

# Maximum Performance (MaP) Testing of Popular Toilet Models

A Cooperative Canadian and American Project



by

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**Important:** This report, originally published in 2003, is periodically updated (approximately every four to six months) on the websites of the Canadian Water and Wastewater Association (CWWA), the California Urban Water Conservation Council (CUWCC), and Veritec Consulting Inc. (see addresses below). Individual agencies or municipalities are free to link to these sites.

[http://www.cwwa.ca/home\\_e.asp](http://www.cwwa.ca/home_e.asp)  
(MaP report listed in "What's New" section)

[http://www.cuwcc.org/products\\_tech.lasso](http://www.cuwcc.org/products_tech.lasso)  
(Scroll down to MaP report.)

<http://veritec.ca>  
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Maximum Performance (MaP) Toilet Fixture Performance Testing Protocol,  
Version 2 - September 2005

## Contributors

Initiated in 2003 by municipalities and other interested organizations in Canada, the Maximum Performance (MaP) Testing program was a cooperative effort between Canadian and American partners, including:

### Canada

- Canadian Water and Wastewater Association (CWWA) – **LEAD AGENCY**
- B.C. Capital Regional District, Victoria, British Columbia
- B.C. Buildings Corporation, Victoria, British Columbia
- Canada Mortgage and Housing Corporation
- Calgary, Alberta
- Edmonton, Alberta
- Greater Vancouver Regional District, British Columbia
- Halifax, Nova Scotia
- Hamilton, Ontario
- Montreal, Quebec
- Ottawa, Ontario
- Region of Durham, Ontario
- Region of Halton, Ontario
- Region of Peel, Ontario
- Region of Waterloo, Ontario
- Toronto, Ontario
- Winnipeg, Manitoba

### U.S.A.

- California Urban Water Conservation Council, Sacramento, California
- East Bay Municipal Utility District, Oakland, California
- Los Angeles Department of Water and Power, Los Angeles, California
- Seattle Public Utilities, Seattle, Washington
- Tampa Bay Water, Clearwater, Florida

We gratefully acknowledge the contributions from these participating agencies and municipalities.

## Disclaimers

The information in this report is believed to be an accurate description of the units tested and the results obtained. Every effort was made to ensure the accuracy of the findings including, but not limited to, preparation of a detailed test protocol and third-party oversight of testing protocol implementation. However, because only a single unit of each model was tested, these results should not necessarily be considered as fully representative of the typical or average production of the models tested. The results shown in this report should be viewed only as an indication of expected 'field' results.

Although the test protocol utilizes a media whose physical properties resemble typical human waste, the reader is reminded that there is an enormous variation in human waste from person to person, and from one day to another.

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Readers are invited to distribute this report in whole or in part but any changes made to the document must be approved by the CWWA or one of its agents.

Readers are reminded that this report represents a 'snap shot' of the performance levels achieved by certain toilets at a particular time and with particular trim. Manufacturers sometimes make permanent or temporary changes to trim components or to model designs without changing the model names or model numbers. As such, changes to the models tested in this report may have occurred since the testing was completed.

The toilet models tested as part of this program is in no way intended to represent all of the various makes and models available, nor is it intended to provide a comprehensive list of all toilets that might be expected to perform either well or marginally in the field.

The results obtained during this testing program are not guarantees of performance.

The reader should be reminded that there are criteria *in addition* to solids removal that should be considered when selecting a toilet model, e.g., bowl wash, availability of replacement parts, potential for leakage, etc. MaP testing addresses only a single issue: the ability of a toilet model to completely remove solids in a single flush.

Both consumers and manufacturers are encouraged to provide feedback to the authors of this report, especially regarding issues such as incorrect model numbers, models that are listed but are no longer available, etc.

## Revised MaP Testing Protocol

This 5th Edition of the MaP testing results is the last Edition to use the original MaP testing protocol. All subsequent MaP testing will be completed using an updated and revised MaP testing protocol, Maximum Performance (MaP) Toilet Fixture Performance Testing Protocol, Version 2 - September 2005.

Readers are encouraged to read and become familiar with all aspects of the new testing protocol, but the primary changes are as follows:

- Testing for water change-out has been eliminated
- Individual 50g test media specimens (soybean paste) are now encased in a thin latex membrane (similar to a sausage) and can be reused several times.
- Toilet models must successfully clear all test media in a minimum of four of five attempts (vs. two of three attempts used in earlier test protocol).
- Testing is attempted at following mass loadings: 250g, 300g, 350g, 400g, 500g, 600g, 800g, and 1000g. No testing is completed with mass loadings exceeding 1000g.

It is believed that the new protocol and test media will make it easier and less expensive for manufacturers and other agencies to complete MaP testing.

The revised MaP testing protocol, in its entirety, is provided in **Appendix E**.

## 1.0 BACKGROUND

Although virtually all toilet models sold in Canada and the U.S. meet both the flush volume and performance requirements of the Canadian Standards Association (CSA) and the American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME), there remains some question as to whether models that meet the minimum certification requirements meet the expectations of the consumer. What's more, since certification testing offers only a pass/fail grading, there is currently no easy way to distinguish between superior and marginal toilet models available in the market.

Most residential toilet models exceed customer performance expectations while flushing with no more than 6 litres (1.6 gallons). However, recent research in Canada and the U.S. conclude that there are also certified and commercially available models that do not meet customer expectations.

There are two key concerns:

- 1) Fixtures that fail to meet the maximum 6-litre flush requirements of the Canadian Standards Association (CSA) or the 1.6-gallon requirements of the American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)<sup>1</sup> result in toilets that flush with either too much or too little water;
- 2) Fixtures that do not flush effectively result in customer complaints and the need for double flushing.

Currently, however, there is no convenient way for the customer to distinguish between good and marginal performers. In addition, this lack of information on toilet performance levels has served to create a negative perception regarding 6-litre (1.6-gallon) technology in general, as opposed to identifying only those "bad apples".

Although other toilet performance studies have been completed, none of these have been performed using test media as realistic as that used in this test, nor has a quantifiable performance benchmark – based on the results of relevant medical data – been established.

The Maximum Performance (MaP) testing project was developed to identify how well popular toilets models perform using a realistic test media, and to grade each toilet model based on this performance. A soybean paste having similar physical properties (density, moisture content) to human waste was used in combination with toilet paper as the test media. In addition to using a realistic test media, all toilet samples are adjusted, where possible, to their rated flush volume (typically 6 litres / 1.6 gallons) prior to testing to ensure a level playing field.

The developed testing protocol required the soybean paste to be extruded through a 7/8-inch (22-mm) die and cut into 50-gram specimens (each specimen approximately 100 mm or 4 inches in length). Toilet models were subjected to progressively larger loadings (in 50-gram increments) until the unit failed to completely clear the bowl in two of three attempts, or to fully restore a minimum 50mm (2-in.) trap seal.

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<sup>1</sup> Certification testing is intended to ensure that each model meets a specific set of minimum requirements for health and safety, product integrity, and performance. There is no differentiation in certification between a toilet model that just meets the minimum requirements and one that surpasses those requirements.

This **5<sup>th</sup> Edition** of the MaP testing report supersedes all earlier editions. Sixty-six additional models are included in this edition. Beginning with the **4<sup>th</sup> Edition** only a single sample of each toilet model was required to be submitted for testing (previous requirement was two samples). This change was made because of the relative consistency in model performance noted in earlier MaP testing and to better align MaP testing requirements with those of other testing agencies.

The original MaP report (2003) contained information on replacement flapper interchangeability. Information on checking and replacing toilet flappers can now be found on the web at: [www.toiletflapper.org](http://www.toiletflapper.org).

Whereas MaP testing is strictly performance-related, it is also considered important that rebated toilet models sustain their water savings over the life of the fixture. Information regarding long-term water savings, as described in the L.A. Supplemental Purchase Specification (SPS), can be found at: <http://www.cuwcc.com/Uploads/product/LADWP-SPS-ULFTReqs.pdf>.

The performance benchmark adopted by MaP is 250g. This value is based on the results of a British medical study (*Variability of Colonic Function in Healthy Subjects*) that identified 250g as the average maximum fecal size of the male participants in the study. Any toilet that meets or exceeds the 250g performance threshold should meet customer expectations for flushing.

Overall, the MaP testing protocol appears to be well received by both water providers and manufacturers alike. It is expected that many agencies and municipalities will consider the results of MaP testing when evaluating which toilet models to subsidize or rebate.

## **2.0 MAXIMUM PERFORMANCE (MAP) TEST**

### **2.1 Critical Aspects of Test**

MaP testing includes four significant advancements from earlier studies:

- Non-realistic test media (sponges, plastic balls and beads, kraft paper, etc.) replaced with combination of extruded soybean paste and wads of toilet paper. Most agree this media more accurately replicates “real-world” demands upon a toilet fixture.
- All models are adjusted to rated volume, generally 6 litres (1.6 gallons) prior to testing.
- A minimum level of acceptable performance was identified.<sup>2</sup>
- Results are presented by flush type to help assess whether differing flush technologies impact toilet performance.

### **2.2 Minimum Level of Acceptable Performance - Medical Data**

A British medical report<sup>3</sup> outlines the results of fecal tests completed on 10 male and 10 female subjects eating normal diets. The study identified the *average maximum*<sup>4</sup> fecal size of the male

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<sup>2</sup> Although the NAHBRC report scored performance levels from 0 to 82, there was no indication of what score would constitute an acceptable level of performance.

<sup>3</sup> J.B. Wyman, K.W. Heaton, A.P. Manning, and A.C.B. Wicks of the University Department of Medicine, Bristol Royal Infirmary, *Variability of colonic function in healthy subjects*, 1978.

<sup>4</sup> The average of the largest individual “samples” collected from each participant during the program.

participants to be approximately 250 grams and the 95<sup>th</sup> percentile size to be 305 grams<sup>5</sup>. The *average maximum* for women was slightly less at 237 grams, with the 95<sup>th</sup> percentile at 275 grams. The *average fecal size of all participants* was 130 grams<sup>6</sup>.

Based on this medical study, it appears that for sanitary reasons, as well as for customer satisfaction, toilets should flush a *minimum* of approximately 250 grams of solids. Therefore, for the purposes of this study, 250 grams (250g) was set as a performance benchmark.

The photos below help to illustrate some of the aspects involved in MaP testing.



*Test rig (top left), bulk & extruded media (top right), media (bottom left), and adding media to bowl (bottom right).*

### 2.3 Soybean Paste Test Media

Soybean paste was selected as a test media because its physical characteristics (density, moisture content) are reasonably similar to those of human waste. The test media has the following properties: moisture content 51.5 percent, pH 4.78, and density 1.16 grams/mL. The media is extruded through a 7/8-inch (22mm) diameter die, each specimen being approximately four inches (100mm) long and weighing 50 grams ( $\pm 5$  grams).

