

TOTO®

Aquia® Dual-Max® Toilet

MS654114MF – One-piece
CST412MF – Two-piece

Innovative and highly-efficient, the Aquia Dual-Max Toilet adds elegance and ease to your bathroom experience through its timeless style and innovative performance design. It features a simple, elongated skirt to offer clean lines – and easier cleaning. Available in a range of finishes and colors, this transitional aesthetic model offers planet-friendly advancements that respect water and your time.

The Aquia is available in a two-piece toilet and tank set, or choose the one-piece for a more streamline look and an included seat.



Performance Dashboard

Features & functionality

- Dual-Max® flushing system, high efficiency 1.6gpf & 0.9gpf
- Dual flush option
- Chrome push button
- Elongated skirt
- Universal Height
- 12" Rough-in

Visit TOTO for more product specifications:

- Aquia Dual-Max Toilet, One-piece – [MS654114MF](#)
- Aquia Dual-Max Toilet, Two-piece – [CST412MF](#)

CSI MasterFormat™ #22 41 13.13

Environmental performance

Improved by:

Lower water use

Certifications & rating systems:

- WaterSense® certified
- Declare™ label

[See LCA results & interpretation](#)



Dual-Max® Flushing System

The TOTO Dual-Max flushing system is the leading choice for dual-flushing technology. Our system uses water responsibly without sacrificing performance.

How it works: Our goal was to optimize water usage and provide effective flushing performance. The Dual-Max system allows the user to choose the appropriate amount of water for each flush, ranging from 0.9 to 1.6 GPF.



SM Transparency Report™ + Material Health Overview

VERIFICATION

LCA

3rd party verified



Self-declared

Transparency Report

Certified



Self-declared

Material evaluation

3rd party verified

Self-declared



Validity: 10/18/14 – 10/18/17
TOT – 10/18/14 – 008

The LCA and Report are independently verified and certified to the SM Transparency Report Framework and ISO 14025.

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Life cycle assessment

Material health

Scope and summary

Cradle to grave Cradle to gate with options Cradle to gate

Functional unit

One toilet in a U.S. household that functions for 10 years. The period of 10 years is modeled as the period of application based on the average economical lifespan for residential applications. The technical lifespan is longer. The economical lifespan of commercial applications can be longer or lower due to aesthetic replacements or more intense use. The implication is that the LCA model assumes that the application ends at year 10 and that the materials will be treated in an end-of-life scenario.

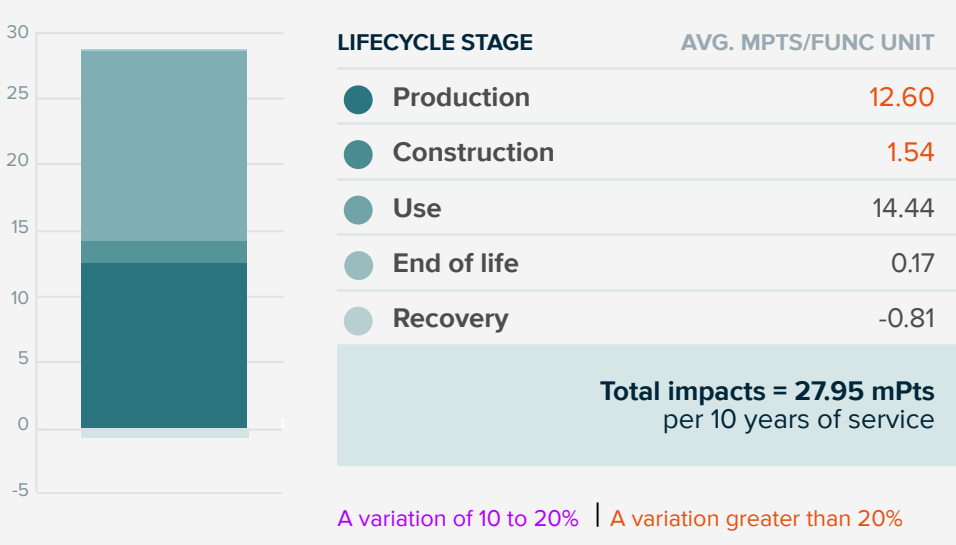
Default use phase scenario

10 years of service in a U.S. household with 1.133 gallon/use and 5.1 flushes/day and 2.6 people resulting in 54,852 gallons

