

DOCKETED

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Trane Comments and Proposal for Commercial and Industrial Fans & Blowers

Additional submitted attachment is included below.



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September 18, 2017

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 17-AAER-06
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket No. 17-AAER-06 – Phase II Pre-Rulemaking, Commercial and Industrial Fans & Blowers, Invitation to Submit Proposals

Dear Mr. Galdamez:

Thank you for the opportunity to submit proposals for the Appliance Standards Phase II Pre-Rulemaking for Commercial and Industrial Fans & Blowers, as issued by the California Energy Commission (CEC) on July 18th, 2017.

Ingersoll Rand (NYSE:IR) advances the quality of life by creating and sustaining safe, comfortable and efficient environments. Our people and our family of brands - including Club Car, Ingersoll Rand, Thermo King and Trane - work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. Our company is helping to solve some of the world's most pressing challenges including the demand for energy resources and its impact on the environment. As such Ingersoll Rand announced in 2014 a roadmap to increase energy efficiency and reduce environmental impact from our operations and product portfolio to result in 20.85 million metric tons of CO₂e avoidance globally by 2020. Most recently, Ingersoll Rand was an original signatory to the "We Are Still In" declaration confirming our commitment to stand by plans that align with the targets set by the Paris Agreement regarding reducing carbon emissions to avert the worst effects of climate change.

Trane is a member of the Air-conditioning, Heating, and Refrigeration Institute (AHRI) and contributed data to the proposal that they have submitted to this docket. We agree with the AHRI position that regulating fans embedded in heating, ventilating, and air conditioning (HVAC) equipment is not cost-effective; Trane is submitting a proposal in Appendix A of these comments to provide CEC with an additional means to consider addressing our concerns, and further demonstrate the potential impact this regulation could have on an Original Equipment Manufacturer of HVAC products. The joint proposal submitted to this docket by the Air Movement and Control Association (AMCA), Appliance Standards Awareness Project (ASAP), Northwest Energy Efficiency Alliance (NEEA), Natural Resources Defense Council (NRDC), American Council for an Energy-Efficient Economy (ACEEE), and California Investor Owned Utilities also adequately addresses fans which are embedded in HVAC equipment by excluding them from the scope of this regulation. The industry-wide data and analysis included in the AHRI proposal, as well as our own justification contained in Appendix B, provide



sufficient reasoning for the exemption of embedded fans in HVAC equipment from this appliance standard.

Trane embraces energy conservation standards for our products as established by appliance standards and building energy codes, and does not take lightly the recommendation that fans embedded in our equipment be exempt from these standards. However, redesigning and re-optimizing HVAC equipment to accommodate a fan with additional prescriptive requirements – as this regulation would mandate if fans embedded within these products are not exempted – will significantly increase the cost of this equipment for consumers in California while yielding only nominal energy savings, and in some applications may even increase the energy consumption of this equipment. As such, inclusion of these fans as part of the appliance standards for Commercial & Industrial Fans & Blowers would run contrary to CEC's goals for this rulemaking.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ron Cosby". The signature is fluid and cursive, with the first name "Ron" and last name "Cosby" clearly distinguishable.

Ron Cosby
Technology & Thermal Systems Leader

APPENDIX A: PROPOSAL FOR APPLIANCE STANDARDS FOR COMMERCIAL & INDUSTRIAL FANS AND BLOWERS

DEFINITIONS

DEFINITE PURPOSE FAN means a fan which cannot be used in most general purpose applications, and is designed for use in a specifically-defined application or service condition other than usual.

EMBEDDED FAN means a fan which is fixed inside of a fan housing as part of a finished product, and which is not sold on the open market as a standalone fan.

HEAT REJECTION FAN means a definite purpose fan which is designed with the sole purpose of removing heat from a system, in conjunction with a heat exchanger, and which is not designed to provide a specific airflow.

EXCEPTIONS

Embedded fans which meet one or more of the following criteria are exempt from these standards:

1. Fans contained in finished products within the scope of:
 - a. California Title 20;
 - b. California Title 24 Tables 110.2-A to 110.2-K;
 - c. Title 10 of the U.S. Code of Federal Regulations, Parts 429 to 431;
2. Fans contained in space conditioning systems that adhere to California Title 24 Section 140.4;
3. Air economizer fans as defined in California Title 24 Sections 120.1, 140.4 and 140.9;
4. *Heat rejection fans*;
5. All other *definite purpose fans* which conform to specific operating characteristics and application conditions as defined by an equipment performance rating standard such as AHRI 340/360, AHRI 430, or AHRI 440, and are manufactured for exclusive use in equipment that is tested and certified in accordance with such a standard;
6. Replacement fans for finished products which will remain in operation.