<sup>5</sup> It would be expected that only 5% of male samples would be larger than 305g.

<sup>6</sup> A toilet only capable of flushing the *average* loading (130g) would be expected to plug/clog or fail about 50% of the time, therefore, the benchmark of 250g (average male maximum) was selected for this project.

## 2.4 Media Source

Although several media with varying physical characteristics were evaluated during initial project development, the specific media used in the MaP testing was obtained in 20-kg (44-lb) containers from a single Canadian importer (the product originates in Japan). Readers wishing further information regarding the paste should contact Veritec directly.

## 2.5 Test Protocol

MaP test protocol (2003) is included in **Appendix A** (MaP test protocol Version 2 - September 2005, which will be used in subsequent testing, is included in **Appendix E**). All toilet fixtures are assembled, placed on the test stand, and connected to a water supply (50 psi static pressure). Tank water levels are set to the waterline and flush volumes recorded. Adjustments are made, if necessary, to ensure all samples flushed with their rated volume, generally 6 litres (1.6 gallons).

The ability of a toilet to completely remove 100 percent of waste in a single flush without plugging or clogging is considered by many to be one of the most important test criteria. Testing was conducted by loading the fixture in 50-gram increments of test media until it failed to pass 100 percent of the media in two of three attempts. Four loosely crumpled balls of toilet paper (six sheets each) were included in each test. The toilet paper used in testing had the following specifications: single ply toilet paper conforming to ASME A112.19.14–2001, section 3.2.5.1.2. Minimum level of acceptable performance was set at 250g. Test results sorted by manufacturer are presented in **Appendix B** and sorted by performance level are presented in **Appendix C**. Flush volumes when models are adjusted to waterline (at 50 PSI) are presented in **Appendix D**.

## 3.0 CONCLUSIONS

The test program revealed a significant range in the maximum performance levels of the toilet fixtures tested – yet all of these toilets are certified as meeting the minimum standards set forth by CSA and ANSI/ASME.

**Appendix B** and **Appendix C** colour-code (color-code) models clearing less than 250g of media, models clearing between 250 and 500g, and models clearing greater than 500g. Pressure-assisted models, both 6- and 4-L (1.6- and 1.1-G), and HET<sup>7</sup> models are also identified.

## 4.0 RECOMMENDATIONS

1. All toilet models should be required to remove at least 250g of solids as part of qualification or certification.
2. Municipalities and other rebating agencies should consider giving priority to toilet models that meet the L.A. SPS as these toilets are more likely to sustain water savings over their lifetime. Proprietary flappers (unique to the particular toilet model) are preferred to early-closing models as they are more likely to be replaced with the correct flapper. Proprietary flappers are, however, generally more difficult to locate and purchase.

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<sup>7</sup> High-Efficiency Toilet

# APPENDIX A

## Maximum Performance (MaP) Toilet Fixture Performance Testing Protocol, 2003

(note: this protocol is being superseded by protocol  
outlined in Appendix E).

## **Appendix A: Protocol for Maximum Performance (MaP) Toilet Fixture Testing, 2003**

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### **Scope of Protocol:**

- Maximum media loading (in 50g increments) at which toilet model successfully clears all media from bowl without clogging or plugging in two of three tests.
- Percentage of water exchanged when flushing toilet without a media load.

### **A. Solid Media Performance Test**

- Media specifications: Soybean paste with moisture content of 51.5%, pH of 4.8, density of 1.16 g/mL (72 lb/ft<sup>3</sup>), extruded through 22mm (7/8-in.) diameter die, each specimen approximately 100mm (4-in.) in length and weighing 50g (±5g).
- Toilet paper specifications: Each ball of paper comprises six sheets of single ply toilet paper conforming to ASME A112.19.14–2001, section 3.2.5.1.2.
- Drop guide specifications (used to ensure media is dropped into bowl in same manner for all toilets): Plexiglas rectangle large enough to fit across the top of the bowl, 3mm (1/8-in.) thick with a 50mm (2-in.) diameter opening in centre (center).
- Remove tank and bowl from packaging; assemble on test rig according to manufacturer's written instructions. Ensure tank and bowl are level.
- All tests are completed at 50 PSIG (0.34 megapascals) static pressure.
- Set tank water level to waterline; flush three times taking note of the flush volume. Adjust volume to rated flush volume, if possible. Record flush volume.
- Place drop guide across top of bowl, with opening directly over toilet sump.
- Drop 50g media specimens through opening until the desired mass of media is in bowl.
- Drop four balls of toilet paper into bowl. Wait 10 seconds. Flush toilet sample.
- If 100% of media removed from fixture, increase loading and repeat test.
- NOTE: Each toilet is flushed without media between each test to ensure that all media has been removed from bowl and trap, and that the bowl water is properly recharged.
- If less than 100% of media is removed from fixture, decrease loading and repeat test.
- Record maximum mass of media successfully removed from the bowl in two of three attempts.

### **B. Water Change-Out Capability Test**

- Flush the fixture two times to remove all solids, if any, from the fixture.
- Conductivity of the clean bowl water is measured using a conductivity meter (municipal water supply at test facility has conductivity range of approximately 310-330 µS).
- Add approximately 20 mL (0.68 oz) of an 18 g/L (2.4 oz/gal) salt solution to the bowl and stir gently to ensure uniform mixing, while assuring that there is no water loss over weir.
- Measure conductivity of diluted salt solution in bowl.
- Flush toilet, wait for flush cycle to complete.
- Measure new conductivity of water in bowl, i.e., volume of residual salt solution present.
- Determine approximate water change-out efficiency as percentage.

# **APPENDIX B**

MaP Results Sorted by Manufacturer

New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6-L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor Mounted	Wall Mounted		
																Dual-Flush	Max 1.1-G (4L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity					
	Am. Std.	Cadet	2333: 4098 tank, 3099 bowl	750	SPS	*	-			*					*					*			
	Am. Std.	Cadet	2798: 4112 tank, 3454 bowl	150			*	2		*			*								*		
	Am. Std.	Cadet	2898: 4112 tank, 3459 bowl	125			*	2		*			*								*		
	Am. Std.	Champion (1-pc)	2004	650	SPS	*		3		*			*								*		
	Am. Std.	Champion (1-pc)	2034	800	SPS	*		3	*	*	*	*	*								*		
	Am. Std.	Champion Elongated	2018: 3121 bowl, 4260 tank	575	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Champion Right Height	2002: 3225 bowl, 4260 tank	800			*	3	*	*	*	*	*								*		
	Am. Std.	Champion Round Front	2023: 3110 bowl, 4260 tank	475	SPS		*	-	*	*			*								*		
	Am. Std.	Champion Select	2035: 3110 bowl, 4272 tank	800	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Champion Select	2057: 3225 bowl, 4272 tank	1,100	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Champion Select	2087: 3121 bowl, 4272 tank	1,100	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Colony / Afton	4392 tank, 3038 bowl	775			*	2		*			*								*		
	Am. Std.	Colony / Afton (lined)	4392 tank, 3038 bowl	775			*	2		*			*								*		
	Am. Std.	Doral Champion	2367: 3225 bowl, 4272 tank	1,100	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Doral Champion	2368: 3121 bowl, 4272 tank	1,100	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Doral Champion	2369: 3110 bowl, 4272 tank	800	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Doral Classic Champion	2058: 3225 bowl, 4281 tank	1,100	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Doral Classic Champion	2074: 3121 bowl, 4281 tank	1,100	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	Doral Classic Champion	2076: 3110 bowl, 4281 tank	800	SPS		*	3	*	*	*	*	*								*		
	Am. Std.	FloWise	2073: 3018 bowl, 4023 tank	550	SPS		*	3	*	*	*	*	*								*		*
	Am. Std.	Glenwall	3402 bowl, 4098 tank	800	SPS		*	-		*	*	*	*		*						*		*
	Am. Std.	Hamilton	2092-0170-20	150		*		2		*	*	*	*								*		*
	Am. Std.	Oakmont Champion El Right Ht	2738: 3101 bowl, 4272 tank	1,100			*	3	*	*	*	*	*								*		*
	Am. Std.	Oakmont Champion Elongated	2625: 3153 bowl, 4272 tank	1,000	SPS		*	3	*	*	*	*	*								*		*
	Am. Std.	Oakmont Champion Round Front	2627: 3167 bowl, 4272 tank	1,000	SPS		*	3	*	*	*	*	*								*		*
	Am. Std.	Plebe	3344 bowl, 4392 tank,	225			*	2		*			*								*		*
	Am. Std.	Ravenna	3454 bowl, 4096 tank	200			*	2		*			*								*		*
	Am. Std.	Sonoma	3338 bowl, 4392 tank	325			*	2		*			*								*		*
	Am. Std.	Townsend Champion EL Right Ht	2733: 3177 bowl, 4281 tank	1,100			*	3	*	*	*	*	*								*		*
	Am. Std.	Townsend Champion RF Right Ht	2735: 3180 bowl, 4281 tank	1,000			*	3	*	*	*	*	*								*		*
	Am. Std.	Yorkville	2320: 3120 bowl, 4099 tank	1,000	SPS		*	-		*	*	*	*		*						*		*
	Briggs	Abingdon III	4229: 4875 bowl, 4440 tank	150	SPS	*		2		*			*								*		*
	Briggs	Altima III	4232: 4320 bowl, 4430 tank	150	SPS		*	2		*			*								*		*
	Briggs	Hathaway Vacuity	4360 bowl, 4460 tank	700			*	2		*			*								*		*
	Briggs	Vacuity	4200	375	SPS		*	2		*			*								*		*

