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HVAC Advanced Products Division

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October 9, 2009

Ms. Rebecca Duff
ICF International
1725 Eye St., NW
Suite 1000
Washington, DC 20006

Re: Mitsubishi Electric & Electronics USA, Inc.'s Comments on the ENERGY STAR® Geothermal Heat Pump Specifications Version 3.0 – Draft 1

Dear Ms. Duff;

Mitsubishi Electric & Electronics USA, Inc. (MEUS) appreciates the opportunity to submit the following comments in response to the U.S. Environmental Protection Agency's (EPA) request for public comment on Draft 1 of the ENERGY STAR®. We are requesting that EPA considering the inclusion of highly efficient variable refrigerant flow (VRF) multi-split geothermal heat pump systems in the Version 3.0 specification.

MEUS's key comments are summarized as follows:

- In June, the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) approved AHRI 1230, a test procedure for rating of VRF multi-split air-conditioning and heat pump equipment. This test procedure should be specified in Version 3.0 as the appropriate test procedure for VRF multi-split air conditioners and heat pumps of all sizes including geothermal heat pumps.

- Version 3.0 should incorporate a definition of VRF multi-split system that is drawn from AHRI 1230.

- The proposed program should include the highly efficient variable refrigerant flow multi-split geothermal heat pump systems with capacities below 135,000 Btu/h. Even though these systems are mostly 3-phase, we have numerous examples of these systems being used in residential applications.

AHRI 1230 – Test Procedure for VRF Multi-split Systems

In June 2009, AHRI approved Standard 1230 as the appropriate test procedure for VRF multi-split air conditioning and heat pump equipment. Therefore, AHRI 1230 should be specified in Version 3.0 as the appropriate test procedure for VRF multi-split geothermal heat pumps. The development of this standard was based, in part, on the ISO Standard 13256-1 which is the AHRI standard for geothermal heat pumps. The testing requirements are essentially the same except that Standard 1230 allows for testing with

multiple indoor units based on the "tested combination" definition developed by AHRI members and Department of Energy representatives.

3.25 *Tested Combination.* A sample basic model comprised of units that are production units, or are representative of production units, of the basic model being tested. The tested combination shall have the following features:

a. The basic model of a variable refrigerant flow system ("VRF system") used as a tested combination shall consist of an outdoor unit (an outdoor unit can include multiple outdoor units that have been manifolded into a single refrigeration system, with a specific model number) that is matched with between 2 and 5 indoor units (for systems with nominal cooling capacities greater than 150,000 Btu/h [43,846 W], the number of indoor units may be as high as 8 to be able to test non-ducted indoor unit combinations)

b. The indoor units shall:

b.1 Represent the highest sales model family as determined by type of indoor unit e.g. ceiling cassette, wall-mounted, ceiling concealed. etc. If 5 are insufficient to reach capacity another model family can be used for testing.

b.2 Together, have a nominal cooling capacity between 95% and 105% of the nominal cooling capacity of the outdoor unit.

b.3 Not, individually, have a nominal cooling capacity greater than 50% of the nominal cooling capacity of the outdoor unit, unless the nominal cooling capacity of the outdoor unit is 24,000 Btu/h [7016 W] or less.

b.4 Have a fan speed that is consistent with the manufacturer's specifications.

b.5 All be subject to the same minimum external static pressure requirement while being configurable to produce the same static pressure at the exit of each outlet plenum when manifolded as per section 2.4.1 of 10 CFR Part 430, Subpart B, Appendix M.

Definition of VRF Multi-split Geothermal Heat Pump Systems

EPA solicited input on the appropriate definition for "VRF multi-split systems." MEUS recommends use of a definition consistent with the definition of those systems in AHRI 1230. AHRI 1230 defines VRF multi-split systems as:

3.10 *Multi-Split Heat Pump*. One or more factory-made assemblies designed to be used as permanently installed equipment to take heat from a heat source and deliver it to the conditioned space when heating is desired. It may be constructed to remove heat from the conditioned space and discharge it to a heat sink if cooling and dehumidification are desired from the same equipment. It normally includes multiple indoor conditioning coils, compressor(s), and outdoor coil(s). Such equipment may be provided in more than one assembly, the separated assemblies of which are intended to be used together. The equipment may also provide the functions of cleaning, circulating and humidifying the air.

3.27 *VRF Multi-Split System*. A split system air-conditioner or heat pump incorporating a single refrigerant circuit, with one or more outdoor units, at least one variable speed compressor or an alternative compressor combination for varying the capacity of the system by three or more steps, multiple indoor fan coil units, each of which is individually metered and individually controlled by a proprietary control device and common communications network. The system shall be capable of operating either as an air conditioner or a heat pump. Variable refrigerant flow implies three or more steps of control on common, inter-connecting piping.

3.28 *VRF Heat Recovery Multi-Split System*. A split system air-conditioner or heat pump incorporating a single refrigerant circuit, with one or more outdoor units at least one variable-speed compressor or an alternate compressor combination for varying the capacity of the system by three or more steps, multiple indoor fan coil units, each of which is individually metered and individually controlled by a proprietary control device and common communications network. This system is capable of operating as an air-conditioner or as a heat pump. The system is also capable of providing simultaneous heating and cooling operation, where recovered energy from the indoor units operating in one mode can be transferred to one or more

3.29 *Water-To-Air Heat Pump and/or Brine-to-Air Heat Pump*. A heat pump which consists of one or more factory-made assemblies which normally include an indoor conditioning coil with air-moving means, compressor(s), and refrigerant-to- water or refrigerant-to-brine heat exchanger(s), including means to provide both cooling and heating, cooling-only, or heating-only functions. When such equipment is provided in more than one assembly, the separated assemblies should be designed to be used together. Such equipment may also provide functions of sanitary water heating, air cleaning, dehumidifying, and humidifying.

3.30 *Water Loop Heat Pump.* Water-to-air heat pump using liquid circulating in a common piping loop functioning as a heat source/heat sink. The temperature of the liquid loop is usually mechanically controlled within a temperature range of 59°F [15°C] to 104°F [40.0°C].

MEUS proposes that the Eligibility Criteria include definitions for VRF systems that are consistent with that contained in AHRI 1230 which will then align ENERGY STAR with the categorization of VRF systems in AHRI 1230 and allow industry-wide standardization.

As VRF systems are extremely efficient products, they should not be penalized and required to wait until 2010 for ENERGY STAR designation simply because of the previous lack of an appropriate test procedure. Thus, EPA should reserve the flexibility to grant ENERGY STAR certification immediately for VRF products that meet the current requirements, rather than requiring the manufacturer to wait for the transition to the Version 3.0.

Thank you for your consideration of these comments on Draft 1 of Version 3.0 of the ENERGY STAR Geothermal Heat Pump specifications. If you have any questions regarding the information discussed above, please do not hesitate to contact me at (678) 376-2923.

Sincerely,

Paul Doppel
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Factory Liaison and Government Affairs
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