Material composition greater than 1% by weight

PART	MATERIAL	AVG. % WT.
Ceramic	Ceramic	84%
Packaging	Corrugated board	10%
Seat	Polypropylene	4%
	Other	2%

Total impacts by life cycle stages [mPts/func unit]



What's causing the greatest impacts

All lifecycle stages

The use stage and the production stage are equally important and dominate the results for all impact categories.

The impact of the use stage is mostly due to the embedded energy arising from acquisition, treatment and distribution of the water used during the operation of the product (26-62%). The production stage itself is very relevant as it shows major contributions throughout. It has the most significant contributions to ozone depletion (emissions due to the natural gas, hard coal and crude oil exploration and transportation), fossil fuel depletion (mostly defined by the natural gas used at the kiln, the use of fossil fuel based thermal power plants and the production of polypropylene) and ecotoxicity (mainly caused by stainless steel parts' production, electricity production and the disposal of slags). The contributions covered under the construction/installation stage are mostly associated with the product delivery to the market and the disposal of packaging materials, mainly corrugated cardboard. The recovery stage includes recycling processes and benefits by preventing the need to produce primary materials. Recycling is a relevant factor for some of the impact categories, offsetting a portion of the impacts caused by production. Additionally, the delivery of the product to the construction/installation site as well as the processes for dismantling the product and final waste treatment during the end of life stage are slightly relevant in the carcinogenics, non-carcinogenics and ecotoxicity impact categories.

Production stage

The ceramic parts dominate the material contribution except for carcinogenics.

The stainless steel parts also have major contributions to the carcinogenics impact category. Additionally, the corrugated boards have a significant contribution to eutrophication. The remaining parts and processes contribute between 7% and 16% of the overall impacts in the rest of the categories.

Sensitivity analysis

Deviations are throughout, mainly because Aquia CST412MF contains more ceramic (10-20% deviation) and thus also requires more packaging material than Aquia MS654114MF (10-20% deviation). Another reason is the difference in transportation of the product to the market, as Aquia CST412MF is mainly produced outside the US while Aquia MS654114MF is produced in the US. Both products use the same amount of water and so there is no deviation in the use stage.

Multi-product weighted average

Results represent the weighted average using production volumes for the products covered. Variations of specific products for differences of 10-20% against the average are indicated in purple; differences greater than 20% are indicated in red. A difference greater than 10% is considered significant.

TOTO PeoplePlanetWater. programs improving environmental performance

- Dual-Max®, E-Max®, Tornado Flush™, 1G®, and EcoPower® reduce water consumption in the use phase
- Energy efficiency programs optimize the firing process
- 50% electricity from renewable energy
- 100% of post-industrial ceramic waste is recycled

[See how we make it greener](#)

LCA results

LIFECYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE	RECOVERY
Information modules: Included Excluded*	A1 Raw Materials	A4 Transportation/Delivery	B1 Use	C1 Deconstruction/Demolition	D1 Recycling
*Installation and deconstruction/demolition are mostly manual. The toilets and/or urinals should not need repair, maintenance or replacement during the modeled life time.	A2 Transportation	A5 Construction/Installation	B2 Maintenance	C2 Transportation	D2 Recovery
Operational energy use is irrelevant to the life cycle of the modeled product.	A3 Manufacturing		B3 Repair	C3 Waste processing	D3 Reuse
Reuse and energy recovery are not modeled for toilets and/or urinals.			B4 Replacement	C4 Disposal	
			B5 Refurbishment		
			B6 Operational energy use		
			B7 Operational water use		

