



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.
