

# Macerator Toilet Comparison

Question:

How does SeaLand stand out from other macerator toilets?

Answer:

Close attention to many details that add up to a highly superior product.



# Comparison Report

*Complete Report Available at IBEX*

Over six months of testing of 11 competitive toilet models from six different companies:

Dometic Corp.

ITT Jabsco

Johnson Pump

Planus

Raritan Eng.

Thetford/Tecma



# Comparative Evaluations include

## **Macerator Pump Design**

- Impeller/macerator design and materials
- In-line blockage relating to pump designs – cutters vs. impellers
- Ability to pass foreign material
- Check valve design
- Motor shaft seal design

## **Toilet Operation**

- Flush activation and control panel design
- Water consumption
- Peak noise Levels
- Power consumption
- Breaker and wire size

## **Comfort, Installation, Quality and Technical Concerns**

- Seat size and comfort
- Installation factors
- Pipe sizing considerations
- Quality issues
- Technical support

# The MAJOR Point of Differentiation: MACERATOR PUMP DESIGN



## Three versions of macerator impeller designs.

Metal Cutting Blades: The stainless steel blades cut solid materials entering the pump chamber into smaller pieces (about ¼-inch or 0.6 cm) and push the macerated material and flush water into the discharge piping.

Plastic Impellers: With one exception, all other toilets evaluated use a plastic impeller in a *volute* design. A volute pump has an offset impeller which can allow larger solids to be pushed into the discharge piping or holding tank.

Two-Stage Cutter / Flexible Vane Pump: This design couples a stamped metal plate and a separate plastic impeller driven from one motor. It is an older design that was once common for electric marine toilets. This type of pump tends to clog easily.



Upper Stage:  
Metal plate  
breaks up  
tissue and  
solids.

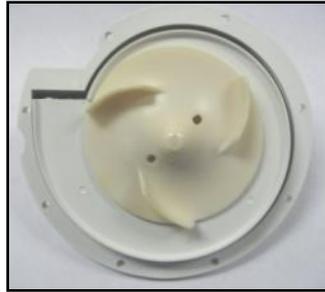
Lower Stage:  
Small plastic  
impeller.



# Macerator Pump Design



Dometic (All Models)  
Stainless Steel Cutter/  
Impeller



Jabsco (Lite Flush)  
Plastic Impeller



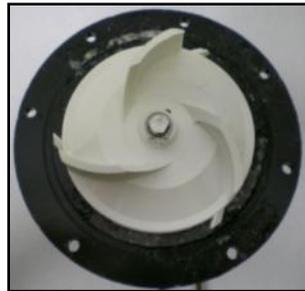
Jabsco (Deluxe Flush)  
Plastic Impeller



Jabsco (Quiet Flush)  
Metal Impeller



Planus (Artic)  
Plastic Impeller



Johnson Pump (AquaT)  
Plastic Impeller



Raritan (Elegance)  
Plastic Impeller



Thetford / Tecma  
(Silence Plus)  
Plastic Impeller



Thetford / Tecma  
(EasyFit)  
Plastic Impeller

Toilets that incorporate plastic impellers avoid blockage by passing relatively unbroken solids. This means un-macerated waste, if it makes it through the pump chamber, will move into the boat's piping system or holding tank. The result can be a blocked discharge pipe or holding tank.



0.3 lbs (0.1 kg) of banana cut into approximately 2-inch (5.0 cm) lengths.

Resulting material from a Dometic 8100



Results from Thetford EasyFit



Below are photos of a typical “baby wipe” flushed through both a Dometic toilet and through a Thetford EasyFit toilet.



The wipe was totally broken up by the Dometic macerator.



It was passed into the holding tank in an almost completely whole condition by the Thetford Tecma EasyFit.



The result was a clog in the holding tank discharge pump.

