

Torricelli Tank



Torricelli Setup

Purpose: Demonstrates Torricelli's law concerning the speed of water leaking from a tank.

Place the tube in the plastic tray to catch the water that will squirt out of the tube's side. Using the large beaker, fill the tank up to the top. The water squirting from the holes at various altitudes can be seen to have differing speeds.

Note: Assuming that the upper water level is at rest, a simple application of Bernoulli's theorem gives Torricelli's law,

$$v = [2gh]^{1/2} ,$$

for the speed of water leaving through a hole placed a distance h below the tank's water level.

It seems that Torricelli's real statement of the law (before Bernoulli) was that the height of a fountain squirting upwards was equal to the column height h .

Because of real-world effects, this is not so easy to show. A kinematical evaluation of the peeing tank above will also show some big discrepancies with the law. (Even accounting for the fact the upper surface is moving.)

However, the tank/tube has been scientifically designed so that it does not squirt out of the tray.

Extra Equipment: Big beaker and paper towels

Location: Shelf D6