New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor Mounted	Wall Mounted
																Dual-Flush	Max 1.1-G (4L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity			
	Briggs	Vacuity	4210: 4310 bowl, 4400 tank	500	SPS	*	*	2		*				*					*	*	
	Briggs	Vacuity	4245: 4345 bowl, 4400 tank	650	SPS		*	2			*			*					*	*	
	Capizzi	Capizzi	0778 bowl, 1278 tank	475			*	-		*								*	*		
	Capizzi	Turbo Capizzi High Profile	0478 bowl, 1578 tank	500	SPS		*	-		*								*	*		
	Capizzi	Turbo Capizzi Low Profile	0478 bowl, 1513 tank	400			*	-		*								*	*		
	Capizzi	Turbo Capizzi Low Profile ADA	0441 bowl, 1513 tank	500			*	-		*	*							*	*		
	Caroma	Caravelle 270	989760: 609159 bowl, 629435 tank	500	SPS		*	-	*	*			*					*	*		
	Caroma	Caravelle 270 ADA	989770: 609177 bowl, 687180 tank	800	SPS		*	-	*	*		*	*					*	*		
	Caroma	Caravelle 305	989680: 609151 bowl, 629435 tank	650	SPS		*	-	*	*			*					*	*		
	Caroma	Caravelle One-Piece	989646	500		*		-	*	*			*					*	*		
	Caroma	Reflections 270	989720: 609159 bowl, 629530 tank	650	SPS		*	-	*	*			*					*	*		
	Caroma	Royale 305	609151 bowl, 624530 tank	600	SPS		*	-	*	*			*					*	*		
	Caroma	Royale 305 EL ADA	609130 bowl, 629530 tank	850			*	-	*	*	*	*	*					*	*		
	Caroma	Tasman 270	989860: 270 Bowl, Tasman 270 tank	550	SPS		*	-	*	*			*					*	*		
	Corona	Orchid	8510	200			*	2		*			*							*	
	Crane	Cranada Pro II / Galaxy Elite II	3782: 3352 bowl, 3742 tank	450			*	2		*			*							*	
	Crane	Cranada Pro II / Galaxy Elite II	3792: 3372 bowl, 3742 tank	375			*	2		*			*							*	
	Crane	Economiser	3834: 3824 bowl, 3612 tank	750	SPS		*	-		*					*					*	
	Crane	Economiser	3835: 3825 bowl, 3612 tank	725	SPS		*	-		*					*					*	
	Crane	SureFlush	31352: 31192 bowl, 31242 tank	350			*	3	*	*			*							*	
	Crane	SureFlush	31362: 31202 bowl, 31242 tank	500	SPS		*	3	*	*		*	*							*	
	Crane	SureFlush	31372: 31212 bowl, 31242 tank	500	SPS		*	3	*	*	*	*	*							*	
	Crane	VIP	3992 bowl, 3976 tank	550			*	2		*			*						*	*	
	Crane	VIP Flush	3996: 3991 bowl, 3976 tank	350			*	2		*			*							*	
	Crane	VIP Flush	3995: 3990 bowl, 3976 tank	725	SPS		*	2		*			*							*	
	Eljer	Aquasaver	091-7025: 131-7025 bowl, 141-7000 tank	550	SPS		*	-		*					*					*	
	Eljer	Canterbury	081-1620-00	150		*		2		*			*							*	
	Eljer	Patriot	091-2120: 141-2120 tank, 131-2120 bowl	150			*	2		*			*							*	
	Eljer	Patriot	131-2175 bowl, 141-0220 tank	425			*	2		*	*	*	*							*	
	Eljer	Patriot Savoy	131-2120 bowl, 141-0220 tank	425			*	2		*			*							*	
	Eljer	Patriot Savoy	131-2125 bowl, 141-0220 tank	500			*	2		*			*							*	
	Eljer	Savoy	131-2120 bowl, 141-0260 tank	325			*	2		*			*							*	
	Eljer	Titan	091: 131 bowl, 141 tank	900			*	3		*	*	*	*							*	
	Foremost	Premier / Lilas	LL-8207-HC bowl, T-8207 tank	850			*	2		*	*	*	*							*	
	Foremost	Premier / Lilas	LL-8207-W bowl, T-8207-W tank	375			*	2		*			*							*	

New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6-L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor Mounted	Wall Mounted	
																Dual-Flush	Max 1.1-G (4L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity				
	Foremost	Premier / Lilas	TL-5101-WL	325		*		2		*			*							*		
	Foremost	Regent	LL-5207-W bowl, T-5207-W tank	350			*	2		*			*							*		
	Foremost	Victorian	LL-1207-W bowl, T-1207-W tank	275			*	2		*			*							*		
	Gerber	Aquasaver	21-712: 28-790 tank	150			*	2		*			*							*		
	Gerber	Ultra Flush	21-302: 21-342 bowl, 28-380 tank	900	SPS		*	-		*			*							*		
	Gerber	Ultra Flush	21-310: 21-374 bowl, 28-380 tank	625	SPS		*	-		*			*						*	*		
	Gerber	Ultra Flush	21-311: 21-372 bowl, 28-385 tank	1,000	SPS		*	-		*	*		*							*		
	Gerber	Ultra Flush	21-312: 21-372 bowl, 28-380 tank	1,000	SPS		*	-		*			*							*		
	Gerber	Ultra Flush	21-314: 21-372 bowl, 28-384 tank	1,000	SPS		*	-		*	*		*							*		
	Gerber	Ultra Flush	21-317: 21-377 bowl, 28-385 tank	1,000	SPS		*	-		*	*		*							*		
	Gerber	Ultra Flush	21-318: 21-377 bowl, 28-380 tank	1,000	SPS		*	-		*	*		*							*		
	Gerber	Ultra Flush	21-324: 21-377 bowl, 28-384 tank	1,000	SPS		*	-		*	*		*							*		
	Gerber	Ultra Flush	21-325: 21-375 bowl, 28-380 tank	1,000	SPS		*	-		*	*		*						*	*		
	Gerber	Ultra Flush	DF 21-318: 21-377 bowl, DF-28-380 tank	1,000			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	DF-21-312: 21-372 bowl, DF-28-380 tank	1,000			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	DF-21-314: 21-372 bowl, DF-28-384 tank	1,000			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	DF-21-324: 21-377 bowl, DF-28-384 tank	1,000			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	DF-21-325: 21-375 bowl, DF-28-380 tank	1,000			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	EF 21-318: 21-377 bowl, EF-28-380 tank	800			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	EF-21-312: 21-372 bowl, EF-28-380 tank	800			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	EF-21-314: 21-372 bowl, EF-28-384 tank	800			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	EF-21-324: 21-372 bowl, EF-28-384 tank	800			*	-		*	*		*	*					*	*		
	Gerber	Ultra Flush	EF-21-325: 21-375 bowl, EF-28-380 tank	800			*	-		*	*		*	*					*	*		
	Glacier Bay	Aragon IV	164963	175			*	2		*			*							*		
	Glacier Bay	Westminster	445-684 bowl, 455-685 tank (lined)	550			*	2		*			*							*		
	Globe Union	C21672	C21672: C53672 bowl, C60321 tank	450			*	2		*	*		*							*		
	Globe Union	C21682	C21682: C53682 bowl, C60321 tank	300			*	2		*			*							*		
	Globe Union	C21692	C21692: C53692 bowl, C60321 tank	800			*	2		*			*							*		
	Jacuzzi	Era	BM06	250		*		3		*			*							*		
	Jacuzzi	Perfecta	BN30959 bowl, BN30-BN31 tank	300			*	3		*	*		*							*		
	Jacuzzi	Perfecta	BN31959 bowl, BN30-BN31 tank	350			*	3		*			*							*		
	Kohler	Bancroft Comfort Height	K-3487: 4281 bowl, 4633 tank	800	SPS		*	3		*	*		*							*		
	Kohler	Cimarron	K-3496: 4286-0 bowl, 4634-0 tank	675	SPS		*	3		*	*		*							*		
	Kohler	Cimarron	K-3497: 4287-0 bowl, 4634-0 tank	675	SPS		*	3		*			*							*		
	Kohler	Cimarron Comfort Height	K-3489	800	SPS	*		3		*	*		*							*		

New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor Mounted	Wall Mounted	
																Dual-Flush	Max 1.1-G (4L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity				
	Kohler	Devonshire	K-3457: 4269 bowl, 4619 tank	250		*	2			*										*		
	Kohler	Highline Pressure Lite	K-3493: 4304 bowl, 4645 tank	800	SPS		-			*					*					*		
	Kohler	Memoirs	4257-0 bowl, 4454-U-0 tank	125		*	2			*			*							*		
	Kohler	Memoirs	K-3451 (Classic tank lid)	800	SPS	*	3			*			*							*		
	Kohler	Memoirs	K-3453 (Stately tank lid)	800	SPS	*	3			*			*							*		
	Kohler	Purist	K-3492 Power-Assisted	800	SPS	*	-			*					*					*		
	Kohler	San Rafael Power Lite	K-3398 Power-Assisted	850	SPS	*	-			*					*	*				*		
	Kohler	Santa Rosa	K-3323	500		*	2			*			*							*		
	Kohler	Sterling Rockton	402024: 402021 bowl, 402022 tank	325	SPS	*	-	*	*				*			*				*		
	Kohler	Wellworth	K3422: 4276 bowl, 4620 tank	125		*	2			*			*							*		
	Kohler	Wellworth	K3423: 4277 bowl, 4620 tank	250		*	2			*			*							*		
	Kohler	Wellworth Pressure Lite	K-3505: 4303 bowl, 4645 tank	1,000	SPS	*	-			*					*					*		
	Komet	Deco	DE 627 bowl, DE 611 tank	75		*	2			*			*							*		
	Mancesa	Cyclone	2282 bowl, 2281 tank	650	SPS	*	-			*						*				*		
	Mancesa	San Marino	2262W bowl, 2261W tank	200		*	2			*			*							*		
	Mancesa	St. Michelle	2360 bowl, 4260 tank	350		*	2			*			*							*		
	Mancesa	Windsor	2700W bowl, 2711W tank	225		*	2			*			*							*		
	Mansfield	Alto	130 bowl, 160 tank	275	SPS	*	-	*	*				*							*		
	Mansfield	EcoQuantum	146 bowl, 119 tank	850	SPS	*	-			*					*	*				*		
	Mansfield	EcoQuantum	147 bowl, 119 tank	825	SPS	*	-			*					*	*				*		
	Mansfield	EcoQuantum	148 bowl, 119 tank	925	SPS	*	-			*	*				*	*				*		
	Mansfield	Magnum	722	600		*	3			*			*							*		
	Mansfield	Maverick	101 bowl, 102 tank	650	SPS	*	3			*			*							*		
	Mansfield	Quantum	146 bowl, 123 tank	850	SPS	*	-			*					*					*		
	Mansfield	Quantum	147 bowl, 123 tank	825	SPS	*	-			*					*					*		
	Mansfield	Quantum	148 bowl, 123 tank	925	SPS	*	-			*	*				*					*		
	Mansfield	QuantumOne	146 bowl, 153 tank	675	SPS	*	-			*						*				*		
	Mansfield	QuantumOne	147 bowl, 153 tank	525	SPS	*	-			*						*				*		
	Mansfield	QuantumOne	148 bowl, 153 tank	675	SPS	*	-			*	*					*				*		
	Niagara	Flapperless	N2216	725	SPS	*	-	*	*				*							*		
	Niagara	Niagara Turbo	N2220	150	SPS	*	2			*			*							*		
	Orion	Iris	50073 bowl, 51073 tank	150		*	2			*			*							*		
	Peerless Pottery (by Capizzi)	Predator ADA	608 bowl, 1 tank	500		*	-			*	*					*				*		
	Peerless Pottery (by Capizzi)	Predator Low Profile	606 bowl, 1 tank	400		*	-			*						*				*		
	Pegasus (Home Depot)	Tulip	477-546: 3107 bowl, 3427 tank	400		*	-	*		*			*			*				*		

