



December 4, 2007

340 Mad River Park
Waitsfield, VT 05673
Tel: 866-642-3197
Fax: 802-496-6924

Richard Karney, PE
ENERGY STAR Product Manager
U.S. Department of Energy

Eric Moffroid
SVP, Sales
Bosch Water Heating North America

Dear Mr. Karney,

Bosch Water Heating would again like to extend our congratulations to the U.S. Department of Energy for preparing to include water heaters in the ENERGY STAR program. Adding this large residential energy use to a program that has such powerful market impacts will surely lead to improved energy efficiency in U.S. homes. We agree with DOE when it states that water heating is the only major residential energy end use that ENERGY STAR does not address.

Regarding the Second Draft Criteria Analysis and Proposal issued by DOE on October 26, Bosch Water Heating has the following comments that pertain specifically to **Minimum Energy Factor** and **Minimum Flow Requirements**.

Minimum Energy Factor:

- 1) We were in agreement with the previously published minimum Energy Factor of 0.80. This was an already accepted and established baseline as determined in the Energy Policy Act of 2005 for federal tax credit qualification. Should ENERGY STAR raise this minimum to .82 for gas tankless water heaters the industry will be harmed. Furthermore, ENERGY STAR would create confusion and exclusion across this growing industry that is already bringing reduced energy costs and more efficient systems into American homes.
 - a) Confusion: Given .80 was already established for the tax credit, to now raise the baseline to .82 (only for tankless) seems arbitrary and counterproductive as the additional savings garnered from \$.02 of a therm is negligible and certainly not enough to offset the additional costs from install. (see below)
 - b) Exclusionary: Many manufacturers (Bosch included) geared their product line to meet .80 in order to qualify for the very effective tax credit qualification. To now require these same manufacturers retool in order to meet .82 to qualify for ENERGY STAR is exclusionary.
 - c) Additional Installation Costs: Moving from .80 to .82 will have the unintended consequence of requiring stainless steel venting instead of far less expensive galvanized metal. Additionally the need to dispose of condensate will now be required. Both will add hundreds of dollars to every install and dissuade potential Energy Star inclined customers.
 - d) Negative Impact on Solar Energy Systems: The residential solar energy market is a growing industry in the US and another avenue for American families to lower their home energy costs. Obviously, thermal solar systems cannot single-handedly satisfy a home's hot water

usage all year round. There will be cloudy days. As such, solar energy systems are used in conjunction with small less expensive back-up water heating systems. Tankless systems are ideal for this application. Should ENERGY STAR proceed with its intention to raise the energy factor for these systems to .82, the added costs for installation will negatively impact an additional segment of home owners that wish to lower their costs.

Lastly on the topic of EF, we at Bosch are sincerely confused that the DOE would differentiate between Gas-fired storage and Gas-fired instantaneous residential water heaters as outlined below. According to the DOE's own *Energy Conservation Program for Consumer Products and Standards Rulemaking for Residential Water Heaters* Gas-fired Storage will be held to Efficiency Level 1 requirements while the far more nascent Gas-fired instantaneous industry will be held to Level 2 requirements. This too seems arbitrary and unjust.

Gas-fired storage residential water heaters

Efficiency Level	Energy Factor	Recovery Efficiency
Baseline – Minimum Federal Energy Conservation Standard	0.59	0.78
Efficiency Level 1	0.62	0.78
Efficiency Level 2	0.65	0.78
Efficiency Level 3	0.68	0.80
Max Available Efficiency Level	0.86	0.95

Gas-fired instantaneous residential water heaters

Efficiency Level	Energy Factor	Recovery Efficiency
Baseline – Minimum Federal Energy Conservation Standard	0.62	0.78
Efficiency Level 1	0.75	0.80
Efficiency Level 2	0.82	0.85
Efficiency Level 3	0.85	0.85
Max Available Efficiency Level	0.92	0.93

Minimum Flow Requirements:

- 2) We believe DOE was going in the right direction when it reduced the minimum gallons-per-minute requirement to 3.0 at a 77 degree rise from the previous 3.5 gpm. However, we still feel such a requirement is not necessary. The ENERGY STAR model water heater chosen needs to fit the need that is required, which should be determined by the consumer. If the consumer is misled to buy more water heater than is needed, neither the consumer nor the environment nor America's overall energy usage will benefit.

In the written words of Lowe's Homecenter (DOE has a copy of this letter) the second largest reseller of water heaters in the United States and the recipient of the ENERGY STAR partner award for five consecutive years, including the 2004 ENERGY STAR retail partner of the year:

These (moderate flow rate) models are far less expensive for our customers to purchase (almost half the price of the models your proposal would require), much simpler to install and maintain.....our customers have been consistently pleased with these mid-size models we carry. Not everyone needs the biggest and most powerful (and most expensive) water heaters available; therefore we are recommending the inclusion of the mid-size (2.5 GPM) models in your Energy Star program.

Please consider a few other notes from Bosch constituents regarding a minimum flow rate:

1. Smaller homes and smaller families (one or two individuals) typically utilize one major hot application at a time which can be more than satisfied from a small to mid size tankless water heater. The Proposal would require these home owners to purchase large over sized-capacity tankless water heaters only.
2. DOE may be proceeding with a minimum degree rise / flow rate for an antiquated reason. Traditionally, a 77° degree rise for tank heaters has been mandated to prevent Legionella from forming which can cause Legionaire's disease. This is not an issue for concern with tankless systems and is therefore unnecessary. DOE does not explain why 77° degree rise should be applied to tankless systems. The average groundwater in the US is 55°F. A mandated 77° rise would deliver water at a temperature of 132°F, quickly scalding people. (Fast food establishments typically serve hot coffee at this temperature.) In order to cool down this scorching water to a usable 106°F significantly more tempering water has to be added. This is not only wasteful but more costly for a homeowner.
3. On the minimum flow rate - smaller heaters used as point of use heaters serving showers is even more efficient than a central tankless due to lowered energy loss in distribution. Some homes are doing this - using more than one heater and zoning. Forcing larger heaters would lead people to use a central system only, wasting both energy and water in distribution.
4. There is currently consideration to drive water consumption down further through the use of increasingly restrictive shower heads. Since water consumption is a hot topic in much of the country, why would we advocate increased output? That's counter-intuitive at best.

5. The vast majority of homes are working at lower flow rates the majority of time. Larger heaters are actually much less efficient at low fire, where they would operate the most. Properly sizing heaters makes much more sense as tankless heater operate at their peak efficiency at high fire.

Finally, if a minimum flow is required by the DOE, then we at Bosch would endorse a minimum of 2.5 gallons per minute at a 77° degree rise as this is the maximum flow restriction for all shower heads in the United States.

Thank you once again for your many efforts and we look forward to continuing to work with the DOE at decreasing our country's energy demand and everyone's utility bills.

Sincerely,

Eric Moffroid
cc Josh Butzbaugh