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March 22, 2019

The Honorable Rep. Dominique Jackson
The Honorable Rep. Edie Hooton
House Energy & Environment Committee
Colorado General Assembly
200 E Colfax Avenue, Room HCR 0112
Denver, CO 80203

Re: Inclusion of Energy Conservation Standards for Commercial and Industrial Air Compressors in Colorado House Bill 19-1231

Dear Rep. Jackson and Rep. Hooton:

Thank you for the opportunity to comment on energy conservation standards for commercial and industrial air compressors in Colorado as proposed by House Bill 19-1231 (HB 1231).

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. In 2014, Ingersoll Rand announced 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 CO_2e avoidance globally by 2020. 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. As such, we are eager to work with the State of Colorado as it seeks to meet its clean energy goals, including reducing emissions of at least 26 percent below 2005 levels by 2025.

Ingersoll Rand supports implementation of the U.S. Department of Energy (DOE) Pre-publication *Federal Register* Final Rule Pertaining to Energy Conservation Standards for Commercial and Industrial Compressors, issued on December 5, 2016 (EERE-2013-BT-STD-0040). We were one of many stakeholders who provided input to DOE during the open rulemaking process, some of which was incorporated into the Final Rule. Ingersoll Rand also supports the implementation of energy conservation standards for commercial and industrial air compressors by U.S. States – should they create identical requirements as the DOE Pre-publication Final Rule – with an implementation date on or after January 1, 2022. This position aligns with the California Energy Commission (CEC) rulemaking on Appliance Efficiency Regulations for Commercial and Industrial Air Compressors (CEC Docket No. 18-AAER-05).

Passage of HB 1231 would establish requirements for Commercial and Industrial Air Compressors equivalent to those contained in the DOE Pre-publication *Federal Register* Final Rule. Ingersoll Rand supports the

inclusion of these requirements for energy conservation standards for air compressors in HB 1231 without modification, but notes that there are clarifications regarding enforcement of the regulations that the air compressor industry had sought from DOE and remain relevant questions for States implementing these standards.

Adoption of energy conservation standards for air compressors will benefit the industry in two key ways:

Alignment with Investments and Market Readiness

Ingersoll Rand is committed to continued investment in energy efficiency improvements for our air compressor portfolio to provide market-leading products, and we expect that other manufacturers have the same goals. Implementation of the appliance efficiency regulations as proposed in HB 1231 will create regulatory certainty in the Colorado market consistent with our expectations regarding the DOE Final Rule.

Consistency in Declarations of Product Performance

Implementation of these standards for air compressors will also mean enforcement of the DOE Test Procedures Regarding Commercial and Industrial Air Compressors in Colorado. Ingersoll Rand expects that enforcement of the Test Procedures will ensure consistent, verified representations of air compressor energy performance in the State.

Clarifications Sought Regarding Enforcement of the Appliance Efficiency Regulations for Commercial and Industrial Air Compressors

In the DOE Pre-publication *Federal Register* Final Rule, Section III(G)(1)(C) states:

DOE understands that manufacturers of compressors may have historical test data that were developed based on ISO 1217:2009(E). If historical test data is based on the same methodology being adopted in this final rule, then manufacturers may use this data for the purposes of representing any metrics subject to the representations requirements.

This acknowledgment is critical, as it allows manufacturers to rely on existing test data in order to establish ratings based on historical data, so long as it is representative of the values expected should the equipment be tested under the new Test Procedures. In order to comply with appliance efficiency regulations within a reasonable amount of time, we must be able to rely on existing test data prior to the enforcement of the Test Procedures. The time and resources that would be required for the industry to re-test all of its equipment would place a significant burden on manufacturers, and it is not possible to complete this process by January 1, 2022. Ingersoll Rand requests that Colorado make the same clarification as Section III(G)(1)(C) in the DOE Pre-publication *Federal Register* Final Rule regarding enforcement of the appliance efficiency regulations in the State.

Additionally, the Compressed Air & Gas Institute (CAGI), the trade association representing air compressor manufacturers of which Ingersoll Rand is a member, has made several interpretations regarding the certification of products using the DOE Test Procedures for Commercial and Industrial Air Compressors. These interpretations were communicated in a letter from CAGI to DOE dated August 9, 2017 (appended to these comments for reference), and summarized below:

1. AEDM Tolerance: In §429.70(h)(2)(ii)(a), the 5% tolerance applies for validation of the AEDM, when comparing the physical test results of the basic models upon which the AEDM is based and the output of the AEDM. Ingersoll Rand interprets this to mean that a verification test on a single basic model would be acceptable so long as value is not more than 5% lower than the value calculated using the AEDM. We also interpret this to be applicable for custom products based on a basic model, for which a rating is derived using an AEDM, but only has a sample size of 1.
2. ISO Tolerances: The DOE test procedure is based on ISO 1217 and the tolerances in the standard are applicable. In §431.343, Materials incorporated by reference, Section (b)(1)(vi) states the following: "*Annex C (normative), Simplified acceptance test for electrically driven packaged displacement compressors (excluding C.1.2, C.2.1, C.3, C.4.2.2, C.4.3.1, and C.4.5).*" Annex C, C.1.1 includes Table C.1, Maximum deviations from specified values during an acceptance test, and Table C.2, Maximum deviations permissible at test. Ingersoll Rand interprets this to mean that allowable test tolerances as listed in ISO1217 Table C.1 may be used when conducting a single test on individual basic models. For low volume sample sizes, Ingersoll Rand assumes that the principles of Appendix B to Subpart C of Part 429, with regard to the determination of LCL (lower control limit) based on the true mean, standard deviation and standard error shall apply.
3. Specialty Equipment: For custom or specialty equipment, Ingersoll Rand assumes that if a customer requests modification to a basic model, this custom product may be rated by following the AEDM procedures for the basic model, and testing of the modified model is not required. Such modifications may add additional energy-consuming components that are necessary to operate the package in a specialized application, which cannot be disabled or removed in a test. The basic model, upon which the modified unit is based, would be tested and the data made available to the general public.
4. Discharge Pressure: Appendix A.III.B.2.2 provides instructions regarding the determination of the maximum discharge pressure, including that a manufacturer's instructions regarding the maximum discharge pressure are to be followed regardless of the capability of the machine. For example, if a manufacturer instructs that a compressor maximum discharge pressure is 115 psig, Ingersoll Rand assumes that 115 psig shall be used to test the equipment regardless of the actual maximum discharge pressure that the compressor may be capable of achieving.

CAGI has not received a response from DOE regarding these interpretations, and Ingersoll Rand requests that Colorado confirm that these interpretations are accurate as it relates to enforcement of energy conservation standards for air compressors in the State.

We appreciate the opportunity to provide comments on the inclusion of energy conservation standards for air compressors in HB 1231. If you wish to discuss these comments any further, please do not hesitate to contact me.

Sincerely,

Mark Lessans
Energy Efficiency Analyst