SM 2013 Learn about SM Single Score results

Impacts per 10 years of service	12.60 mPts	1.54 mPts	14.44 mPts	0.17 mPts	-0.81 mPts
Materials or processes contributing >20% to total impacts in each lifecycle stage	Ceramic parts production as well as well zinc and brass parts together with zinc turning process.	Transportation of the product to installation site or consumer and disposal of packaging.	Volume of water use during the operation of the product and the embedded energy use (such as electricity) in the water used.	Transport to waste processing, waste processing and disposal of material flows transported to a landfill.	Plastic and metal components' recycling processes.

TRACI

A variation of 10 to 20% | A variation greater than 20%

LIFECYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE	RECOVERY	
Ecological damage						
Impact Category	Unit					
Acidification	kg SO ₂ eq	9.77E-01	1.95E-01	1.25E+00	9.16E-03	-3.43E-02
Ecotoxicity	CTU _e	1.49E+02	3.68E+01	1.16E+022	2.44E+00	-5.18E+00
Eutrophication	kg N eq	5.67E-02	1.46E-02	1.06E-01	8.28E-04	-7.62E-03
Global warming	kg CO ₂ eq	1.65E+02	1.77E+01	1.87E+02	4.20E+00	3.57E+00
Ozone depletion	kg CFC-11 eq	1.74E-056	1.18E-08	7.87E-06	2.01E-07	-3.19E-07
Human health damage						
Impact Category	Unit					
Carcinogenics	CTU _h	2.56E-06	1.99E-07	3.95E-06	2.29E-08	-3.50E-07
Non-carcinogenics	CTU _h	1.37E-05	1.91E-06	1.75E-05	1.57E-07	-7.36E-07
Respiratory effects	kg PM _{2.5} eq	7.11E-02	3.43E-03	8.33E-02	6.59E-04	-4.61E-03
Smog	kg O ₃ eq	7.35E+00	5.76E+00	8.69E+00	2.46E-01	-4.47E-01
Resources depletion						
Impact Category	Unit					
Fossil fuel depletion	MJ surplus	3.40E+02	2.61E+01	1.26E+02	3.07E+00	-6.03E+00

References

LCA Background Report

TOTO Sanitary Ceramic Products LCA Background Report (public version), TOTO 2014

SM Transparency Report Framework

Part A: Part A: LCA Calculation Rules and Background Report Requirements (Draft V2) (based on ISO14040-44, ISO14025 and EN15804)
Part B: Product Group Definition – Residential Toilets

SM Transparency Reports enable purchasers and users to compare the environmental performance of products on a life cycle basis. They are designed to present information transparently to make the limitations of comparability more understandable. SM Transparency Reports of products that comply with the same Product Group Definition (PGD) and include the same life cycle stages, but are made by different manufacturers, may not sufficiently align to support direct comparisons. They therefore, cannot be used as comparative assertions unless the conditions defined in ISO 14025 Section 6.7.2. 'Requirements for Comparability' are satisfied.

Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4 MR Building product disclosure and optimization

Environmental product declarations

SM Transparency Report product credit values:

<input type="radio"/> LCA self-declared, Report self-declared	0 product
<input type="radio"/> LCA verified, Report self-declared	1/4 product
<input checked="" type="radio"/> LCA verified, Report certified	1 product

Green Globes for New Construction and Sustainable Interiors

NC 3.5.1.2 Path B: Prescriptive Path from Building Core | NC 3.5.2.2 and SI 4.1.1 Path B: Prescriptive Path for Interior Fit-outs

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3rd party verified NSF
Self-declared

Transparency Report
Certified NSF
Self-declared

Material evaluation
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Life cycle assessment

Material health

Evaluation program: Declare

Declare labels are issued to products disclosing ingredient inventory, sourcing and end of life options. Declare labels are based on the Manufacturers Guide to Declare, administered by the International Living Future Institute.