New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6-L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor Mounted	Wall Mounted	
																Dual-Flush	Max 1.1-G (4L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity				
	RAK Ceramics	Compact Syphonic Elongated	CT30 bowl, CT65 tank	650			*	3			*	*	*							*		
	St. Thomas	Marathon	6201.01	200			*	2		*			*							*		
	Toto	Aquia	CST 414: CT414 bowl, ST 413 tank	800			*	2			*		*			*				*		
	Toto	Carlyle	MS874114SG	625		*		3			*		*							*		
	Toto	Carusoe	CST715: C715 bowl, ST706 tank	650			*	2		*			*							*		
	Toto	Clayton (nee Baldwin)	CST784: C784SF bowl, ST784S tank	675			*	3			*	*	*							*		
	Toto	CST703	CST703: C703 bowl, ST703 tank	550			*	2		*			*							*		
	Toto	Dalton	CST734: C734F bowl, ST733 tank	650			*	2			*	*	*							*		
	Toto	Drake	CST744S: C744 bowl, ST743 tank	900	SPS		*	3			*		*							*		
	Toto	Plymouth	MS924154F	675	SPS	*		3			*		*							*		
	Toto	Ultimate	MS853113	400	SPS	*		3		*			*							*		
	Toto	Ultimate	MS854114	325	SPS	*		3			*		*							*		
	Toto	Ultramax	MS854114S	700	SPS	*		3			*		*							*		
	Vitra	Altantis	5050 bowl, 6853 tank	800	SPS		*	2		*			*							*		
	Vitra	Altantis	5051 bowl, 6853 tank	750	SPS		*	2			*		*							*		
	Vitra	Corina	5068 bowl, 5070 tank	825			*	3		*			*							*		
	Vitra	Corina	5069 bowl, 5070 tank	850			*	3			*		*							*		
	Vitra	Corina (1-pc)	5178	750		*		3			*		*							*		
	Vitra	Corina (1-pc)	5209	850		*		3		*			*							*		
	Vitra	Dual Flush	5076 bowl, 5055 tank	475			*	-	*	*			*		*					*		
	Vitra	Mona	4117 bowl, 4015 tank	800			*	3			*		*							*		
	Vitra	Riva	4117 bowl, 6952 tank	700			*	3			*		*							*		
	Vortens-Lamosa	Genova	3121 bowl, 3421 tank	450			*	2			*		*							*		
	Vortens-Lamosa	GTA	3200 bowl, 3412 tank	300			*	2		*			*							*		
	Vortens-Lamosa	Palermo	3126	350		*		2		*			*							*		
	Vortens-Lamosa	Rhodas	3123 bowl, 3433 tank	550			*	-		*	*	*	*		*					*		
	Vortens-Lamosa	Tornado	3138 bowl, 3468 tank	700	SPS		*	-		*			*		*		*			*		
	Vortens-Lamosa	Tulip	477-546: 3107 bowl, 3427 tank	400			*	-	*	*			*		*		*			*		
	Vortens-Lamosa	Vienna II	3208 bowl, 3412 tank	550			*	2		*			*							*		
	Vortens-Lamosa	Vienna RF (Lined)	3208 bowl, 3464L tank (lined)	550			*	2		*			*							*		
	Vortens-Lamosa	Vienna RF (Unlined)	3208 bowl, 3464V tank (unlined)	600	SPS		*	2		*			*							*		
	Vortens-Lamosa	Vienna RF Dual-Flush	3208 bowl, 3420 tank	375	SPS	*	-	*	*	*			*		*		*			*		
	Western Pottery	Aris 822	822 bowl, ULF8 tank	375	SPS		*	2		*			*							*		
	Western Pottery	Challenger Hi-Boy	872 bowl, ULF-8 tank	1,000			*	2			*		*							*		
	Western Pottery	Clinton 832	832 bowl	300	SPS		*	2			*		*							*		

# **APPENDIX C**

MaP Results Sorted by Performance

New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6-L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor-Mounted	Wall Mounted		
																Dual-Flush	Max 1.1-G (4-L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity					
	Komet	Deco	DE 627 bowl, DE 611 tank	75			*	2		*			*							*			
	Am. Std.	Cadet	2898: 4112 tank, 3459 bowl	125			*	2			*		*								*		
	Kohler	Memoirs	4257-0 bowl, 4454-U-0 tank	125			*	2		*			*								*		
	Kohler	Wellworth	K3422: 4276 bowl, 4620 tank	125			*	2		*			*								*		
	Am. Std.	Cadet	2798: 4112 tank, 3454 bowl	150			*	2		*			*								*		
	Am. Std.	Hamilton	2092-0170-20	150		*		2		*			*								*		
	Briggs	Abingdon III	4229: 4875 bowl, 4440 tank	150	SPS	*		2		*			*								*		
	Briggs	Altima III	4232: 4320 bowl, 4430 tank	150	SPS		*	2		*			*								*		
	Eljer	Canterbury	081-1620-00	150		*		2		*			*								*		
	Eljer	Patriot	091-2120: 141-2120 tank, 131-2120 bowl	150			*	2		*			*								*		
	Gerber	Aquasaver	21-712: 28-790 tank	150			*	2		*			*								*		
	Niagara	Niagara Turbo	N2220	150	SPS		*	2		*			*								*		
	Orion	Iris	50073 bowl, 51073 tank	150			*	2		*			*								*		
	Glacier Bay	Aragon IV	164963	175			*	2		*			*								*		
	Am. Std.	Ravenna	3454 bowl, 4096 tank	200			*	2		*			*								*		
	Corona	Orchid	8510	200			*	2		*			*								*		
	Mancesa	San Marino	2262W bowl, 2261W tank	200			*	2		*			*								*		
	St. Thomas	Marathon	6201.01	200			*	2		*			*								*		
	Am. Std.	Plebe	3344 bowl, 4392 tank,	225			*	2		*			*								*		
	Mancesa	Windsor	2700W bowl, 2711W tank	225			*	2		*			*								*		
	Jacuzzi	Era	BM06	250		*		3		*			*								*		
	Kohler	Devonshire	K-3457: 4269 bowl, 4619 tank	250			*	2		*			*								*		
	Kohler	Wellworth	K3423: 4277 bowl, 4620 tank	250			*	2		*			*								*		
	Foremost	Victorian	LL-1207-W bowl, T-1207-W tank	275			*	2		*			*								*		
	Mansfield	Alto	130 bowl, 160 tank	275	SPS		*	-	*	*			*								*		
	Globe Union	C21682	C21682: C53682 bowl, C60321 tank	300			*	2		*			*								*		
	Jacuzzi	Perfecta	BN30959 bowl, BN30-BN31 tank	300			*	3		*		*	*								*		
	Vortens-Lamosa	GTA	3200 bowl, 3412 tank	300			*	2		*			*								*		
	Western Pottery	Clinton 832	832 bowl	300	SPS		*	2		*			*								*		
	Am. Std.	Sonoma	3338 bowl, 4392 tank	325			*	2		*			*								*		
	Eljer	Savoy	131-2120 bowl, 141-0260 tank	325			*	2		*			*								*		
	Foremost	Premier / Lilas	TL-5101-WL	325		*		2		*			*								*		
	Kohler	Sterling Rockton	402024: 402021 bowl, 402022 tank	325	SPS		*	-	*	*			*			*					*		
	Toto	Ultimate	MS854114	325	SPS	*		3		*			*								*		
	Crane	SureFlush	31352: 31192 bowl, 31242 tank	350			*	3	*	*			*								*		

New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6-L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor-Mounted	Wall Mounted	
																Dual-Flush	Max 1.1-G (4-L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity				
	Crane	VIP Flush	3996: 3991 bowl, 3976 tank	350			*	2			*										*	
	Foremost	Regent	LL-5207-W bowl, T-5207-W tank	350			*	2		*			*								*	
	Jacuzzi	Perfecta	BN31959 bowl, BN30-BN31 tank	350			*	3		*			*								*	
	Mancesa	St. Michelle	2360 bowl, 4260 tank	350			*	2		*			*								*	
	Vortens-Lamosa	Palermo	3126	350		*		2		*			*								*	
	Briggs	Vacuity	4200	375	SPS		*	2			*			*							*	
	Crane	Cranada Pro II / Galaxy Elite II	3792: 3372 bowl, 3742 tank	375			*	2			*		*								*	
	Foremost	Premier / Lilas	LL-8207-W bowl, T-8207-W tank	375			*	2		*			*								*	
	Vortens-Lamosa	Vienna RF Dual-Flush	3208 bowl, 3420 tank	375	SPS		*	-	*	*			*			*					*	
	Western Pottery	Aris 822	822 bowl, ULF8 tank	375	SPS		*	2		*			*								*	
	Capizzi	Turbo Capizzi Low Profile	0478 bowl, 1513 tank	400			*	-		*						*					*	
	Peerless Pottery (by Capizzi)	Predator Low Profile	606 bowl, 1 tank	400			*	-		*						*					*	
	Pegasus (Home Depot)	Tulip	477-546: 3107 bowl, 3427 tank	400			*	-	*	*			*			*					*	
	Toto	Ultimate	MS853113	400	SPS	*		3		*			*								*	
	Vortens-Lamosa	Tulip	477-546: 3107 bowl, 3427 tank	400			*	-	*	*			*			*					*	
	Eljer	Patriot	131-2175 bowl, 141-0220 tank	425			*	2		*	*	*	*								*	
	Eljer	Patriot Savoy	131-2120 bowl, 141-0220 tank	425			*	2		*			*								*	
	Crane	Cranada Pro II / Galaxy Elite II	3782: 3352 bowl, 3742 tank	450			*	2		*			*								*	
	Globe Union	C21672	C21672: C53672 bowl, C60321 tank	450			*	2		*	*	*	*								*	
	Vortens-Lamosa	Genova	3121 bowl, 3421 tank	450			*	2		*			*								*	
	Am. Std.	Champion Round Front	2023: 3110 bowl, 4260 tank	475	SPS		*	-	*	*			*								*	
	Capizzi	Capizzi	0778 bowl, 1278 tank	475			*	-		*			*			*					*	
	Vitra	Dual Flush	5076 bowl, 5055 tank	475			*	-	*	*			*			*					*	
	Briggs	Vacuity	4210: 4310 bowl, 4400 tank	500	SPS		*	2		*			*								*	
	Capizzi	Turbo Capizzi High Profile	0478 bowl, 1578 tank	500	SPS		*	-		*			*			*					*	
	Capizzi	Turbo Capizzi Low Profile ADA	0441 bowl, 1513 tank	500			*	-		*	*		*			*					*	
	Caroma	Caravelle 270	989760: 609159 bowl, 629435 tank	500	SPS		*	-	*	*			*			*					*	
	Caroma	Caravelle One-Piece	989646	500		*		-	*	*			*			*					*	
	Crane	SureFlush	31362: 31202 bowl, 31242 tank	500	SPS		*	3	*	*			*			*					*	
	Crane	SureFlush	31372: 31212 bowl, 31242 tank	500	SPS		*	3	*	*	*	*	*			*					*	
	Eljer	Patriot Savoy	131-2125 bowl, 141-0220 tank	500			*	2		*			*			*					*	
	Kohler	Santa Rosa	K-3323	500		*		2		*			*			*					*	
	Peerless Pottery (by Capizzi)	Predator ADA	608 bowl, 1 tank	500			*	-		*	*		*			*					*	
	Mansfield	QuantumOne	147 bowl, 153 tank	525	SPS		*	-		*			*			*					*	
	Am. Std.	FloWise	2073: 3018 bowl, 4023 tank	550	SPS		*	3	*	*	*	*	*			*					*	

