

HIGH EFFICIENCY TOILETS (HETs)



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What is an HET?

The plumbing industry is introducing many new technologies and toilet fixture models that reduce effective flush volumes well below the mandated 1.6-gallons per flush - gpf (6.0-liters per flush – lpf) maximum. Thus, the High Efficiency Toilet (HET) is becoming a significant part of the toilet fixture marketplace as water authorities and municipalities incorporate them into their toilet water efficiency programs. Furthermore, “green” builders install HETs to assist them in qualifying their project for water-efficiency LEED credits.

The HET is defined as a fixture that flushes at 20 percent below the 1.6-gpf/6.0-lpf maximum or better, equating to a maximum of 1.3-gpf/4.8-lpf. This 20 percent reduction threshold serves as a metric for water authorities and municipalities designing more aggressive toilet replacement programs and, in some cases, establishing an additional performance tier for their financial incentives (e.g., rebate and voucher programs). Previous field studies in the U.S. and Canada have demonstrated that the average flush volume of dual-flush toilets in residential applications ranges between 1.1 and 1.2 gals.¹

Fixtures currently considered as qualifying for the HET designation² are as follows:

Dual-Flush Toilet Fixtures (1.6-gpf/6.0-lpf “full flush” & 0.8 to 1.1-gpf/3.0 to 4.0-lpf “short flush”)

Manufacturer	Model Name	Model Number	Waste Removal Performance Measure ³ -MaP (full 1.6-gallon/6-liter flush – in grams)
Caroma	Caravelle One-Piece	989646	MaP testing not performed
	Caravelle ADA	989770	MaP testing not performed
	Caravelle 305	989680	500
	Caravelle 270	989760	MaP testing not performed
	Reflections 305	989750	MaP testing not performed
	Reflections 270	989720	MaP testing not performed
	Royale 305	624530W tank – 609151W bowl	600
	Sovereign 305	989750	MaP testing not performed
	Tasman 270	989860	550
	Vintage 270	605310 bowl - 625070 tank	MaP testing not performed

¹ Consult the CUWCC website for dual-flush savings information from 5 field studies: http://www.cuwcc.org/products_tech.lasso

² Based upon flush volumes as certified and as reported by the manufacturer. The CUWCC makes no guarantee that the listed fixtures do, in fact, perform at the flush volumes noted or certified. It is the responsibility of the reader to verify flush volumes.

³ Maximum Performance (MaP) testing by Veritec Consulting, Inc. Refer to Fourth Edition report dated May 2005, available for download from the CUWCC website: http://www.cuwcc.org/products_tech.lasso

Dual-Flush Toilet Fixtures (continued)

Manufacturer	Model Name	Model Number	Waste Removal Performance Measure ⁴ -MaP (full 1.6-gallon/6-liter flush – in grams)
Caroma (continued)	Walvit ⁵	604118 (round front - RF)	MaP testing not performed
	Walvit ⁵	(elongated - EL)	MaP testing not performed
Gerber⁶	Ultra Dual-Flush	DF-21-302 RF	MaP testing not performed
	Ultra Dual-Flush	DF-21-304 RF	MaP testing not performed
	Ultra Dual-Flush	DF-21-312 EL	MaP testing not performed
	Ultra Dual-Flush	DF-21-314 EL	MaP testing not performed
	Ultra Dual-Flush	DF-21-318 ADA EL	MaP testing not performed
	Ultra Dual-Flush	DF-21-319 ADA EL	MaP testing not performed
	Ultra Dual-Flush	DF-21-324 ADA EL	MaP testing not performed
	Ultra Dual-Flush	DF-21-310 EL (back outlet)	MaP testing not performed
	Ultra Dual-Flush	DF-21-325 ADA EL (back outlet)	MaP testing not performed
Kohler	Sterling Rockton	402024 RF	325
Mancesa	(dual-flush)		MaP testing not performed
Mansfield⁵	Eco-Quantum™	146-119 RF	850
	Eco-Quantum™	147-119 EL	825
	Eco-Quantum™	148-119 ADA EL	925
	Eco-Quantum™	146-119RH RF ⁷	850
	Eco-Quantum™	147-119RH EL ⁶	825
	Eco-Quantum™	148-119RH ADA EL ⁶	925
	Eco-Quantum™	149-119 (back outlet)	MaP testing not performed
Pegasus (Home Depot – Expo)	Tulip	3904-02-E ADA EL	MaP testing not performed
Toto	Aquia	CST414MP EL	MaP testing not performed
Vitra	Dual Flush	5076-xxx-0075 – 5055-xxx-5137 RF	475
Vortens	Dali	5101 - 5201	MaP testing not performed
	Vienna RF	3208 – 3420 RF	375

⁴ Maximum Performance (MaP) testing by Veritec Consulting, Inc. Refer to Fourth Edition report dated May 2005, available for download from the CUWCC website: http://www.cuwcc.org/products_tech.lasso

⁵ The Walvit is a wall-hung, rear-outlet bowl and works with a Water Wafer in-wall tank.