How it works

Material ingredients are inventoried and screened against the [Living Building Challenge](#) (LBC) Red List which represents the 'worst in class' materials, chemicals, and elements known to pose serious risks to human health and the greater ecosystem.

The Declare product database and label are used to select products that meet the Living Building Challenge's stringent materials requirements, streamlining the materials specification and certification process.

Assessment scope and results

Content inventory: All ingredients identified by name and CAS #
Inventory threshold: 100 ppm

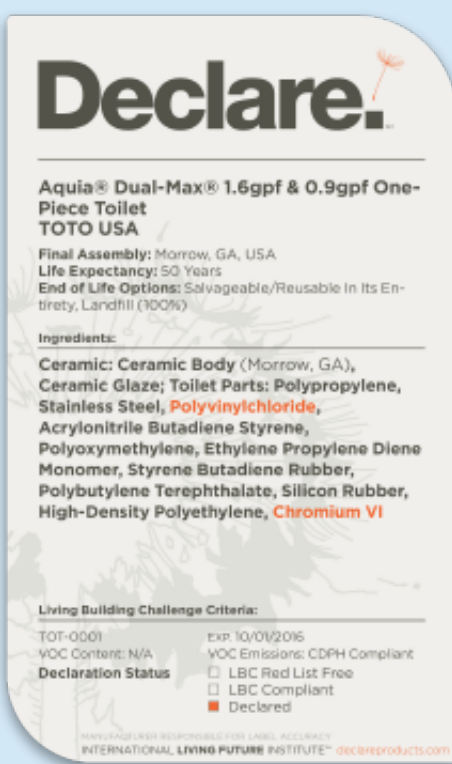
Declaration status:

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- LBC Red List Free [?](#)
- LBC Compliant [?](#)
- Declared [?](#)

● **Aquia Dual-Max Toilet, one piece**

● **Aquia Dual-Max Toilet, two piece**



[Click on each label to see the full declaration](#)

How this rating was achieved

Declare level

'Declared' is awarded to products when all the ingredients name and CAS numbers have been disclosed. 100% disclosure qualifies the product for the LEED v4 building product disclosure and optimization - material ingredients credit option 1.

What's in the product and why

The one-piece version of the Aquia is manufactured in the United States. Manufacturing in the US means that robust human labor, safety and environmental rules and regulations were followed. Local sourcing of raw materials means that less smog and air pollution are generated as a result of transport. The ceramic body and glaze makes up ~88-93% of the total mass of the toilet. Therefore, manufacturing and transportation of the ceramic create the greatest human health impacts when compared to the overall manufacture of the entire toilet. *By specifying an Aquia toilet manufactured in the United States, the consumer helps mitigate these human health impacts.*

Red List materials

The push button is plated with chrome (Hexavalent Chromium VI). Chromium material is used as a decorative finish in applications where corrosion-resistance and durability are required. During the chrome plating process health hazards have been identified and are managed according to the OSHA Guidelines. Process controls are used to protect the environment and the production workers wear personal protection equipment. *After the plating process the chrome surface is inert and does not pose any health risks.* The push button in the final form does not represent any hazards to the user. TOTO continues to investigate alternative finishes in order to reduce and/or eliminate Chromium VI on the toilet push buttons and trip levers.

The Aquia uses parts containing PVC (Polyvinyl Chloride), a plastic commonly used within the plumbing industry. The primary health concern is during the production process when the raw material components are in a powder or pelletized form. If inhaled or ingested the results can be toxic and potentially carcinogenic. *In the final form, materials are inert and not a hazard to the users of the toilet.*

As part of TOTO's efforts to reduce health impacts, alternative options for Dual-Max® toilets that do not utilize PVC are available. [Contact us.](#)

While there are no legislative or regulatory mandates to remove this material from a product, as part of our goal to mitigate adverse health impacts, TOTO has moved beyond compliance by voluntarily eliminating this compound.

