

Cooling Tower & Condensers:

Water Reuse & Percent Blowdown



Calculation of Percent Blowdown & Cycles for Cooling Towers and Condenser Water Systems

The purpose of a cooling tower or condenser system is to reuse water and reduce water usage. Determining the conductivity set point of the water system is important to maximize your water reuse. Conductivity is the electrical resistance measurement of the dissolved solids, suspended solids, and dissolved gases of the water and is expressed in micro ohms (uomhs).

Corrosion inhibitors and scale prevention chemicals are used to maximize the number of cycles the water is used. The definition of cycles is the number of times the water is reused in the water system. For example, if the makeup water to the cooling tower is 100 uomhs and your tower recirculating is 800 uomhs, your cycles are calculated as follows:

Cycles = Cooling Tower Recirculating Conductivity / Cooling Tower Make-up Water

For this Example: Cycles = 800 uomhs / 100 uomhs or 8

Percent blowdown for the tower is calculated the following way:

Percent Blowdown = (1 / Cycles) x 100

For this Example: Percent Blowdown = (1/8) x 100 = 12.5%

This means 12.5% of the water is being lost to blow down. Knowing your tower cycles is important for minimizing water usage and reducing the amount of water lost to blowdown. Determining proper cycles or conductivity set point is dependent on the water alkalinity and calcium. Every system is unique.

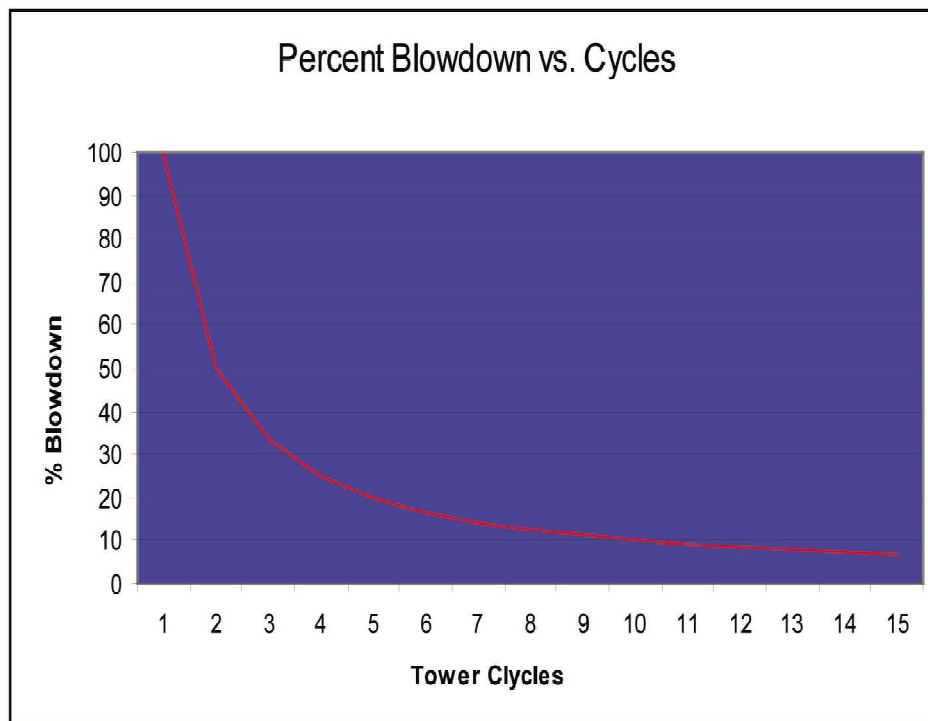


Figure 1 - Percent Blowdown versus Cycles. Changing your cycles from 2 to 8 equates to a 38% water savings. Going from 8 to 12 is only a water savings of 3.4%.

Conclusion:

Operating your cycles at a higher rate has minimal benefits beyond 8 cycles. Going from 8 to 12 cycles increased the recirculating water impurities by 33%. Many times water systems are stressed to the point of scaling. There is no need to take the added scaling risks for minimal water savings.