**Why is this important?** A clogged holding tank or discharge pump would be a very expensive service call not covered by the manufacturer of the toilet. Consider the impact of large pieces of debris entering the holding tank and causing blockage, especially in the discharge pump. All Dometic macerator toilets produce effluent that will easily pass through the holding tank and discharge pump.

# COMPETITIVE MODEL FINDINGS



# ITT JABSCO

Jabsco is a business unit of ITT and a long-time supplier of pumps to marine industry. They occupy low end of market and design for low price and low long-term reliability.



Quiet Flush



Lite Flush

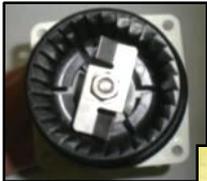


Deluxe Flush



## Jabsco Quiet Flush

- Old style two-stage pump. Inefficient design. Clogs easily.
- Child-sized seat.
- Motor extends to the rear from the base (see fit issue below).
- Manually operated. No holding tank level indication.



Upper Stage:  
Metal plate  
breaks up  
tissue and  
solids.

Lower Stage:  
Small plastic  
impeller.

Above comparison of Dometic 8100 and Jabsco Quiet Flush installed on same platform with a 10° slope on the wall behind the toilets. Even though the Quiet Flush has a smaller front-to-back footprint, the space at the rear of the 8100 allows it to be mounted further back on the platform. The black lines in the middle photo indicate the position of the front edge of the bowls. The mark at the top shows the front edge of the 8100 and the lower one indicates the front edge of the Quiet Flush. This clearly shows the advantage of a sloped back wall. Also, notice the difference in seat size.



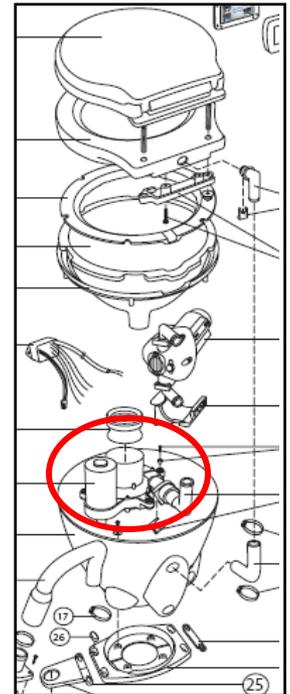
## Jabsco Lite Flush

- Plastic impeller pump had serious failure caused by paper towel.
- Child-sized seat.
- Panel has unclear graphics and no level indication.
- High peak noise [69.7 dB(A)]



This toilet uses a belt-driven macerator located at the outlet of the toilet bowl (circled in red). On one test trial with a paper towel, the plastic impeller stopped and locked. The motor continued to turn and the belt actually melted the plastic drive wheel on the plastic impeller (see photo).

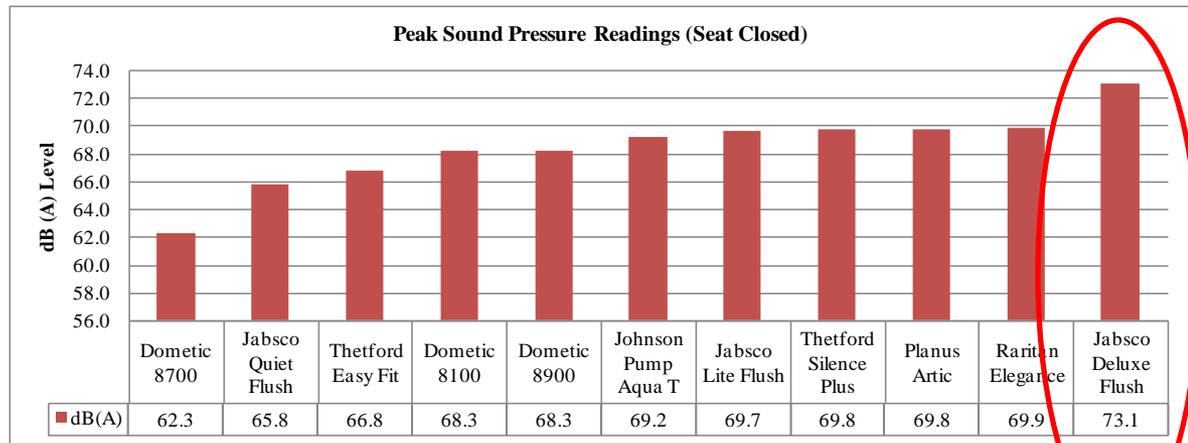
It took roughly 45 minutes to replace this component. We also found that the impeller and motor are only available as complete assembly (circled in red) so that replacing this minor part will be very costly to the end user.





