

May 2, 2013

Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program
Mailstop EE-2J
1000 Independence Avenue SW
Washington, DC 20585

Re: Framework Document for Commercial and Industrial Pumps (Docket No. EERE-2011-BT-STD-0031)

Dear Ms. Edwards:

These comments are submitted by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) in response to the U.S. Department of Energy's (DOE) release of the framework document for commercial and industrial pumps appearing in the Federal Register on February 1, 2013.

AHRI is the trade association representing manufacturers of heating, cooling, water heating, and commercial refrigeration equipment. 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.

AHRI has reviewed the Framework Document with its members and applauds DOE's effort to improve pump system efficiency. Information DOE has requested and general comments are provided in this letter to help incentivize the use of energy saving system designs and assemblies.

The vast majority of pumps included in the scope of the proposed requirements are sold independently of motors and drives, by pump manufacturers. AHRI members estimate that pumps sold by pump manufacturers, as packages of pumps, motors and drives make up approximately 10% - 20% of the covered pumps sold for use in HVACR applications. The remaining 80% - 90% of pumps are assembled with motors and/or variable frequency drives (VFD) (a subset of VSDs) by distributors or contractors in the field. Thus, unless DOE develops coverage of all possible combinations of extended product, a regulatory regime that includes requirements for a class of pump/motor/drive product may inadvertently cover only approximately 10% of the possible combinations

that are in use. There are, however, potential solutions that would allow for the rating of the majority of possible pump/motor/drive assemblies, as opposed to the minority.

ANSI/AHRI Standard 1210-2011 – *Performance Rating of Variable Frequency Drives* - the current performance rating standard for standalone VSDs used in HVACR applications – will soon provide performance maps for VFDs tested with standard NEMA design B four-pole motors that comply with NEMA MG-1 Part 31. An AHRI VFD certification program has recently been launched and performance data are expected to be published in 2014. A systemic efficiency calculation for the majority of pump/motor/VFD packages may then be possible by combining VFD, motor, and pump performance maps. This method would provide data for many more systems and a random selection of calculated system efficiency metrics could be verified by test.

If DOE does establish a regulatory regime that includes pump packages with VSDs in this regulatory cycle, AHRI recommends that the pump manufacturers manage compliance of the extended product and that separately sold VFDs remain outside of the DOE's authority.

The selection of a regulatory regime that includes VSDs must also be sure to select appropriate part load levels and operating points. AHRI 1210 requires that a VFD and standardized motor be tested at 4 different speeds: 40%, 50%, 75%, and 100%. Those operational testing points for which measurements are taken were designed to anticipate how compressors, fans, and pumps operate. Since fans and compressors are more likely to operate at the lower operating speeds than pumps, AHRI estimates that VFDs in pump/motor/VFD packages range from approximately 50% -100% of maximum speed and average operation is at approximately 75% of full speed. While VFDs have a relatively close distribution of efficiency among models, AHRI recognizes that VFD speed should not be the primary variable of a pump/motor/VFD package test. Instead, AHRI recommends that DOE accept the Hydraulic Institute's suggestions to use ANSI/HI 14.6-2011 for stand-alone pump testing and take time to develop a sound method for testing pump/motor/VSD packages. Typical VFD operation in pump/motor/VFD packages must be considered.

If DOE defines pumps with motors and/or controls, AHRI suggests that DOE develop a combined pump/motor/VSD efficiency metric using a weighted average of measurements at specified rating points. Once available, DOE may incorporate AHRI performance data for VFDs into a calculation of pump/motor/VSD package efficiency. A corresponding test procedure must ensure that operation is reflective of the part-load conditions typically in use. Additionally, the methodology used to develop the Integrated Part-Load Value (IPLV) metric, as described in Appendix D of AHRI Standard 550/590 – *Performance Rating of Water-Chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle* may be a useful reference. AHRI recommends that meeting minimum levels of a weighted average metric for pump/motor/VSD packages is favorable to meeting minimum levels at multiple points as a weighted metric will allow for more flexibility of design.

Additionally, most drives are not capable of producing 110% capacity for more than 1 minute and DOE should not include an overload test point based on over speeding.

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 that reads "Jon Lemmond". The signature is written in a cursive style with a large initial "J" and a distinct "L".

Jon Lemmond, PE
Regulatory Engineer, AHRI
Tel: 703.524.0376
Email: jlemmond@ahrinet.org