



## **METLUND D'MAND® SYSTEMS**

<b>DOCKET</b>
<b>05-BSTD-2</b>
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Rob,

I have reviewed the material from the Efficiency Standards Hearing held on May 19th. There are several statements and comments in some of the reports that are unclear and in some cases not totally accurate in regards to On Demand Re-circulation Systems.

The Distribution System Multiplier should be less than 1.0 as it clearly states that in the Oak Ridge National Laboratory and in the Davis Energy Group, Inc. Measure Information Template dated April 19, 2006, that the study done on five homes the On Demand System did in fact save energy compared to the conventional way of running water down the drain. This is even more significant in that the homes the tests were conducted were over 50 years old. These homes were with basements and the pipes were in conditioned space. In most homes built in California in the last 30 years the pipes are plumbed under slab or in the attic and are not in conditioned space. It would be obvious that a greater energy saving would occur if the tests were conducted in homes more conducive to current plumbing standards in California.

In reference to motion sensors and On Demand Systems, the test results that were used by Davis Energy Group were not complete. The plumbing layout and the circulation system configurations were in place prior to the installation of the On Demand Re-circulation System in the Livermore test home which was the only home used in the test. DEG later added motion sensors to their study before the On Demand System was installed. I was called by DEG to review and comment on the On Demand Systems including the plumbing layout of the home, the placement of the motion sensors and on the project overall. My comment was the hard wired motion sensors DEG used were not suitable for the On Demand System and were placed in the wrong locations for the most suitable activation. Since they had already wired the home we had no other choice than to locate the sensors at the same place. I recommended wireless motion sensor in order to correctly place the sensors but the home owners were living in the home and this would have created possible problems. It was not an ideal test study for motion sensors. Even with the improper placement of the motion sensors, DEG found that the On Demand Pumping System operated significantly less than any of the other circulation system alternatives they tested: it ran 1/70<sup>th</sup> as long as a continuously pumped system and 1/5<sup>th</sup> as long as the next most efficient alternative.

Motion sensors should be acceptable for use in new buildings, both residential and non-residential, for the following reasons: First, the correct On Demand motions sensors operate on a different principal than standard motion sensors. The On Demand Motion Sensors will only send a single signal to the electronics in the On Demand System. The On Demand System will only go on if the delta-t temperature is low enough to allow the pump to be activated. The motion sensor goes into a stand by mode and will not send another signal for at least 5 to 10 minutes by design. No other motion sensor will do this. Even if it did the electronic pump (On Demand System) would not active if hot water was already in the system.

Second, in studies completed by the CEC it has been proven that if the hot water line is well insulated that water will stay above 105 degrees for almost 40 minutes. During that time even if a motion was detected by the On Demand Motion Sensor, the Electronic On Demand Pumping Systems would not allow the pump to go on. And while it is likely that the On Demand Pumping System will run a few more times each day than it would if the only method of activation was a button that needed to be pressed shortly before hot water was desired, since the hot water lines are required to be insulated, the impact of this will be small.

However I do see where a motion sensor in the kitchen may not be placed correctly, as was the case in the DEG study in Livermore. My recommendation is not to allow a motion sensor to be installed in the kitchen but allow it to be installed in the bathroom areas.

In non-residential applications, installation of the On-Demand type motion sensor either in the hallway serving both bathrooms or inside each bathroom is a particularly good use of this activation technique. In these instances, it is acceptable to use them both on dedicated return lines and on those where the cold water line is used as the return.

It was commented at the Friday 19th Hearing that water in conditioned space would be warm enough to wash your hands. In the Oak Ridge Study the average temperature for the hot water in conditioned space was slightly less than 70 degrees. 70 degrees is not considered warm water and is in fact about 30 degrees below our body temperature. While people may put up with a relatively cool water temperature for rinsing their hands, from a health point of view 70 degrees is not acceptable to effectively clean our hands of germs. Above body temperature is more acceptable. It is important to have the hot water at any fixture at above 100 degrees for health reasons when you plan to wash your hands or face, and it probably needs to be hotter in order to take a shower.