Where it goes at the end of its life

TOTO encourages consumers to recycle their used toilet and toilet parts. Contact your local municipality for recycling programs.

How we're making it healthier

Goals and plans for improvement:

- Utilize alternative materials to PVC, removing this compound from tank parts in all TOTO models.
- With no compromise to beauty, functionality or durability, TOTO intends to offer alternative finishes for trip levers that do not require Chromium VI.

[See how we make it greener](#)

References

Declare

TOTO USA, Declare label for Aquia Dual-Max Toilet MS654114MF
TOTO USA, Declare label for Aquia Dual-Max Toilet CST412MF

Manufacturer's Guide to Declare

A comprehensive guide providing information about the program, the assessment methodology, how to submit material data to obtain a Declare label and how they are used to meet the Health & Happiness and Materials Petals of the Living Building Challenge.

Rating systems

LEED v4, Building product disclosure and optimization Material Ingredients

Credit values:

- | | |
|--|-----------|
| <input checked="" type="radio"/> Option 1. Material ingredient reporting | 1 product |
| <input type="radio"/> Option 2. Material ingredient optimization | 1 product |

Living Building Challenge Living Building Challenge 3.0



Materials petal:

- Imperative 10. Red List Free
- Imperative 12. Responsible Industry
- Imperative 13. Living Economy Sourcing

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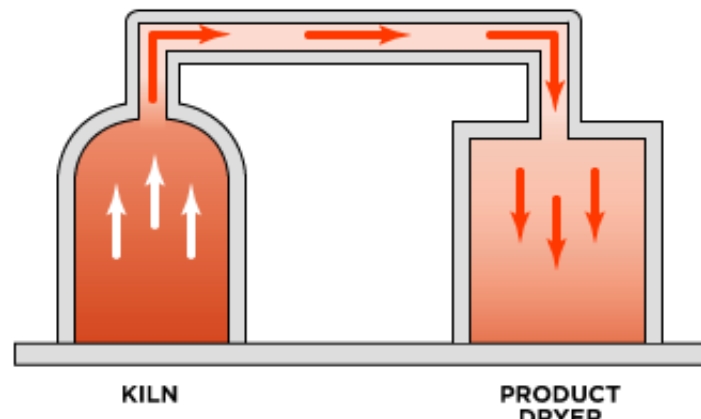
Collapse all