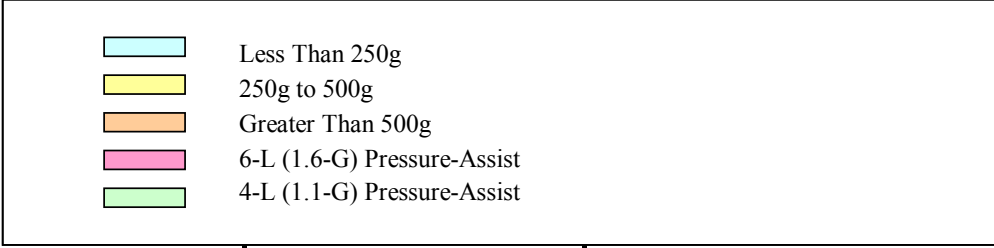
New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6-L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor-Mounted	Wall Mounted	
																Dual-Flush	Max 1.1-G (4-L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity				
	Caroma	Tasman 270	989860: 270 Bowl, Tasman 270 tank	550	SPS		*	-	*	*			*			*			*	*		
	Crane	VIP	3992 bowl, 3976 tank	550			*	2		*				*					*	*		
	Eljer	Aquasaver	091-7025: 131-7025 bowl, 141-7000 tank	550	SPS		*	-		*					*					*	*	
	Glacier Bay	Westminster	445-684 bowl, 455-685 tank (lined)	550			*	2		*			*							*	*	
	Toto	CST703	CST703: C703 bowl, ST703 tank	550			*	2		*			*							*	*	
	Vortens-Lamosa	Rhodas	3123 bowl, 3433 tank	550			*	-		*	*	*	*			*				*	*	
	Vortens-Lamosa	Vienna II	3208 bowl, 3412 tank	550			*	2		*			*							*	*	
	Vortens-Lamosa	Vienna RF (Lined)	3208 bowl, 3464L tank (lined)	550			*	2		*			*							*	*	
	Am. Std.	Champion Elongated	2018: 3121 bowl, 4260 tank	575	SPS		*	3	*	*	*	*	*							*	*	
	Caroma	Royale 305	609151 bowl, 624530 tank	600	SPS		*	-	*	*	*	*	*			*				*	*	
	Mansfield	Magnum	722	600		*		3		*	*	*	*							*	*	
	Vortens-Lamosa	Vienna RF (Unlined)	3208 bowl, 3464V tank (unlined)	600	SPS		*	2		*			*							*	*	
	Gerber	Ultra Flush	21-310: 21-374 bowl, 28-380 tank	625	SPS		*	-		*					*					*	*	
	Toto	Carlyle	MS874114SG	625		*		3		*	*	*	*							*	*	
	Am. Std.	Champion (1-pc)	2004	650	SPS	*		3		*	*	*	*							*	*	
	Briggs	Vacuity	4245: 4345 bowl, 4400 tank	650	SPS		*	2		*			*							*	*	
	Caroma	Caravelle 305	989680: 609151 bowl, 629435 tank	650	SPS		*	-	*	*	*	*	*			*				*	*	
	Caroma	Reflections 270	989720: 609159 bowl, 629530 tank	650	SPS		*	-	*	*	*	*	*			*				*	*	
	Mancesa	Cyclone	2282 bowl, 2281 tank	650	SPS		*	-		*	*	*	*				*			*	*	
	Mansfield	Maverick	101 bowl, 102 tank	650	SPS		*	3		*	*	*	*							*	*	
	RAK Ceramics	Compact Syphonic Elongated	CT30 bowl, CT65 tank	650			*	3		*	*	*	*							*	*	
	Toto	Carusoe	CST715: C715 bowl, ST706 tank	650			*	2		*	*	*	*							*	*	
	Toto	Dalton	CST734: C734F bowl, ST733 tank	650			*	2		*	*	*	*							*	*	
	Kohler	Cimarron	K-3496: 4286-0 bowl, 4634-0 tank	675	SPS		*	3		*	*	*	*							*	*	
	Kohler	Cimarron	K-3497: 4287-0 bowl, 4634-0 tank	675	SPS		*	3		*	*	*	*							*	*	
	Mansfield	QuantumOne	146 bowl, 153 tank	675	SPS		*	-		*	*	*	*			*				*	*	
	Mansfield	QuantumOne	148 bowl, 153 tank	675	SPS		*	-		*	*	*	*			*				*	*	
	Toto	Clayton (nee Baldwin)	CST784: C784SF bowl, ST784S tank	675			*	3		*	*	*	*							*	*	
	Toto	Plymouth	MS924154F	675	SPS	*		3		*	*	*	*							*	*	
	Briggs	Hathaway Vacuity	4360 bowl, 4460 tank	700			*	2		*	*	*	*							*	*	
	Toto	Ultramax	MS854114S	700	SPS	*		3		*	*	*	*							*	*	
	Vitra	Riva	4117 bowl, 6952 tank	700			*	3		*	*	*	*							*	*	
	Vortens-Lamosa	Tornado	3138 bowl, 3468 tank	700	SPS		*	-		*	*	*	*			*				*	*	
	Crane	Economiser	3835: 3825 bowl, 3612 tank	725	SPS		*	-		*	*	*	*		*					*	*	
	Crane	VIP Flush	3995: 3990 bowl, 3976 tank	725	SPS		*	2		*	*	*	*		*					*	*	

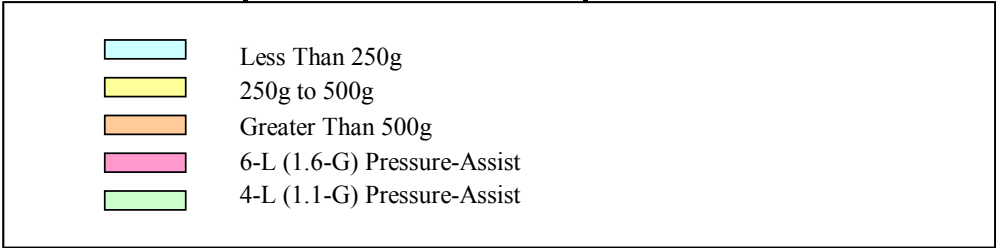
New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6-L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor-Mounted	Wall Mounted	
																Dual-Flush	Max 1.1-G (4-L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity				
	Niagara	Flapperless	N2216	725	SPS		*	-	*	*										*		
	Am. Std.	Cadet	2333: 4098 tank, 3099 bowl	750	SPS		*	-		*					*					*		
	Crane	Economiser	3834: 3824 bowl, 3612 tank	750	SPS		*	-		*					*					*		
	Vitra	Altantis	5051 bowl, 6853 tank	750	SPS		*	2		*			*							*		
	Vitra	Corina (1-pc)	5178	750		*		3		*			*							*		
	Am. Std.	Colony / Afton	4392 tank, 3038 bowl	775			*	2		*			*							*		
	Am. Std.	Colony / Afton (lined)	4392 tank, 3038 bowl	775			*	2		*			*							*		
	Am. Std.	Champion (1-pc)	2034	800	SPS	*		3	*	*	*	*	*							*		
	Am. Std.	Champion Right Height	2002: 3225 bowl, 4260 tank	800			*	3	*	*	*	*	*							*		
	Am. Std.	Champion Select	2035: 3110 bowl, 4272 tank	800	SPS		*	3	*	*			*							*		
	Am. Std.	Doral Champion	2369: 3110 bowl, 4272 tank	800	SPS		*	3	*	*			*							*		
	Am. Std.	Doral Classic Champion	2076: 3110 bowl, 4281 tank	800	SPS		*	3	*	*			*							*		
	Am. Std.	Glenwall	3402 bowl, 4098 tank	800	SPS		*	-		*					*				*		*	
	Caroma	Caravelle 270 ADA	989770: 609177 bowl, 687180 tank	800	SPS		*	-	*	*		*	*			*			*		*	
	Gerber	Ultra Flush	EF 21-318: 21-377 bowl, EF-28-380 tank	800			*	-		*	*	*				*			*		*	
	Gerber	Ultra Flush	EF-21-312: 21-372 bowl, EF-28-380 tank	800			*	-		*	*	*				*			*		*	
	Gerber	Ultra Flush	EF-21-314: 21-372 bowl, EF-28-384 tank	800			*	-		*	*	*				*			*		*	
	Gerber	Ultra Flush	EF-21-324: 21-372 bowl, EF-28-384 tank	800			*	-		*	*	*				*			*		*	
	Gerber	Ultra Flush	EF-21-325: 21-375 bowl, EF-28-380 tank	800			*	-		*	*	*				*		*	*		*	
	Globe Union	C21692	C21692: C53692 bowl, C60321 tank	800			*	2		*			*							*		
	Kohler	Bancroft Comfort Height	K-3487: 4281 bowl, 4633 tank	800	SPS		*	3		*	*	*							*		*	
	Kohler	Cimarron Comfort Height	K-3489	800	SPS	*		3		*	*	*							*		*	
	Kohler	Highline Pressure Lite	K-3493: 4304 bowl, 4645 tank	800	SPS		*	-		*				*					*		*	
	Kohler	Memoirs	K-3451 (Classic tank lid)	800	SPS	*		3		*			*						*		*	
	Kohler	Memoirs	K-3453 (Stately tank lid)	800	SPS	*		3		*			*						*		*	
	Kohler	Purist	K-3492 Power-Assisted	800	SPS	*		-		*					*				*		*	
	Toto	Aquia	CST 414: CT414 bowl, ST 413 tank	800			*	2		*			*			*			*		*	
	Vitra	Altantis	5050 bowl, 6853 tank	800	SPS		*	2		*			*						*		*	
	Vitra	Mona	4117 bowl, 4015 tank	800			*	3		*			*						*		*	
	Mansfield	EcoQuantum	147 bowl, 119 tank	825	SPS		*	-		*				*	*				*		*	
	Mansfield	Quantum	147 bowl, 123 tank	825	SPS		*	-		*				*	*				*		*	
	Vitra	Corina	5068 bowl, 5070 tank	825			*	3		*			*						*		*	
	Caroma	Royale 305 EL ADA	609130 bowl, 629530 tank	850			*	-	*	*	*	*	*			*			*		*	
	Foremost	Premier / Lilas	LL-8207-HC bowl, T-8207 tank	850			*	2		*	*	*	*			*			*		*	
	Kohler	San Rafael Power Lite	K-3398 Power-Assisted	850	SPS	*		-		*	*	*	*		*	*			*		*	

