

A PRIMER ON HETS...

What is a high-efficiency toilet (HET)?

An HET is a fixture with an average flush volume that is at least 20 percent below that of a conventional ultra-low-flush toilet (ULFT). That is, the average flush volume is 1.28 gallons per flush or less.

NOTE: An HET is **NOT** a ULFT....nor is a ULFT the same as an HET.

How long have HETs been available in the U.S?

The first HET (a gravity-fed, dual-flush fixture) was introduced in the U.S. in late 1998 by Caroma. At that time, the dual-flush technology had been proven and available in the Australian marketplace for about 10 years. Prototypes of the second category of HETs (1.0-gallon pressure-assist fixtures) were field tested for the manufacturer by various northern California water utilities in 2001. Results were marginal, at best, and, as a result, the manufacturer went back and continued its product development. It wasn't until 2003 that the pressure-assist HET technology was proven to be effective and became available in the marketplace. Since 2003, HET technologies have been offered by nearly all major manufacturers.

Today, a total of 104 different HET fixture models are available from 21 different manufacturers.

Why did it take so long to grow the HET marketplace?

For five years (1998 to 2003), Caroma was the exclusive provider of HET models in the marketplace.. During that five year period, other manufacturers began to recognize two growing market opportunities: water-efficiency/water conservation and "green building". Research and development took place and four different HET technologies evolved from those companies: dual-flush, pressure-assist, single-flush gravity, and flushometer valve.

Within the next 12 months, we expect that the number of HET models available in the marketplace will grow by 50 percent as some manufacturers introduce many new models and others change a large part of their focus from ULFTs to HETs.

Why the term "High-Efficiency Toilet"??

Whether for toilets or some other plumbing device, it is clear that the terms "low-flow" or "ultra-low-flow" carry a negative connotation, especially since the problems with the first ULFTs of the 1990s. As such, water-efficiency professionals decided that "high-efficiency" was a more positive and more performance indicative term that would leave behind some of the negatives that seem to surround the "low-flow" designation. For some of the same reasons, manufacturers also supported the term, feeling that marketing to "green builders" and others would be enhanced by a more positive term. Additionally, the "high-efficiency toilets" designation is consistent with high-efficiency clothes washers (HEWs), high-efficiency urinals (HEUs), and other efficient products yet to be introduced.

Do HETs meet customer performance expectations?

Over 15,000 HETs have been installed in California in the past eight years. Water providers with mature HET programs (Redwood City and Santa Clara Valley WD) report positive customer feedback. Nearly all of the HETs installed as a result of these two programs were specially selected as part of giveaway or direct installation programs. These toilets do NOT necessarily represent the wide range of certified HETs currently available in the marketplace. Thus, the customer feedback obtained by RC and SCV is only the

first step in a statewide customer satisfaction survey. Water providers in California will be soliciting customer opinions through formal follow-up surveys of those who participate in their HET programs.

What about MaP scores?

From a performance viewpoint, most all HETs yield higher MaP scores than their ULFT counterparts, probably due largely to the extensive development and engineering that went into these new models. (As noted later, many say that this didn't happen in 1992 when ULFTs were mandated, thereby leading to much customer dissatisfaction.) Specifically, while new ULFTs average about 450 grams in the MaP testing protocol, HETs actually average about 100 grams higher!

CAUTION: The MaP test represents only ONE measure of flush performance, that of evacuating sinking solid waste in a single flush. Customers also have performance expectations for bowl cleaning, noise, splashing and other factors; these are NOT measured in the MaP testing protocol. It is our opinion that, because of the widespread "success" of MaP testing as a marketing tool, it is possible that a manufacturer could sacrifice other performance elements for the sake of achieving higher MaP scores. Therefore, a fixture scoring 1,000 grams on the MaP test may not result in any more satisfied customers than one achieving, say, 600 grams.

CAUTION: MaP testing is a laboratory test. It attempts to replicate "real world" conditions but can never substitute for genuine customer feedback on the performance of and satisfaction with HET fixtures.

What about moving waste in the drainline?

Drainline transport has been cited by some as a concern as flush volumes are reduced to as low as one gallon, i.e., will clogging and backups occur as water volumes are reduced? To deal with this issue, in 2005, we conducted a very comprehensive laboratory study of nine different flush technologies and the resulting solid waste movement in drainlines of various sizes and slopes. Using the MaP media and a variety of HET fixtures, the study showed that in all cases there was sufficient water to move the waste beneath a typical residential dwelling to the sewer¹.

The U.S. EPA had similar concerns about drainline transport of wastes as they developed the HET portion of their new WaterSense program. We conducted additional laboratory tests and satisfied the EPA that sufficient water existed to transport the solid waste.

CAUTION: HETs must meet the very same flushing performance and drainline waste transport requirements as all other toilets sold in the United States and Canada. All toilets, regardless of flush volume, may experience problems when installed in locations with degraded or damaged drainline systems, e.g., root intrusion, sagging or broken lines, buildup of solids, etc., or in non-residential buildings with very long drainline runs and no additional sources of wastewater near the toilet fixture. However, when installed where these conditions exist, HETs, because of their reduced flush volume, could be slightly more susceptible to problems. No field experience nor customer feedback has yet confirmed this, however. Water providers are urged to exercise caution when recommending HETs to customers with older homes OR where evidence of drainline problems exists OR in warehouses with exceedingly long drainlines to the municipal sewer.

For further information and technical assistance on HETs, contact:

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¹ See the Council's web page to view and download the study report: http://www.cuwcc.org/toilet_fixtures.lasso