## Jabsco Deluxe Flush

- Highest peak noise of all toilets tested [73.1 dB(A)].
- Panel has unclear graphics and no level indication.



## JOHNSON PUMP

Primarily a pump company. Added toilets to their line made by Matromarine in Italy to compete with Jabsco.



AquaT

## Johnson Pump Aqua T

- New toilet had severe corrosion on pump motor housing.
- Poor motor shaft seal.
- High pump noise [69.2 dB(A)]
- Manual operation. No holding tank level indication.



## PLANUS SpA

New supplier in 2009. Basically same management as Tecma before Thetford acquisition. Fragmented distribution outside of Italy.

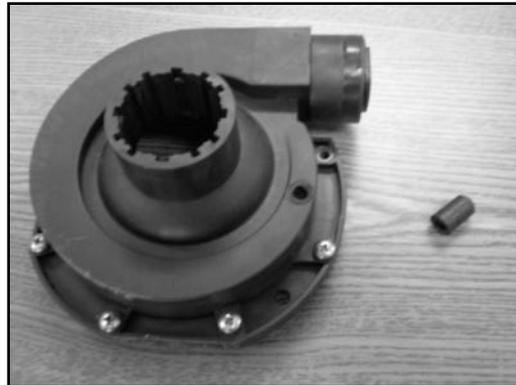


Artic

## Planus Artic



- Unable to do much testing due to broken fitting (see photo below) in freshly opened carton. No repair parts available in US.
- Panel has unclear graphics. No holding tank level indication.
- Highest water consumption and power consumption based on similarity with Thetford /Tecma Silence Plus.
- Child-sized seat.
- Compact requires large cut out in deck and mechanism hangs 4-inches (10 cm) below mounting surface (see photo comparing Artic to 8900 below).



Pump housing with broken fitting.



Both Thetford Tecma Silence Plus and Planus Artic require 4-inches (10.1 cm) of clearance below the mounting surface. Dometic 8900 on left and similar Thetford Tecma Silence Plus on right.

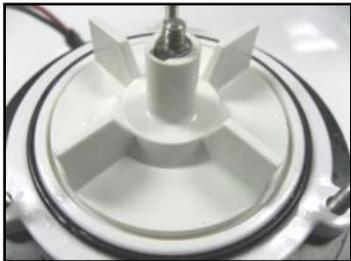
# RARITAN ENGINEERING

Small, old line supplier to the marine industry.