New Since 4th Edition	Make	Model	Model Number	MaP Performance	LA SPS Certified	1-piece model	2-piece model	Flush Valve-Flapper size (in.)	No flapper / Non-traditional flapper	Round Front Bowl	Elongated Bowl	ADA / Comfort Height	1.6G (6L) Gravity-flush	1.6G (6L) Vacuum-Assist	1.6-G (6-L) Power OR Pressure-Assist	HETs			Rear Discharge	Floor-Mounted	Wall Mounted	
																Dual-Flush	Max 1.1-G (4-L) Pressure-Assist	Max 1.28 G (4.8 L) Gravity				
	Mansfield	EcoQuantum	146 bowl, 119 tank	850	SPS		*	-		*					*	*				*		
	Mansfield	Quantum	146 bowl, 123 tank	850	SPS		*	-		*					*					*		
	Vitra	Corina	5069 bowl, 5070 tank	850			*	3		*			*							*		
	Vitra	Corina (1-pc)	5209	850		*		3		*			*							*		
	Eljer	Titan	091: 131 bowl, 141 tank	900			*	3		*	*	*	*							*		
	Gerber	Ultra Flush	21-302: 21-342 bowl, 28-380 tank	900	SPS		*	-		*					*					*		
	Toto	Drake	CST744S: C744 bowl, ST743 tank	900	SPS		*	3		*			*							*		
	Mansfield	EcoQuantum	148 bowl, 119 tank	925	SPS		*	-		*	*	*			*	*				*		
	Mansfield	Quantum	148 bowl, 123 tank	925	SPS		*	-		*	*	*			*	*				*		
	Am. Std.	Oakmont Champion Elongated	2625: 3153 bowl, 4272 tank	1,000	SPS		*	3	*	*	*	*	*							*		
	Am. Std.	Oakmont Champion Round Front	2627: 3167 bowl, 4272 tank	1,000	SPS		*	3	*	*	*	*	*							*		
	Am. Std.	Townsend Champion RF Right Ht	2735: 3180 bowl, 4281 tank	1,000			*	3	*	*	*	*	*							*		
	Am. Std.	Yorkville	2320: 3120 bowl, 4099 tank	1,000	SPS		*	-		*					*				*		*	
	Gerber	Ultra Flush	21-311: 21-372 bowl, 28-385 tank	1,000	SPS		*	-		*	*	*			*					*		
	Gerber	Ultra Flush	21-312: 21-372 bowl, 28-380 tank	1,000	SPS		*	-		*					*					*		
	Gerber	Ultra Flush	21-314: 21-372 bowl, 28-384 tank	1,000	SPS		*	-		*					*					*		
	Gerber	Ultra Flush	21-317: 21-377 bowl, 28-385 tank	1,000	SPS		*	-		*	*	*			*					*		
	Gerber	Ultra Flush	21-318: 21-377 bowl, 28-380 tank	1,000	SPS		*	-		*	*	*			*					*		
	Gerber	Ultra Flush	21-324: 21-377 bowl, 28-384 tank	1,000	SPS		*	-		*	*	*			*					*		
	Gerber	Ultra Flush	21-325: 21-375 bowl, 28-380 tank	1,000	SPS		*	-		*	*	*			*				*	*		
	Gerber	Ultra Flush	DF 21-318: 21-377 bowl, DF-28-380 tank	1,000			*	-		*	*	*			*	*				*		
	Gerber	Ultra Flush	DF-21-312: 21-372 bowl, DF-28-380 tank	1,000			*	-		*	*	*			*	*				*		
	Gerber	Ultra Flush	DF-21-314: 21-372 bowl, DF-28-384 tank	1,000			*	-		*	*	*			*	*				*		
	Gerber	Ultra Flush	DF-21-324: 21-377 bowl, DF-28-384 tank	1,000			*	-		*	*	*			*	*				*		
	Gerber	Ultra Flush	DF-21-325: 21-375 bowl, DF-28-380 tank	1,000			*	-		*	*	*			*	*			*	*		
	Kohler	Wellworth Pressure Lite	K-3505: 4303 bowl, 4645 tank	1,000	SPS		*	-		*					*					*		
	Western Pottery	Challenger Hi-Boy	872 bowl, ULF-8 tank	1,000			*	2		*		*								*		
	Am. Std.	Champion Select	2057: 3225 bowl, 4272 tank	1,100	SPS		*	3	*	*	*	*								*		
	Am. Std.	Champion Select	2087: 3121 bowl, 4272 tank	1,100	SPS		*	3	*	*	*	*								*		
	Am. Std.	Doral Champion	2367: 3225 bowl, 4272 tank	1,100	SPS		*	3	*	*	*	*								*		
	Am. Std.	Doral Champion	2368: 3121 bowl, 4272 tank	1,100	SPS		*	3	*	*	*	*								*		
	Am. Std.	Doral Classic Champion	2058: 3225 bowl, 4281 tank	1,100	SPS		*	3	*	*	*	*								*		
	Am. Std.	Doral Classic Champion	2074: 3121 bowl, 4281 tank	1,100	SPS		*	3	*	*	*	*								*		
	Am. Std.	Oakmont Champion El Right Ht	2738: 3101 bowl, 4272 tank	1,100			*	3	*	*	*	*								*		
	Am. Std.	Townsend Champion EL Right Ht	2733: 3177 bowl, 4281 tank	1,100			*	3	*	*	*	*								*		

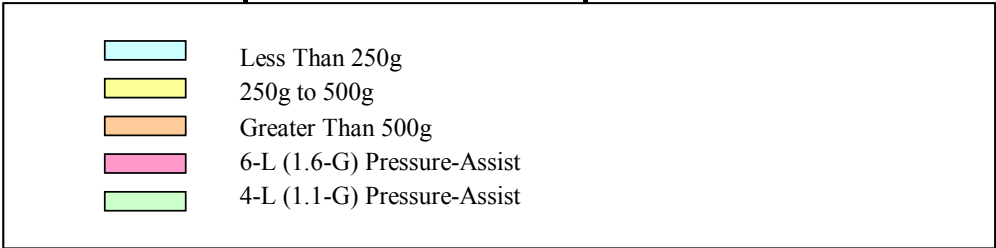
# **APPENDIX D**

Flush Volumes when Adjusted to  
Waterline

Addition to this Edition				Flush Volume at Waterline	
	Make	Model	Model Number	Volume (L)	Volume (G)
	Am. Std.	Cadet (PA) EL	4098 tank & 3099 bowl	6.2	1.64
	Am. Std.	Cadet EL	2898.012, with 4112 tank & 3459 bowl	5.8	1.53
	Am. Std.	Cadet RF	2798.012, with 4112 tank & 3454 bowl	5.7	1.51
	Am. Std.	Champion (1-pc)	2004	6.0	1.59
	Am. Std.	Champion (1-pc)	2034	6.0	1.59
	Am. Std.	Champion EL	3121 Bowl, 4260 tank	6.1	1.60
	Am. Std.	Champion EL ADA	3225 bowl & 4260 tank	6.8	1.80
	Am. Std.	Champion RF	3110 bowl & 4260 tank	6.1	1.61
	Am. Std.	Champion Right Height	2002: 3225 bowl, 4260 tank	6.0	1.59
	Am. Std.	Champion Select	2035: 3110 bowl, 4272 tank	6.0	1.59
	Am. Std.	Champion Select	2057: 3225 bowl, 4272 tank	6.0	1.59
	Am. Std.	Champion Select	2087: 3121 bowl, 4272 tank	6.0	1.59
	Am. Std.	Colony / Afton	4392 tank & 3038 bowl	5.4	1.41
	Am. Std.	Colony / Afton (lined)	4392 tank & 3038 bowl	6.1	1.61
	Am. Std.	Doral Champion	2367: 3225 bowl, 4272 tank	6.0	1.59
	Am. Std.	Doral Champion	2368: 3121 bowl, 4272 tank	6.0	1.59
	Am. Std.	Doral Champion	2369: 3110 bowl, 4272 tank	6.0	1.59
	Am. Std.	Doral Classic Champion	2058: 3225 bowl, 4281 tank	5.2	1.40
	Am. Std.	Doral Classic Champion	2074: 3121 bowl, 4281 tank	5.2	1.40
	Am. Std.	Doral Classic Champion	2076: 3110 bowl, 4281 tank	5.2	1.40
	Am. Std.	FloWise	4023 tank & 3018 Bowl	4.2	1.10
	Am. Std.	Glenwall EL	3402016.021 bowl, 4098100.021 tank	6.0	1.59
	Am. Std.	Hamilton EL	2092-0170-20	5.1	1.35
	Am. Std.	Oakmont Champion El Right Ht	2738: 3101 bowl, 4272 tank	6.0	1.59
	Am. Std.	Oakmont Champion Elongated	2625: 3153 bowl, 4272 tank	6.0	1.59
	Am. Std.	Oakmont Champion Round Front	2627: 3167 bowl, 4272 tank	6.0	1.59
	Am. Std.	Plebe EL	4392 tank & 3344 bowl	7.2	1.90
	Am. Std.	Ravenna RF	4096 tank & 3454 bowl	5.2	1.37
	Am. Std.	Sonoma RF	4392 tank & 3338 bowl	6.0	1.59
	Am. Std.	Townsend Champion EL Right Ht	2733: 3177 bowl, 4281 tank	5.2	1.40
	Am. Std.	Townsend Champion RF Right Ht	2735: 3180 bowl, 4281 tank	5.2	1.40
	Am. Std.	Yorkville	4099 tank, 3120 bowl	6.7	1.77
	Briggs	Abingdon III RF	4229: 4440 tank, 4875 bowl	6.9	1.82
	Briggs	Altima III RF	4232: 4430 tank, 4320 bowl	7.3	1.93
	Briggs	Hathaway Vacuity EL	4360-130 bowl, 4460-130 tank	5.6	1.48
	Briggs	Vacuity EL	4200	5.6	1.48
	Briggs	Vacuity EL	4345-130 bowl, 4400-130 tank	5.2	1.37
	Briggs	Vacuity RF	4400-130 tank & 4310-130 bowl	5.5	1.45
	Capizzi	Capizzi EL	0778-2 bowl, 1278 tank	4.4	1.16
	Capizzi	Turbo Capizzi High Profile	0478 bowl, 1578 tank	3.7	1.00
	Capizzi	Turbo Capizzi Low Profile	0478 bowl, 1513 tank	3.1	0.80
	Capizzi	Turbo Capizzi Low Profile ADA	0441 bowl, 1513 tank	3.7	1.00
	Caroma	Caravelle 270 ADA	989770: 609177 bowl, 687180 tank	6.0	1.59
	Caroma	Caravelle 305	989680: 609151 bowl, 629435 tank	6.0	1.59
	Caroma	Caravelle One-Piece	989646	5.6	1.50
	Caroma	Caravelle RF	2000 tank & 270 Bowl	5.6	1.48
	Caroma	Reflections 270	989720: 609159 bowl , 629530 tank	6.0	1.59
	Caroma	Royale	624530W tank & 609151W bowl	6.0	1.59

