



# Danger in the Shower: 2008 Forum Looks at Hot Water

On average, water heating accounts for 15% of residential energy consumption. In the past few years, there has been an explosion of interest in meeting domestic hot water needs more efficiently. New hot-water-generating technologies, structured plumbing approaches, new demand reduction devices (for example, improved showerheads), and programs for stimulating market uptake of new approaches are all being discussed by individual communities of interest, with limited dialogue among them. In order to foster the dialogue and explore the issues associated with hot water, the American Council for an Energy Efficient Economy (ACEEE) sponsored an important conference on this topic in June 2008 in Sacramento, California.

One of the many topic areas covered at the conference was that of domestic showers and shower systems. Presentations were focused on the current standards development work under way by the American Society of Mechanical Engineers (ASME) standards committee, the EPA WaterSense program, and others; the current market trends in domestic shower systems; and the technical aspects of the plumbing systems designed to protect people who take showers from thermal shock and scalding.

This conference was of particular importance to the water and energy utilities, because these groups had expressed concern over the new low flow rates on showerheads. The failure to address the lack of scald protection systems (automatic compensation valves) in homes built before 1987 has put users at risk when they replace their conventional showerhead with a head flowing at less than 2.5 gallons per minute (gpm). Activating or terminating the fill cycle on a clothes washer, flushing the toilet, or turning on the outdoor irrigation system, for example, can cause an instantaneous pressure drop on the cold or hot water side of the plumbing system. A person who was taking a shower at that instant

could experience a sudden change in the water temperature, be startled or scalded, and perhaps even slip and fall. This is especially likely if a very low-flow showerhead has been installed, and there is no automatic compensation valve (as is usually the case in pre-1987 homes). People who are infirm, or whose mobility, balance, or other capabilities are restricted, are especially vulnerable.

Automatic compensation valves in new homes protect against severe changes in water temperature when the pressure drops; but these systems are only required to be tested at a flow rate of 2.5 gpm. It follows that when the new 1.75 gpm showerheads have no matching automatic compensation valve, anyone in the shower runs the risk of being scalded when the pressure abruptly changes.

The energy and water utilities in attendance were cautioned against giving away very low-flow showerheads (below 2 gpm) to customers without asking where the showerhead was to be installed. In many cases, these giveaway showerheads will be installed in older homes without an automatic compensation valve. Would the utility suffer contingent liability in case of an accident? As of this writing, that is still an open question, and is probably something for the water utilities' legal counsel to tackle.

Green builders, architects, and utilities were also provided with a cautionary statement setting forth the language that should be applied to showerhead and automatic compensation valve installations for domestic use.

In the area of market trends, the showerhead session confronted attendees with examples of the luxury shower phenomenon. A luxury shower is a massive multiple-head shower

system comprised of a series of showerheads, sprays, emitters, and other fittings. In many cases, these systems flow at a total rate in excess of 15 gpm! These systems are not explicitly prohibited either by the Energy Policy Act of 1992 (EPAct 92) or by the plumbing codes (Uniform Plumbing Code, International Plumbing Code, and National Plumbing Code). As a result, the plumbing industry has responded to consumer demand by producing a wide array of multiple-head products that fit just about any bathroom. Reliable estimates of market penetration across the United States are not readily available,

however, so the magnitude of the problem is not well defined.

Of even greater interest to the assembled professionals were the individual showerheads with measured (and broadly advertised!) flow rates far in excess of the EPAct 92 maximum of 2.5 gpm. These showerheads are freely displayed on Web sites, in showrooms, and at trade shows,

clearly flouting the federal regulations, which DOE does not enforce. (In fact, there is no evidence to indicate that DOE has any intention whatsoever of enforcing the 15-year-old federal law on showerheads, now or at any time in the future!) In at least one case, a manufacturer's Web site clearly bragged about the company's scofflaw approach. Again, as with the multiple-head systems, there are little, if any, reliable data on the market penetration of these rogue showerheads. **He**

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