GREEN PIECE

EVAPCO's Newsletter on Environmental Sustainability

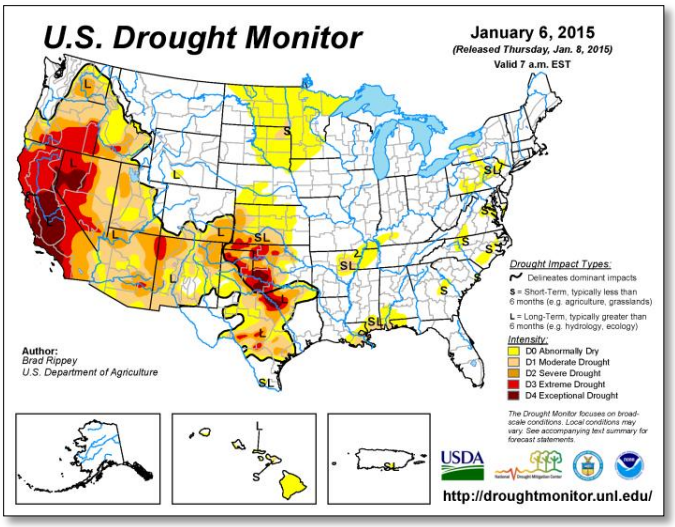
LEED v4 BD+C: New Construction

WE Credit Cooling Tower Water Use

Earn LEED points with a Cooling Tower, Closed Circuit Cooler or Evaporative Condenser!

Drought persisted throughout the U.S. in 2014 and continued into 2015 as the map below indicates. The U.S. Drought Monitor (droughtmonitor.unl.edu/) shows current and up-to-date national drought conditions. California and parts of Texas were in an exceptional drought, but North & South Dakota and Minnesota experienced abnormally dry conditions. Note the following:

- California and Texas began implementing new water policies and regulations to curb ground water withdrawals for agriculture and livestock.
    - Beef producers in Texas drove their herds north to the Midwest where water is abundant.
    - California lost $2.2 billion in 2014 due to their drought and considered revisions to a water bond measure that limits pumping groundwater.



Clearly, there is a need to use water more efficiently in our buildings, industrial processes, agriculture and power generation in the United States. The new LEEDv4 rating system has developed a credit category dedicated to water conservation in cooling towers, closed circuit coolers and evaporative condensers based on **optimizing cycles of concentration and the use of reclaimed water.**

Evaporative cooled equipment, the most energy efficient method of rejecting heat, will need to efficiently utilize its make-up water to earn these LEED points. For this credit, evaporative cooled equipment must run at the highest cycles of concentration possible, while not exceeding the LEED recommended levels, to earn up to two LEED points.

*This Green Piece reviews "**Water Efficiency Credit 3: Cooling Tower Water Use**" and discusses its requirements to earn up to two LEED points.*

WE Credit 3: Cooling Tower Water Use

WE Credit 3	Cooling Tower Water Use	Up to 2 points	EVAPCO cooling towers, closed circuit coolers and evaporative condensers contribute up to two points.

Intent - To conserve water used for cooling tower makeup while controlling microbes, corrosion, and scale in the condenser water system

Requirements - For cooling towers and evaporative condensers, conduct a one-time potable water analysis in order to optimize cooling tower cycles. Measure at least the five control parameters listed in Table 1.

Table 1: Potable Water Analysis

TABLE 1. Maximum concentrations for parameters in condenser water

Parameter	Maximum level
Ca (as $CaCO_3$)	1000 ppm
Total alkalinity	1000 ppm
SiO_2	100 ppm
Cl^-	250 ppm
Conductivity	2000 μS/cm

Equation 1: Cycles of Concentration

EQUATION 1. Indoor water-use reduction

$$\text{Cycles of concentration} = \frac{\text{Acceptable maximum concentrations in condenser water}}{\text{Parameter concentrations in makeup water}}$$

Calculate the number of cooling tower cycles by dividing the maximum allowed concentration level of each parameter by the actual concentration level of each parameter found in the potable makeup water. (See Equation 1)

Objective: Maximize cycles and avoid exceeding the maximum values for any of the parameters in Table 1.

Table 2: Points for cooling tower cycles

TABLE 2. Points for cooling tower cycles

Cooling tower cycles	Points
Maximum number of cycles achieved without exceeding any filtration levels or affecting operation of condenser water system (up to maximum of 10 cycles)	1
Achieve a minimum 10 cycles by increasing the level of treatment in condenser or make-up water OR Meet the minimum number of cycles to earn 1 point and use a minimum 20% recycled nonpotable water	2

- For the project to earn ONE LEED point, the water treatment provider must establish a maximum setting for cycles of concentration (COC) based on the calculation above without exceeding the Table 1 parameters.

- For the project to earn TWO LEED points, the system must reach a minimum of 10 cycles (COC). ALTERNATE: Achieve COC required to earn one point, *but do so using at least 20% reclaimed water.*

EVAPCO provides the potable water analysis and recommends the proper cycles of concentration setting (COC) based on a *Pulse*~Pure or Smart Shield Water Treatment System. Send EVAPCO a POTABLE make-up water sample for analysis of the parameters listed in Table 1. These analytes are included in our evaluation for *Pulse*~Pure (PPF1.0) or Smart Shield (SSF1.0), an example is shown below.

EVAPCO will assist with providing the information required to earn these points.

Potable Water Analysis

Make-up Water Analysis

Attribute	MU	Units
Conductivity	91	umho/cm
pH	7.5	
Total Hardness	22.9	ppm as $CaCO_3$
Ca Hardness	16.7	ppm as $CaCO_3$
Mg Hardness	6.2	ppm as $CaCO_3$
Alkalinity	19.3	ppm as $CaCO_3$

Attribute	MU	Units
Silica	7	ppm
Chloride	7.6	ppm
Sulfate	10.6	ppm
Phosphate	0.4	ppm
Sodium	7.2	ppm
Iron	<0.1	ppm

The subject water sample has been analyzed by Evapco and is acceptable for Pulse~Pure. After any required passivation, the conductivity set point should be incrementally increased until the following cycles are achieved.

	Cycles	Based On
For a condenser or fluid cooler	15.0	Low Range Chloride Test

We anticipate the desired cycles will be achieved at a conductivity set point of 1230 umho/cm.

EVAPCO's standard PPF1.0 water report analyzes the parameters required in Table 1.

Summary

This LEED credit is significant and the only credit that specifically addresses an HVAC product for its water resource use. However, it offers the opportunity to earn LEED points with EVAPCO cooling towers, closed circuit coolers and evaporative condensers and our water treatment systems.

Contact me with any opportunities for this LEED credit or others.

Best regards,

Daryn S. Cline

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