to raise the following concern for your consideration:

The proposed Code language in Table 120.6-C establishes a method of minimum sizing for the hybrid equipment being based exclusively on the dry bulb and the dry heat rejection efficiency. The 2019-NR-MECH6-D Hybrid Condensers CASE report, published earlier this year, demonstrated that the technology enabled energy reduction in refrigeration systems. The key principle through which it achieves this energy benefit is by leveraging adiabatic cooling. Therefore we would like to propose establishing minimum sizing criteria for the equipment based on adiabatic (wet) operating conditions. Key reasons for this modification are as follows:

- Adiabatic condensers are designed to operate in wet-mode during Design Day (i.e. summer, hot) conditions, and are sized in wet mode for peak thermal conditions. As such, code requirements should follow with wet criteria. This would parallel the efficiency criteria for air-cooled and evaporative condensers, which each have a summer-condition selected to match their respective summer-operating mode. For example, while evaporative condensers can run in dry mode, since they are designed to run wet the majority of the year, their rating point is selected as a wet mode condition.

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- All of the energy modeling that was performed in the CASE study to demonstrate the benefit of adiabatic condensers to the State was done assuming wet performance in warm weather. However the Code does not establish any criteria for the performance of the equipment operating in this manner.
- Since the rating points of the air-cooled and adiabatic products, and of the system application are currently proposed at the same conditions, but at lower levels for the more efficient adiabatic units, one could, in theory, take a poor-performing air-cooled condenser, undersize it to the system, creatively label it as an 'adiabatic condenser', and end up with a poor-performing system. This would establish a large loophole and defeat the intent of this Code.
- By establishing criteria based solely on dry performance characteristics of hybrid units, it could incentivize some of the industry to design hybrid equipment with poor adiabatic performance, potentially leading to the defeat of the intent of this regulation, and result in *increased* energy consumption in California.

To eliminate any confusion, and avoid the possibility of anyone taking an air-cooled condenser and attempting to apply it as an adiabatic condenser and using it to circumvent the intent of this Code, we would recommend the following modifications to the rating level for Tables 120.6B & 120.6-C from the proposed Standard:

Condenser Type	Refrigerant Type	Minimum Efficiency	Rating Condition
~~Adiabatic, Dry Mode~~	~~Halocarbon~~	~~45 BTUh/W~~	~~105°F Saturated Condensing Temperature (SCT), 95°F Outdoor Drybulb Temperature~~
Adiabatic	Halocarbon	45 BTUh/W	95°F Saturated Condensing Temperature (SCT), 95°F Outdoor Dry bulb Temperature, 70°F Outdoor Wet bulb Temperature

With this rating condition an air-cooled condenser would have no (0) capacity, and thus could not be substituted. It would also dis-incentivize the introduction of poorly performing adiabatic equipment, which would have a difficult time with the close approach between air temperature and condensing temperature. This would ensure that the intent of the CASE study would be achieved—energy savings for CA with the use of this technology. Note also that the lower system condenser temperature possible with this technology enables much larger system energy savings.

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We understand the desire to use a dry rating point for the minimum efficiency, as the equipment operates much of the year in dry mode. However, concern should already be addressed because the approach (aka "TD") requirement in section 120.6.(a).4.C establishes a minimum level for dry performance, whether traditional air cooled condensers or for adiabatic condensers.

We recognize California as the national leader in energy saving codes and standards and frankly are excited to work with all the stakeholders to develop a code that support California's energy savings goals by providing well considered standards for hybrid condensers for refrigeration systems. We have a factory in Madera, California that manufactures condensers, and have been fortunate that the great citizens of the State of California have recognized the benefits of adiabatic condensers, evidenced by the many unit installations we have in CA. We would be glad to arrange visits, should the Commission desire, to either the factory or to an installation.

Properly implementing requirements for adiabatic condensers in Title 24 will provide owners and operators or refrigeration systems a wider choice of equipment to help meet their specific project needs as they balance the need for energy and water conservation. As noted above, support for this code development is a BAC priority and we pledge our ongoing, good-faith commitment to participate in the process.

Sincerely,

Philip Hollander, P.E.