APPENDIX B: JUSTIFICATION FOR THE EXCLUSION OF EMBEDDED FANS

Justification for each exception listed in Appendix A:

1. Fans embedded in products covered by Title 20, Title 24, and DOE appliance standards:
 - These regulations set minimum product and system efficiency requirements for HVAC equipment which encompass the energy used by the fan – exempting fans embedded in these products prevents regulating these products twice (i.e. “double regulation”).
 - If these fans are included within scope of the Fans & Blowers regulation, manufacturers of these products will be forced to redesign and re-optimize product and system performance as cost-effectively as possible, leading to little-to-no net improvement in system performance or energy savings.

2. Fans contained in space conditioning systems that adhere to California Title 24 Section 140.4
 - Title 24 Section 140.4 sets maximum building total fan power for a building including HVAC/R equipment. Exempting fans embedded in these buildings prevents “double regulation”.
 - Title 24 Section 140.4 specifies that buildings must examine its entire design to meet fan power requirements. This allows designers to examine and optimize at the system level to target the most energy efficient solution. Stipulation of fan efficiency only without respect to the remainder of the air supply system will encourage poor duct design practices that may have high efficiency fans, but lessened space conditioning efficiency overall.

3. Economizer fans:
 - The design point for an economizer enables it to perform its intended function: to provide as much free cooling as possible.
 - Regulations which do not allow economizers in HVAC equipment to operate at the optimum design point for free cooling will result in more building system energy losses than savings.
 - Air economizer fans in systems with demand control ventilation are controlled to the level of CO₂ within the building atmosphere. As such, these fans may also be considered safety fans to ensure occupancy safety and health.

4. Heat rejection fans:
 - Heat rejection fans are not designed for a specific flow or air. As such, an efficiency metric for these fans based on air flow is not valid for evaluating performance.
 - These fans have a sole purpose of rejecting heat from a system. Regulations on heat rejection fans, such as those used in vapor compression/refrigeration processes, will create an increase in system cost and require re-optimization of the heat rejection system to ensure that overall system efficiency regulations are met. Thus any increase in fan efficiency for these definite purpose fans will not result in a reduction in energy consumption, but at best no measurable energy benefit with an increased consumer cost.

5. Definite purpose fans:

- As Ingersoll Rand stated in comments with the DOE NODA releases, fans in commercial and industrial building applications are typically housed within other equipment such as an air handler or unitary rooftop unit. These fans and housings are specifically designed for, or are a permanent fixture within, the equipment for these applications. In many cases, no standalone fan exists that could be tested because the equipment makes up a portion of the housing. As such, there is no applicable test standard that can be used without creation of a fictitious fan design to attempt to represent the embedded design.
- Examples of definite purpose fans within multiple industry scope include condenser fan coil, unit ventilator, fan powered variable air volume and water source heat pump fans. Each of the fans used within these applications is used specifically for the application and requires distinct form and fit for that application.
- Additionally, because definite purpose fans are included in equipment with other functions than air movement, many times those other equipment purposes dictate that changes in fan design impacts the utility and potential safety constraints of the equipment. As such, any changes in fans due to efficiency requirements necessitates retesting and requalification of the equipment impacted. Thus, while fans may or may not be readily available for inclusion into that equipment at a higher efficiency, requirements for new fans impacts equipment cost through redesign and retesting to meet safety and utility requirements.

6. Replacement fans:

- Fans embedded in HVAC equipment have downstream or upstream impacts on overall airflow distribution. Additionally these fans are developed in conjunction with heating coils and gas heat exchangers, and are developed, tested, and certified for product safety.
- When a fan is changed in the field at the application point, an exact model should be used for replacement to comply with safety requirements to ensure that no equipment failure results that may compromise the safety of the building occupants.
- Replacement fan compliance will require development, testing and certification of equipment that may no longer be in production and no longer be available.
- Additionally, requiring replacement fan compliance would require any current products to recertify the units for any potential replacement fan. This would substantially burden the companies conducting the testing and recertification. These costs would be passed on to consumer.
- As indicated in the DOE ASRAC working group for Commercial and Industrial Fans & Blowers, and in comments to DOE, higher efficiency level fans are extremely difficult to find in some equipment classes with equivalent fan footprint. If no replacement fan with equivalent footprint (not fan diameter) can be found then the equipment must be replaced. Equipment replacement will heavily burden consumers, costing as much as 100 times the fan replacement cost.