Addition to this Edition				Flush Volume at Waterline	
	Make	Model	Model Number	Volume (L)	Volume (G)
	Caroma	Royale 305 EL ADA	609130 bowl, 629530 tank	6.0	1.59
	Caroma	Tasman RF	989860: 270 Bowl, Tasman 270 tank	6.0	1.59
	Corona	Orchid RF	8510	6.3	1.66
	Crane	Cranada EL & RF	3372 / 3352 bowl, 3742 tank	6.0	1.59
	Crane	Economiser EL	3825 bowl, 3612 tank	5.4	1.42
	Crane	Economiser RF	3612 tank & 3824 bowl	5.8	1.53
	Crane	SureFlush EL ADA	31212 bowl, 31242 tank	5.3	1.40
	Crane	SureFlush RF	31192 bowl, 31242 tank	5.4	1.42
	Crane	SureFlush RF	31202 bowl, 31242 tank	5.4	1.42
	Crane	VIP (RF)	3992 bowl, 3976 tank	6.0	1.59
	Crane	VIP Flush EL	3976 tank & 3991 bowl	5.5	1.45
	Crane	VIP Flush RF	3995: 3990 bowl, 3976 tank	6.0	1.59
	Eljer	Aquasaver EL	1417 / 137	4.5	1.19
	Eljer	Canterbury RF	081-1620-00	5.6	1.48
	Eljer	Patriot EL ADA	141 tank, 131 bowl	6.0	1.59
	Eljer	Patriot RF	091-2120: 141 tank, 131 bowl	6.6	1.74
	Eljer	Patriot Savoy EL	131 bowl, 141 tank	6.4	1.69
	Eljer	Patriot Savoy RF	131 bowl, 141 tank	6.2	1.63
	Eljer	Savoy RF	141 tank, 131 bowl	6.0	1.59
	Eljer	Titian	091-0777 (141-0777 tank, 131-0777 bowl)	5.7	1.50
	Foremost	Premier EL ADA	LL-8207-HC bowl, T-8207 tank	5.0	1.32
	Foremost	Premier/Lilas	T-8207-W tank & LL-8207-W bowl	5.7	1.51
	Foremost	Premier/Lilas	TL-5101-WL	6.0	1.59
	Foremost	Regent RF	T-5207-W tank & LL-5207-W bowl	5.6	1.48
	Foremost	Victorian RF	T-1207-W tank & LL-1207-W bowl	6.0	1.59
	Gerber	Aquasaver EL	21-712, with 28-790 tank	6.5	1.72
	Gerber	Ultra Flush	21-311: 21-372 bowl, 28-385 tank	5.4	1.40
	Gerber	Ultra Flush	21-312: 21-372 bowl, 28-380 tank	5.4	1.40
	Gerber	Ultra Flush	21-314: 21-372 bowl, 28-384 tank	5.4	1.40
	Gerber	Ultra Flush	21-317: 21-377 bowl, 28-385 tank	5.4	1.40
	Gerber	Ultra Flush	21-318: 21-377 bowl, 28-380 tank	5.4	1.40
	Gerber	Ultra Flush	21-324: 21-377 bowl, 28-384 tank	5.4	1.40
	Gerber	Ultra Flush	21-325: 21-375 bowl, 28-380 tank	5.4	1.40
	Gerber	Ultra Flush	DF 21-318: 21-377 bowl, DF-28-380 tank	3.5	0.90
	Gerber	Ultra Flush	DF-21-312: 21-372 bowl, DF-28-380 tank	3.4	0.90
	Gerber	Ultra Flush	DF-21-314: 21-372 bowl, DF-28-384 tank	3.4	0.90
	Gerber	Ultra Flush	DF-21-324: 21-377 bowl, DF-28-384 tank	3.5	0.90
	Gerber	Ultra Flush	DF-21-325: 21-375 bowl, DF-28-380 tank	3.5	0.90
	Gerber	Ultra Flush	EF 21-318: 21-377 bowl, EF-28-380 tank	3.5	0.90
	Gerber	Ultra Flush	EF-21-312: 21-372 bowl, EF-28-380 tank	3.4	0.90
	Gerber	Ultra Flush	EF-21-314: 21-372 bowl, EF-28-384 tank	3.4	0.90
	Gerber	Ultra Flush	EF-21-324: 21-372 bowl, EF-28-384 tank	3.4	0.90
	Gerber	Ultra Flush	EF-21-325: 21-375 bowl, EF-28-380 tank	3.5	0.90
	Gerber	Ultra Flush EL	21-302: 21-342 bowl, 28-380 tank	5.8	1.53
	Gerber	Ultra Flush EL	28-380 tank & 21-374 bowl	5.6	1.48
	Glacier Bay	Aragon IV RF	164963	7.3	1.93
	Glacier Bay	Westminster RF	455-685 tank (lined) and 445-684 bowl	5.3	1.40
	Globe Union	C21672	C21672: C53672 bowl, C60321 tank	6.0	1.59

Addition to this Edition				Flush Volume at Waterline	
	Make	Model	Model Number	Volume (L)	Volume (G)
	Globe Union	C21682	C21682: C53682 bowl, C60321 tank	6.0	1.59
	Globe Union	C21692	C21692: C53692 bowl, C60321 tank	6.0	1.59
	Jacuzzi	Era	BM06	5.6	1.48
	Jacuzzi	Perfecta	BN30959 / BN3159 bowl, BN30-BN-31 tank	6.0	1.59
	Kohler	Bancroft Comfort Height	K-3487: 4281 bowl, 4633 tank	6.0	1.59
	Kohler	Cimarron Comfort Height	K-3489	6.0	1.59
	Kohler	Cimarron EL ADA	4286-0 bowl, 4634-0 tank	6.0	1.59
	Kohler	Cimarron RF	4287-0 bowl, 4634-0 tank	5.7	1.51
	Kohler	Devonshire EL	4269-0 bowl & 4619-0 tank	5.0	1.32
	Kohler	Highline Pressure Lite	K-3493: 4304 bowl, 4645 tank	5.3	1.40
	Kohler	Memoirs	K-3451 (Classic tank lid)	6.0	1.59
	Kohler	Memoirs	K-3453 (Stately tank lid)	6.0	1.59
	Kohler	Memoirs RF	4257-0 bowl & 4454-U-0 tank	5.8	1.53
	Kohler	Purist	K-3492-Power-Assist	5.4	1.43
	Kohler	San Rafael Power Lite	K-3398 Power-Assisted	5.3	1.40
	Kohler	Santa Rosa RF	3323-0	6.5	1.72
	Kohler	Sterling Rockton RF	402021-0 bowl, 402022-0 tank	5.6	1.48
	Kohler	Wellworth EL & RF	K3422 / K3423 (4276 / 4277 bowl, 4620 tank)	6.0	1.59
	Kohler	Wellworth Pressure Lite	K-3505: 4303 bowl, 4645 tank	6.0	1.59
	Komet	Deco RF	DE 611 tank and DE 627 bowl	9.5	2.51
	Mancesa	Cyclone EL	2282W bowl, 2281W tank	3.6	0.95
	Mancesa	San Marino EL	2262W bowl & 2261W tank	5.9	1.56
	Mancesa	St. Michelle RF	4260 tank, 2360 bowl	5.8	1.53
	Mancesa	Windsor RF	2700W bowl & 2711W tank	5.9	1.56
	Mansfield	Alto RF	130-160	5.8	1.53
	Mansfield	EcoQuantum (@ 1 gal)	146/147/148 bowl, 119 tank	3.4	0.90
	Mansfield	Magnum	722	6.0	1.59
	Mansfield	Maverick	102-101 (tank, bowl)	5.6	1.48
	Mansfield	Quantum	146/147/148 bowl -123 tank	6.0	1.59
	Mansfield	QuantumOne	146/147/148 bowl -153 tank	3.9	1.00
	Niagara	Flapperless RF	N2216	6.5	1.72
	Niagara	Niagara Turbo RF	N2220	5.9	1.56
	Orion	Iris RF	51073 tank & 50073 bowl	6.0	1.59
	Peerless Pottery (by Capizzi)	Predator ADA	608 bowl, 1 tank	3.7	1.00
	Peerless Pottery (by Capizzi)	Predator Low Profile	606 bowl, 1 tank	3.1	0.80
	Pegasus (Home Depot)	Tulip	477-546: 3103 bowl, 3427 tank	5.5	1.50
	RAK Ceramics	Compact Syphonic Elongated	CT30 bowl, CT65 tank	6.0	1.59
	St. Thomas	Marathon RF	6201.01	7.6	2.00
	Toto	Aquia	CST 414: CT414 bowl, ST 413 tank	1.5	5.80
	TOTO	Carlyle EL	MS874114SG	6.3	1.66
	TOTO	Carusoe RF	ST706 tank & C715 bowl	6.2	1.64
	TOTO	Clayton EL ADA (nee Baldwin)	ST784S tank & C784SF bowl	6.1	1.61
	TOTO	CST703 RF	CST703	5.9	1.56
	TOTO	Dalton EL ADA	ST733 tank & C734F bowl	6.2	1.64
	TOTO	Drake EL	CST744S	6.3	1.66
	TOTO	Plymouth EL	MS924154F	5.9	1.56
	TOTO	Ultimate EL	MS854114	5.5	1.45
	TOTO	Ultimate RF	MS853113	6.8	1.80

