



Vacuum Plumbing Systems

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## **Estimated Water Savings Calculation for Typical Department Store Using Vacuum Flush Toilets**

The calculations below are intended to provide an estimated overview of water and sewage savings using vacuum flush toilets compared to conventional plumbing fixtures in a typical discount department store. This estimate is made without re-cycled water use for toilet flushing. Use of re-cycled grey water from hand wash basins and lavatories for toilet flush will further increase annual water savings.

### **Summary:**

**Based on the assumptions listed below, vacuum flush toilets would provide an estimated savings of approximately 56% or 743,600 gallons of water and sewage processing costs annually over conventional toilets.**

### Assumptions:

- Each store averages approximately 100,000 shoppers per week
- Population (staff and shoppers): 50% male and 50% female
- Total current water supply requirement for bathroom areas is estimated at 200,000 gallons/month/store
- The water supply requirement used for bathroom water closets and urinals in the calculations below are based on known urinal flushes of approximately 10,000/week/store
- Male urinal use is estimated to be 85% of total male fixture use. ASPE norms and guidelines indicate 75% for typical workplace scenarios; however, for the purposes of this estimate, this guideline has been increased to 85%

### Water use calculations using conventional low flush gravity drainage fixtures

#### 1. Males

Urinals: Avg. 10,000 flushes per week x 0.5 gallons per flush = 5,000 gallons of water per week

Water closets: Est. 1,500 flushes per week x 1.6 gallons per flush = 2,400 gallons of water per week

#### 2. Females

Water closets: Est. 11,500 flushes per week x 1.6 gallons per flush = 18,400 gallons of water per week

Total water demand and sewage output = 25,800 gallons per week, or approximately 56% of the current estimated monthly water supply requirements for restroom areas per store. Projected annual water supply and sewage output of 1,341,600 gallons per store.

### Water use calculations using vacuum flush water closets and conventional urinals

#### 1. Males

Urinals: Avg. 10,000 flushes per week x 0.5 gallons per flush = 5,000 gallons of water per week

Water closets: Est. 1,500 flushes per week x 0.5 gallons per flush = 750 gallons of water per week

#### 2. Females

Water closets: Est. 11,500 flushes per week x 0.5 gallons per flush = 5,750 gallons of water per week

Total water demand and sewage output = 11,500 gallons per week; approximately 598,000 gallons annually.

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