There are several studies for On Demand Re-circulation Systems that have not been considered by the Efficiency Standards or were not mentioned in the Friday May 19th hearing.

1. The US ENVIRONMENTAL PROTECTION AGENCY (EPA) has completed a formal policy which recognizes On Demand Water Pumping Systems (Demand Systems) as an ENERGY STAR CREDIT for Qualified Homes performance requirements. The report references studies by several credible agencies including;

- The REUWS by the AWWA,
- The study by Oak Ridge National Laboratory,
- The Progress Report on Building America Residential Water Heating Research, Davis Energy Group
- Hot Water Distribution System Research--Phase 1 Final Report, by Applied Energy Technology for the California Energy Commission.

The attached EPA ENERGY STAR report is considered "Draft" status as the final report is being published and released this week by the EPA. The study clearly indicates the savings and factors involved. This report concludes that On Demand Pumping Systems are energy efficient compared to either current practice of running water down the drain while waiting for hot water to arrive or to all other recirculation system alternatives. They are even more effective when combined with Structured Plumbing, a concept with insulation on all hot water lines and which minimizes the volume of water in the line between the circulation loop and each fixture.

2. Another source of information on the subject of Hot Water Distribution Systems in general and On Demand Pumping Systems in particular can be found in a series of three articles that was published nationally first in Plumbing Systems Design (the journal of the American Society of Plumbing Engineers (ASPE)), and subsequently in the Official Magazine (IAMPO) and in Plumbing Standards Magazine (American society of Sanitary Engineers (ASSE)). The articles were favorably accepted not only by the plumbing industry but by the National Green Building groups and builders throughout the country. These articles provide an excellent overview of the problems found in hot water distribution systems, discuss how to improve them and rank the various alternatives in order of effectiveness. They conclude that On Demand Pumping Systems are the most energy and water efficient alternative and are more energy and water efficient than their current practice of running water down the drain while waiting for hot water to arrive.
3. Australia has recognized the On Demand Pumping Systems as a viable method of saving both energy and water. On Demand Pumping Systems have been tested and approved by the Australian Government under AS/NZ 4020 Compliance for WATERMARK LISTING. In addition, as of May 29th 06 On Demand Pumping Systems (manufactured here in the US for Dux Water Heater Mfg. Co.) under the label of READYHOT, have been awarded the Australia Product of the Year beating out

over 100 entries from Australia. The award was presented by the Housing Industry Association (HIA) for the most innovative energy/ water savings product for 2006.

On Demand Pumping Systems have been on the market for the last 14 years. At this time there are three manufacturers: ACT Inc, Metlund Systems, Taco Pumps Co. and Wirsbo (Uponor) Pipe Co.

The concept is rated at practically 100 percent customer satisfaction by over 50,000 customers which should play a major role in any approved products. They have been installed in retrofit to fix problems in existing houses and they have been installed each year by builders throughout the state so that they can prevent customer complaints about waiting for hot water to arrive. Builders who have installed recirculation systems using standard controls have switched to the use of On Demand Pumping Systems because they are more reliable, and provide greater customer satisfaction, including much lower operating costs.

**Having On Demand Pumping Systems allows the home owner to conveniently have the availability of the hot water while simultaneously saving water and energy.** Given their documented benefits, Title 24 Standards should give builders credit for installing On Demand Pumping Systems, rather than penalizing them as is currently the case.

In addition to this letter I have attached the following information for inclusion in the proceedings and for your review.

- #. Environmental Protection Agency (EPA) Draft report.
- #. Australian WATER MARK AS/NZ 4020 Compliance
- # Australian Press Release

If you have any questions, please contact me at 714 668 1200 ext. 109.

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ACT Inc.