



# WATER AND ITS EFFECTS – IMPORTANCE OF WELL TANKS, AND FILTRATION SYSTEMS FOR THE HOME

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PENTAIR WATER PURIFICATION

# IMPORTANCE OF WELL TANKS BAFFLE FACTOR/ CONTACT TIME

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## WHAT IS BAFFLE FACTOR

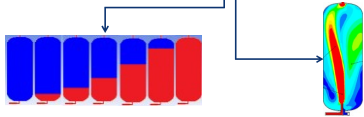
### Effectiveness of the Disinfection Process

- Disinfection performance can be improved by:
  - Increasing the concentration of disinfectant
  - Increasing the disinfectant contact time
  - Decreasing the flow rate
  - Increasing the tank volume
  - Increasing the temperature
  - Increasing the baffling factor.

The only performance factor that we can affect, by design, is the baffling factor.

### Baffle Factor

- The measure of a fluid's short-circuiting inside of a tank
- Value ranges from 0 to 1.0
- 1.0: Best for the disinfection process. Tank fluid is first in, first out (plug flow)
- 0.# Some degree of mixing
- 0.0: Perfect short circuit. Incoming fluid goes directly to the outlet, rest of tank is a dead zone.



Measures of fluid short-circuiting

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## HOW TO DETERMINE THE BAFFLE FACTOR

### Chlorine/Chloride Tracer Study

- The most effective method to determine a system's baffle factor is to perform a chlorine/chloride tracer study on the tank.
  - Feed water to contain a known concentration of chlorine
  - Test tank to contain chlorine-free water
  - The feed solution is pumped into the tank, and the tank's outlet is monitored for chlorine.
    - T (system time) = Tank Capacity / Flow Rate
    - T<sub>10</sub> (T "ten" time) = Time at which the tank's output reaches 10% of the feed concentration
    - For a given flow rate, the Baffle Factor = T<sub>10</sub> / T

### Example Calculation:

- 120 gallon tank
- flow rate of 3 GPM
- T = 120 gallons / 3 GPM = 40 minutes

Experimental Result: Outlet concentration of tank reaches 10% of feed concentration at the 12 minute mark (T<sub>10</sub>=12).

Baffle Factor = 12 minutes / 40 minutes = 0.30

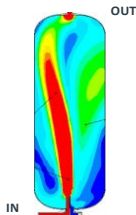
### Determine experimentally

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## ORIGINAL UT TANK, NO INTERNAL WATER ROUTING

- POOR BAFFLING
- Channeling and no mixing, yielding a baffle factor of 0.5
- IF customers were running tanks in series...baffle factor would be improved

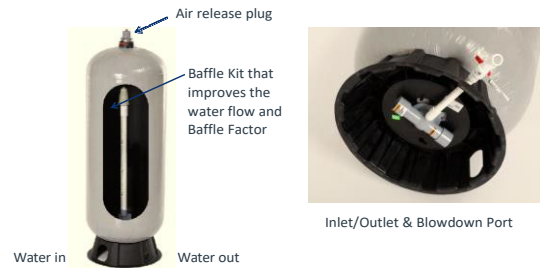


### Current design without internals channeled through the water flow

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## WHAT IS NEW



Baffle Kit available as a conversion kit

### New design improves baffle factor above .3

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