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10-BSTD-01

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September 13, 2011

California Energy Commission (CEC)

Re: AHRI Comments on "Residential Field Verification and Diagnostic Testing for Air Conditioner Refrigerant Charge" (Docket Number 10-BSTD-01; "August 23, 2011 Staff Workshop – 2013 Building Energy Efficiency Standards")

Dear CEC Staff:

The Air-Conditioning, Heating and Refrigeration Institute (AHRI) is the trade association representing manufacturers of heating, cooling, water heating, and commercial refrigeration equipment including manufacturers of commercial HVAC pumps. More than 300 members strong, AHRI is an internationally recognized advocate for the industry, and develops standards for and certifies the performance of many of the products manufactured by our members. In North America, the annual output of the HVACR industry is worth more than \$20 billion. In the United States alone, our members employ approximately 130,000 people, and support some 800,000 dealers, contractors and technicians.

We have reviewed the following proposals with respect to the refrigerant charge verification protocol in the Residential Appendix RA3.2:

- Section 3.5 of the report drafted by Mr. Keith A. Temple and titled "Proposed Improvements to Residential HVAC Diagnostic Test Protocols".
- The "Residential AC Discussion" presentation discussed at the August 23, 2011 CEC staff workshop.

We have some concerns on the recommendation to allow refrigerant charge verification down to 50 °F during the winter. A system typically faces an issue in cold ambient temperatures with respect to the liquid refrigerant in the sump during start up. Crankcase heaters or sump heaters help minimize the condensing of a refrigerant in the compressor and increase the longevity of the compressor bearings and other critical components. When a system is in the off mode, the refrigerant migrates to the compressor sump and saturates various parts within the compressor with a mixture of refrigerant and oil. If the compressor is started in such a condition, liquid slugging – a condition which tends to damage the compressor, can occur. In order to prevent liquid slugging, a temperature difference must be maintained between the sump of the compressor and the coolest point in the system.

Although the refrigerant-oil mixing issue can be counteracted by a sump heater, there are other issues associated with including sump heaters in systems. System manufacturers typically try to minimize the use of sump heaters in their products in order to control the overall cost of manufacturing. Additionally, it would be impossible to retrofit sump heaters to existing systems in the field, so applying the proposed recommendation to these products would end up damaging compressors, thereby reducing the life and efficiency of the

equipment. The refrigerant charge verification protocol at 50 °F for systems without sump heaters would be inaccurate because of the refrigerant-oil mixing issue.

Manufacturers' installation manuals do not currently recommend refrigerant charge verification down to 50 °F. Therefore, manufacturers should not be held liable for any reliability issues that occur in the systems due to the proposed recommendations.

CEC should reject the proposed code changes on refrigerant charge verification based on the concerns stated in this letter. AHRI appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'AR' with a flourish underneath.

Aniruddh Roy
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