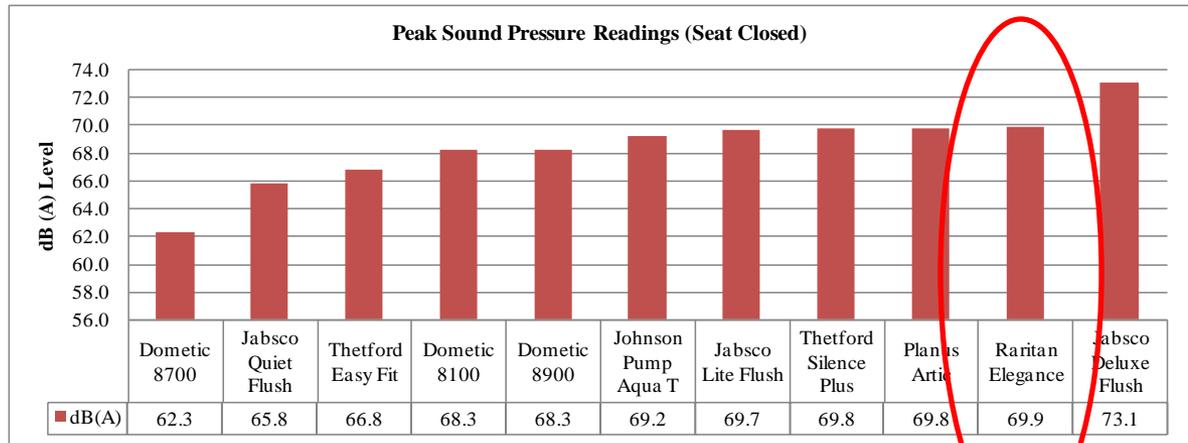


Elegance

# Raritan Engineering



- Did not pass foreign material well. Failed to pass 18 out of 18 items.
- Pump impeller design (with straight vanes) is second highest peak noise level [69.9 dB(A)].



# THETFORD/TECMA



Silence Plus



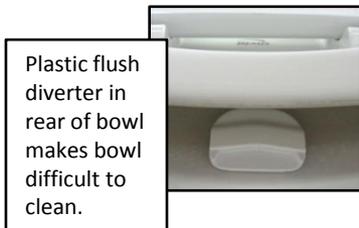
EasyFit

Thetford is primarily an RV supplier of toilets and refrigerators (Norcold). They acquired Wilcox, a US supplier of marine toilets in the late 1990s. In the early 2000s, they acquired Tecma, an Italian manufacturer of marine and residential toilets.

## Thetford / Tecma Easy Fit



- Macerator pump passed large pieces that blocked holding tank discharge pump.
- Very complex water consumption adjustment.
- 30-amp service requires large cable size (can add up to \$16.20 per installation).
- Child-sized seat.
- Flush rim difficult to clean.
- Hose bulges out rear making tight fit to wall impossible. See below.



Plastic flush diverter in rear of bowl makes bowl difficult to clean.

The Easy Fit is held away from the wall due to the discharge hose bulging outside the rear surface of the toilet. Though the Easy Fit has a smaller front-to-back length of its footprint, the 8100 allows it to be mounted further back on the platform. The black lines in the center photo show the difference in overall front-to-back size. The top mark indicates the front edge of the 8100 and the one on the bottom marks the front edge of the EasyFit. Notice the difference in seat opening size.

## Thetford / Tecma Silence Plus



- Worst performance at handling foreign materials (12 of 18 items blocked toilet). Kinked hose in pump on new toilet.
- Unclear panel graphics and water level adjustment is difficult to access.
- Highest water and power consumption.
- High peak pump noise.
- Elongated seat has uncomfortable width.
- Very high discharge velocity (92.5 gpm or 350 l/m) has caused joints to burst when install with two toilets on one discharge pipe.
- Compact requires large cut out in deck and mechanism hangs 4-inches (10 cm) below mounting surface (see photo comparing Silence Plus to 8900 below).



Both Thetford Tecma Silence Plus and Planus Artic require 4-inches (10.1 cm) of clearance below the mounting surface. Dometic 8900 on left and Thetford Tecma Silence Plus on right.

# DOMETIC

Major supplier to marine industry. Dometic product range includes AC, refrigeration and galley equipment. Many decades of experience in marine market. Global network of dealers. Best recognized brands in the industry.



8900



8700



8100

## Dometic 8100 series



- Stainless steel macerator cuts solids into ¼-inch (0.6 cm) particles. Effluent easily passes through holding tank and discharge pump.
- Adult-sized seat opening. Heavy duty, solid wood seat.
- Contemporary styling looks good in any décor.
- Fits in same space as Jabsco Quiet Flush or Thetford Easy Fit.
- Dometic wall switch panel with clear symbols and easy operation.