See LCA results by lifecycle stage

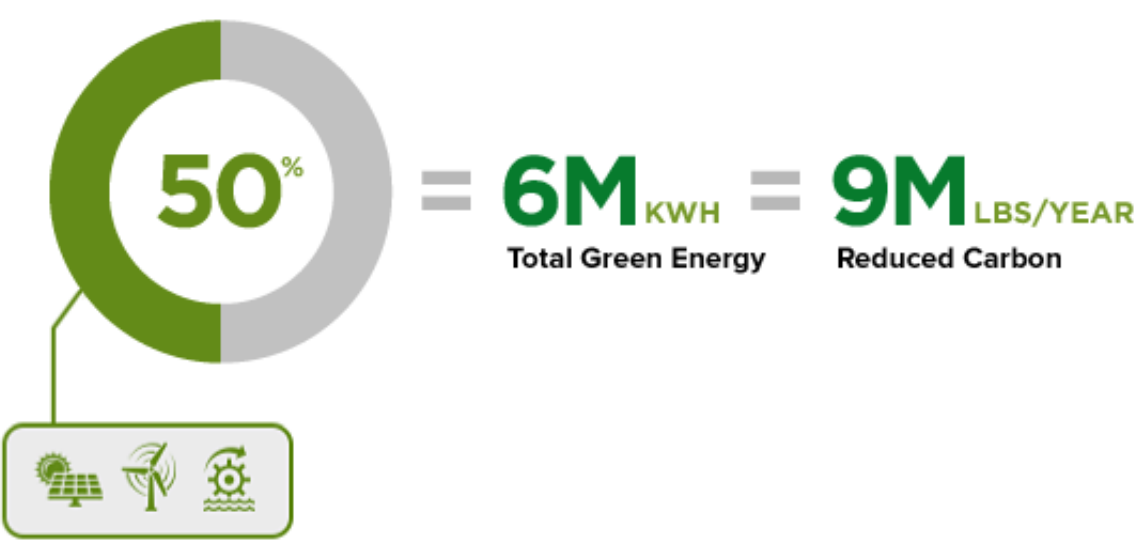
PRODUCTION



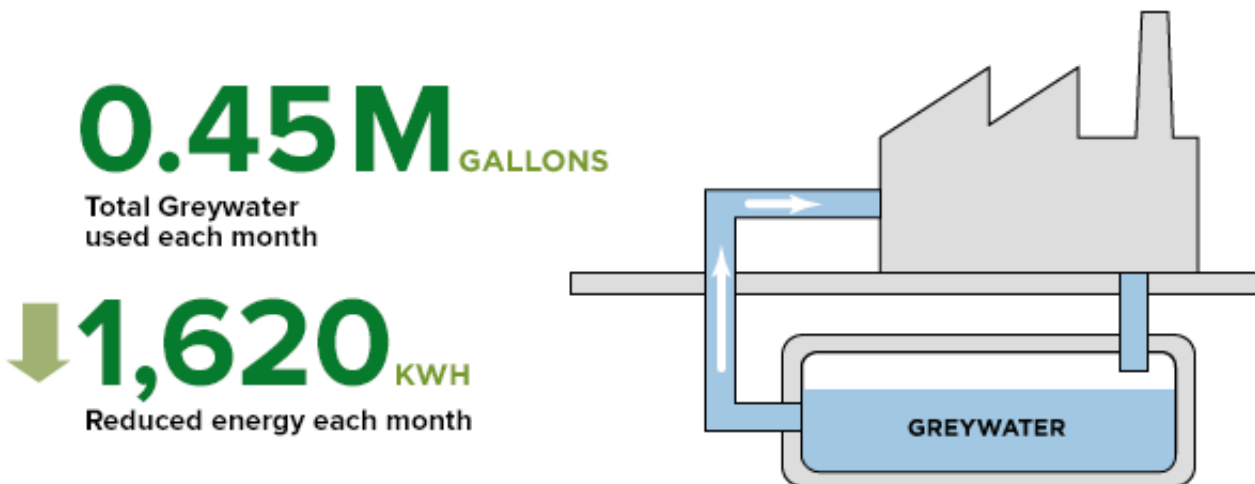
↓ 15%
Less Natural Gas



Waste heat from the kilns is routed to the product dryer. This reduces 15% natural gas consumption.



50% of the electricity that TOTO uses is based on renewable energy generation. It's 6 million kilowatt hours of green energy, which means over 9 million pounds of carbon reduced each year.



0.45 million gallons per month of greywater is used in TOTO's operations. 1,620 of kwh in energy is reduced due to less potable water.



65% of all cardboard used is 100% recycled content.