Addition to this Edition				Flush Volume at Waterline	
	Make	Model	Model Number	Volume (L)	Volume (G)
	TOTO	Ultramax EL	MS854114S	6.5	1.72
	Vitra	Altantis EL & RF	5050 / 5051 bowl, 6853 tank	6.0	1.59
	Vitra	Corina (1-pc)	5178	6.0	1.59
	Vitra	Corina (1-pc)	5209	6.0	1.59
	Vitra	Corina RF & EL	5068 / 5069 bowl, 5070 tank	6.1	1.61
	Vitra	Dual Flush RF	5076 bowl, 5055 tank	6.5	1.72
	Vitra	Mona	4117 bowl, 4015 tank	6.0	1.59
	Vitra	Riva	4117 bowl, 6952 tank	6.0	1.59
	Vortens	Dual Flush RF	3208-02-V bowl & 3420-02-V tank	5.6	1.48
	Vortens	Genova EL	3421-02-V tank & 3121-02-V bowl	6.0	1.59
	Vortens	GTA RF	3412 tank, 3200 bowl	5.6	1.48
	Vortens	Palermo	3126	6.1	1.61
	Vortens	Vienna II RF	3412 tank, 3208 bowl	5.9	1.56
	Vortens-Lamosa	Rhodas	3123 bowl, 3433 tank	6.0	1.59
	Vortens-Lamosa	Tornado	3138 bowl, 3468 tank	4.0	1.10
	Vortens-Lamosa	Tulip	477-546: 3107 bowl, 3427 tank	5.5	1.50
	Vortens-Lamosa	Vienna RF (Lined)	3208 bowl, 3464L tank (lined)	5.7	1.50
	Vortens-Lamosa	Vienna RF (Unlined)	3208 bowl, 3464V tank (unlined)	6.0	1.59
	Western Pottery	Aris RF	822	7.2	1.90
	Western Pottery	Challenger Hi-Boy	872 bowl, ULF-8 tank	6.0	1.59
	Western Pottery	Clinton EL	832 bowl	5.4	1.42

# **APPENDIX E**

# **REVISED PROTOCOL**

Maximum Performance (MaP) Toilet  
Fixture Performance Testing Protocol,  
Version 2 - September 2005

# Maximum Performance (MaP) Testing

## Toilet Fixture Performance Testing Protocol

Version 2 - September 2005

### 1.0 Scope of MaP Testing

- 1.1 Toilet model maximum performance (MaP) level is identified as the maximum media loading (in discreet increments expressed in grams) at which toilet model successfully clears all media from fixture in at least four of five attempts.
- 1.2 Tests where toilet sample clogs, plugs, or fails to restore a minimum of a 2-in. (50mm) trap seal following each flushing test will be deemed a failed test.
- 1.3 MaP test media is comprised of the following:
  - 1.3.1 One or more  $50 \pm 4\text{g}$  test specimen (“test specimen”) consisting of soybean paste contained in latex casing, tied at each end forming a ‘sausage’ approximately  $100 \pm 13\text{mm}$  in length and  $25 \pm 6\text{mm}$  in diameter<sup>1</sup>, and
  - 1.3.2 Four loosely crumpled balls of toilet paper (“paper”).

### 2.0 Testing Protocol

#### 2.1 Fixture Model Selection

- 2.1.1 A single randomly selected sample of each toilet model (“sample”) is required for testing.
- 2.1.2 Toilet models that are not *certified* as provided shall be identified as a “**Prototype Model**”.

#### 2.2 Set-Up

- 2.2.1 Samples shall be assembled according to manufacturer’s written instructions as contained within the product packaging, and placed on test rig, ensuring tank and bowl are level.
- 2.2.2 Tank water level shall be adjusted to the level specified by manufacturer in the manufacturer’s instructions (e.g., set to waterline).
- 2.2.3 Static water supply pressure shall be set to  $50 \pm 3$  PSIG.
- 2.2.4 Inlet water temperature shall be  $15 \pm 10^\circ\text{C}$  ( $59 \pm 18^\circ\text{F}$ ).
- 2.2.5 Flush sample a minimum of three times prior to commencement of testing.
- 2.2.6 Re-adjust tank water level to proper level if required.

#### 2.3 Flush Volume Measurement

- 2.3.1 Measure and record flush volume of sample in accordance with ASME A112.19.2-2003, paragraphs 8.4.1 and 8.4.2.
- 2.3.2 Samples with measured flush volumes in excess of 0.5 litres (0.13 gallons) greater than their rated flush volume shall be deemed to fail MaP testing requirements due to excessive flush volume.
- 2.3.3 Samples with measured flush volumes less than 0.5 litres (0.13 gallons) greater than their rated flush volume shall be adjusted, if possible, to their rated flush volume prior to performance testing.

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<sup>1</sup> approximately  $4 \pm 0.5$  inches in length and  $1 \pm 0.25$  inches in diameter

- 2.3.4 Samples with measured flush volumes less than their rated flush volume shall be tested at their measured volume and this volume shall be recorded on test report.

## 2.4 Waste Extraction Test

- 2.4.1 Test specimens shall be formed by hand such that they are roughly cylindrical in shape and uniform in diameter
- 2.4.2 A test specimen drop guide shall be placed across the top of the bowl, with a 50mm (2-in.) diameter opening aligned over centre of bowl sump. Drop guide may be made of plastic or other rigid material, to be no more than 12mm (0.5-in.) thick, and be of sufficient length to span top of toilet bowl.
- 2.4.3 Test specimens shall be freely dropped in a vertical orientation through opening in drop guide into bowl. Additional test specimens shall be added, as required, to achieve desired mass loading. Record total mass loading.
- 2.4.4 Remove drop guide and freely and randomly drop four balls of crumpled toilet paper over centre of bowl sump.
- 2.4.5 Wait  $10 \pm 1$  seconds.
- 2.4.6 Flush sample. Collect discharged media in strainer or other suitable container positioned below toilet fixture.
- 2.4.7 Record test as **Pass** or **Fail** (test is a **Fail** if any waste remains in the bowl or trap, or if minimum 50mm (2-in.) trap seal has not been restored).
- 2.4.8 Remove (rinse) discharged toilet paper from test specimens, and prepare test specimens for further testing.
- 2.4.9 Flush sample to clean bowl and trapway and fully restore trap seal.
- 2.4.10 Increase (or decrease) mass loading, as required, based on the following intervals, and repeat waste extraction test until such time as the maximum loading has been reached as described in paragraph 2.4.11:
- 50g
  - 100g
  - 150g
  - 200g
  - 250g
  - 300g
  - 350g
  - 400g
  - 500g
  - 600g
  - 800g
  - 1,000g

No testing shall be conducted at mass loading greater than 1,000g.

- 2.4.11 Record highest mass loading at which toilet test sample successfully removed all test media from fixture and restored minimum 2-in. trap seal in at least four of five attempts. This loading represents the maximum performance level for the test sample (i.e., the MaP score).

### 3.0 Test Media Specifications

#### 3.1 Soybean paste nominal specifications:

- 35.5% water, 33.8% soybean, 18.5% rice, and 12.2% salt, and having a density of  $1.15 \pm 0.10$  g/mL (i.e., density greater than that of water).

#### 3.2 Latex casing specifications:

- Casings made from non-lubricated latex condoms (LifeStyles® brand, purchased from Ansell Healthcare Products LLC, Dothan, AL 36303 USA).

#### 3.3 Cord used to tie casing:

- 1.0mm diameter polymer cord that will not crack or harden with time (Stretch Magic Bead & Jewelry Cord, Pepperell Braiding Company, P.O. Box 1487, Pepperell, MA 01463, 800-343-8114)

#### 3.4 Cased test specimens:

- Each test specimen shall have a mass of  $50 \pm 4$ g.
- Test specimens must be able to span clear distance of 76mm (3-in.) for minimum of 15 seconds when tested at room temperature (setup illustrated in Figure 1).
- Test specimens with rips, tears, punctures, or other damage, shall not be used.
- Test specimens may contain small volumes of air, however, specimens that float shall not be used.

#### 3.5 Recommendations for storage of cased test specimens:

- Test specimens should be stored in air-tight containers and refrigerated when not in use. A damp sponge should be placed in bottom of container to prevent test specimen drying.

#### 3.6 Toilet paper specifications:

- Each ball of paper is comprised of six sheets of single ply toilet paper conforming to ASME A112.19.14–2001, section 3.2.5.1.2

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**NOTE** Cased test specimens (ready-to-use) may be purchased from:

Veritec Consulting Inc.  
1495 Bonhill Road, Unit 12  
Mississauga, Ontario, Canada L5T 1M2  
Phone (905) 696-9391, ext. 105  
Fax (905) 696-9395  
[bill@veritec.ca](mailto:bill@veritec.ca)

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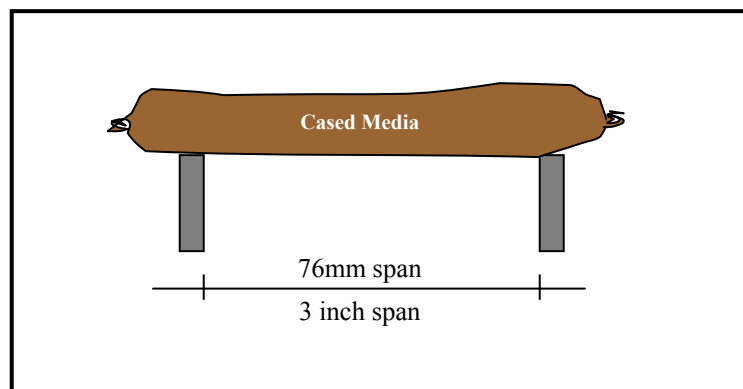


Figure 1