Great styling in any décor.

## Dometic 8700 series

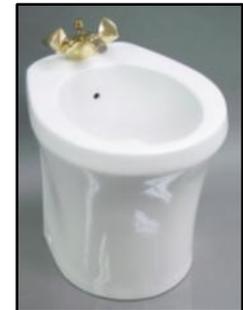


- Stainless steel macerator cuts solids into ¼-inch (0.6 cm) particles. Effluent easily passes through holding tank and discharge pump.
- Elongated seat opening. Heavy duty, solid wood seat.
- Modern styling and understated design looks good in any décor.
- Quietest flushing toilet available [62.3 dB(A)].
- Dometic wall touchpad or traditional flush lever options, or Vimar/Gewiss marine switch brands available.
- Switches feature clear symbols and easy operation. Changes from “normal” flush to “dry bowl” flush by pushing and holding flush button.
- New bi-color tank indicator signals ¾ and full levels.

## Dometic 8900 series



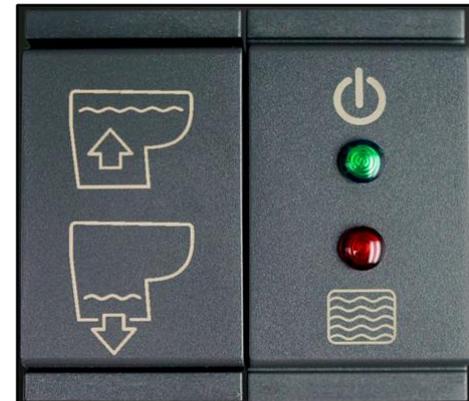
- Stainless steel macerator cuts solids into ¼-inch (0.6 cm) particles. Effluent easily passes through holding tank and discharge pump.
- Elongated seat opening. “Slow-close” thermoset seat and lid.
- Contemporary design looks good in any décor.
- Wall-mounted touchpad panel or Vimar/Gewiss marine switch brands available.
- Switches feature clear symbols and simple operation. Changes from “normal” flush to “dry bowl” flush by pushing and holding flush button.
- New bi-color tank indicator signals ¾ and full levels.
- Now have complete line of ceramic fixtures. Flat-back models (8600 series), integrated bidet models and free-standing bidets.



## Dometic Flush Switch Options

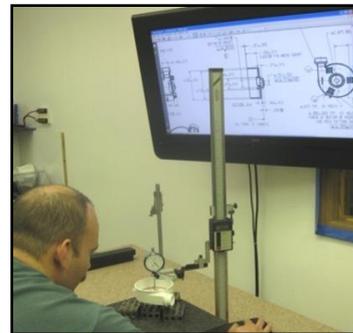
- Dometic touchpad styles\*
- Dometic flush handle (8700 Series) in chrome, nickel or gold finish
- Matching popular switch styles\*: Gewiss (Playbus, Chorus), Vimar (Idea, Eikon)

\*Switches include 9-foot (2.7m) wire harness with pre-assembled connector



## Highlights of Dometic Sanitation Quality programs

- All models individually and 100% water tested.
- New models are double-checked in Customer Compliance Testing Cell.
- Colors matched to standards.
- New or changed components are subject to First Article Inspection Process.
- Corrective and Preventive Action Program in place.



## What else does Dometic bring to the table?



- Our products are backed with a worldwide network of service dealers.
- We offer complete engineering support in selecting and designing the best system to meet your needs.
- Our brands are recognized as the best in the industry, and they add value to your products.

 Dometic

 WAECO  
by Dometic GROUP

 SMEV  
by Dometic GROUP

 Fruisair<sup>®</sup>  
by Dometic GROUP

 Ondara  
by Dometic GROUP

 AIR SYSTEMS  
by Dometic GROUP

 Sealand<sup>®</sup>  
by Dometic GROUP

 Sealand<sup>®</sup>  
by Dometic GROUP