CONSTRUCTION



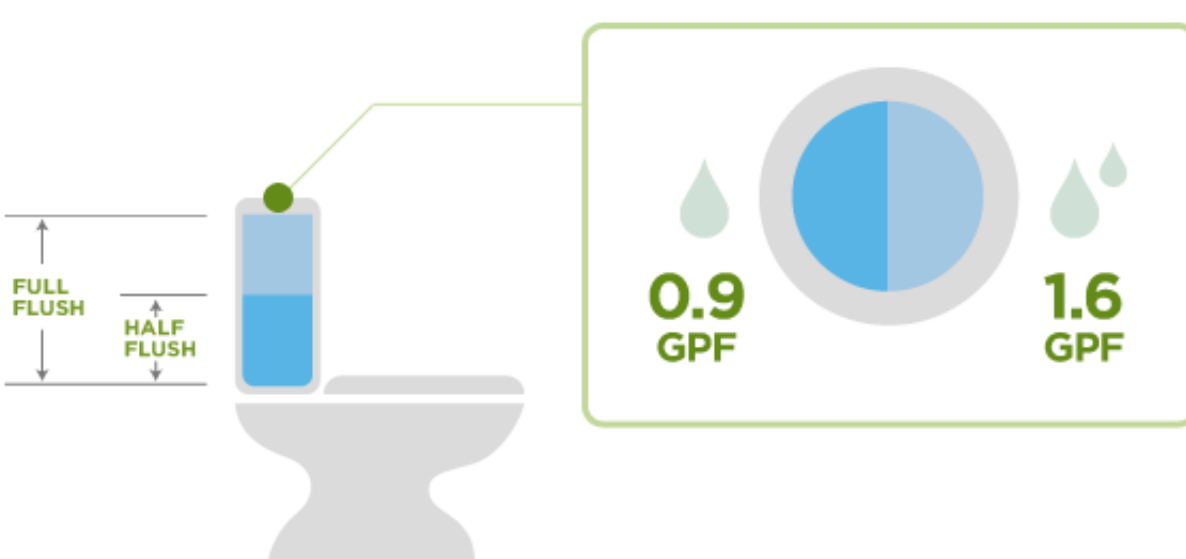
= **INCREASES** = **↓ 50%**
Fill rate of a trailer Reduced transportation cost

One-piece toilets are shipped with every other toilet upside down, increasing the fill rate of a truck trailer and cutting transportation cost in half.

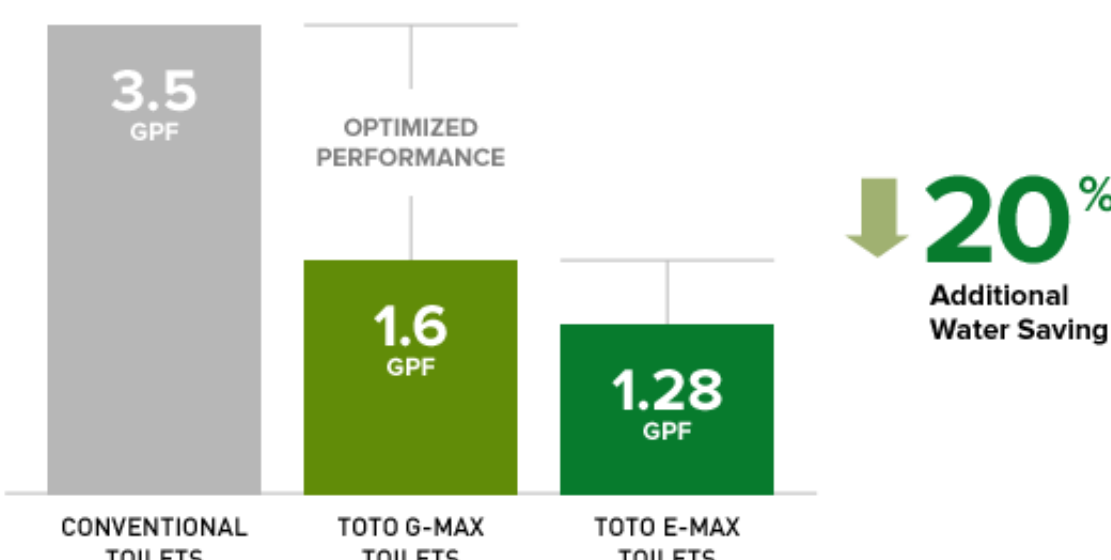


UPS parcel shipments are carbon neutral. TOTO is a registered SmartWay® Transport Partner.

USE



The dual flush system reduces water in the use phase.



Utilizing the same proven engineering as our legendary 1.6 GPF G-Max flushing system, the 1.28 GPF E-Max reinforces TOTO's performance reputation while offering an additional water savings of 20%.

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