⁶ The Gerber Ultra Dual-Flush and the Mansfield Eco-Quantum models use pressure-assist technology from WDI International

⁷ Models designated with the RH suffix use flush handles mounted on the right side of the tank and are identical in all other aspects to those models above with the same model numbers.

Gravity-Fed Single-Flush (1.28-gpf/4.8-lpf)

Manufacturer	Model Name	Model Number	Waste Removal Performance Measure ⁸ -MaP (grams)
American Standard	FloWise	2073.013	450

Pressure-Assist Single-Flush (1.28-gpf/4.8-lpf and below)

Manufacturer	Model Name	Model Number	Waste Removal Performance Measure ⁸ -MaP (grams)
Capizzi⁹	Turbo Capizzi High Profile	1578 tank – 0478 bowl EL	MaP testing not performed
	Turbo Capizzi Low Profile	1513 tank – 0413 bowl EL	MaP testing not performed
	Turbo Capizzi	1278 tank – 0778-2 bowl EL	475
	Turbo Capizzi	1278 tank – 0478 bowl EL	MaP testing not performed
Gerber¹⁰	Ultra Flush	EF-21-302 RF	MaP testing not performed
	Ultra Flush	EF-21-304 RF	MaP testing not performed
	Ultra Flush	EF-21-312 EL	MaP testing not performed
	Ultra Flush	EF-21-314 EL	MaP testing not performed
	Ultra Flush	EF-21-318 ADA EL	MaP testing not performed
	Ultra Flush	EF-21-319 ADA EL	MaP testing not performed
	Ultra Flush	EF-21-324 ADA EL	MaP testing not performed
	Ultra Flush	EF-21-310 EL (back outlet)	MaP testing not performed
	Ultra Flush	EF-21-325 ADA EL (back outlet)	MaP testing not performed
Mancesa⁹	Cyclone 4	02607: 02103 bowl-04103 tank	650
Mansfield⁹	QuantumOne	146-153 RF	675
	QuantumOne	148-153 ADA EL	675
	QuantumOne	147-153 EL	525
	QuantumOne	149-154 EL (back outlet)	MaP testing not performed

⁸ Maximum Performance (MaP) testing by Veritec Consulting, Inc. Refer to Fourth Edition report dated May 2005, available for download from the CUWCC website: http://www.cuwcc.org/products_tech.lasso

⁹ Capizzi, Mancesa, and Mansfield pressure-assist single-flush toilets use Flushmate IV technology by Sloan

¹⁰ The Gerber Ultra Flush uses pressure-assist technology by WDI International

Pressure-Assist Single-Flush (1.28-gpf/4.8-lpf and below) (continued)

Manufacturer	Model Name	Model Number	Waste Removal Performance Measure ¹¹ -MaP (grams)
St. Thomas Creations ¹²	Mariner II	6203.420: 6203 bowl – 6203.424 tank	MaP testing not performed
Vortens ¹²	Tornado	3138-3468 EL	MaP testing not performed

Note for High-Efficiency Toilets

HETs must meet the very same flushing performance and drain line waste transport requirements as all other toilets sold in the United States. All toilets, regardless of flush volume, may experience problems when installed in locations with degraded or damaged drain line systems, e.g., root intrusion, sagging or broken lines, buildup of solids, etc., or in commercial buildings with very long drain line 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 has yet confirmed this, however.

Two drainline studies are intended to provide some additional information on waste transport by various types of toilet fixtures, including HETs:

- Canada Mortgage and Housing Corporation, 2005; Evaluation of Low-Flush-Volume Toilet Technologies to Carry Waste in Drainlines, Final Report, by Veritec Consulting, Inc., February 2005; downloadable from: http://www.cuwcc.org/products_tech.lasso
- Texas A&M University: sponsored by the American Society of Plumbing Engineers (ASPE) and the U.S. Department of Energy (study currently underway).

Further Information on High-Efficiency Toilets

Contact John Koeller at: 714-777-2744 or koeller@earthlink.net

¹¹ Maximum Performance (MaP) testing by Veritec Consulting, Inc. Refer to Fourth Edition report dated May 2005, available for download from the CUWCC website: http://www.cuwcc.org/products_tech.lasso

¹² The St. Thomas Creations and Vortens pressure-assist single-flush toilets use Flushmate IV technology by Sloan