

# GREEN PIECE



## SPECIFY EVAPCO'S WATER SAVER™ AND EARN LEED POINTS!

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LEED v4.1 is the next generation standard for green building design, construction, operations, and performance. It now includes a new Water Efficiency Credit: *Optimize Process Water Use*. This Green Piece will focus on how EVAPCO's Water Saver™ System can assist with earning LEED Points for this credit by reducing makeup water conductivity. Contact me (Daryn Cline) or [watersystems@evapco.com](mailto:watersystems@evapco.com) with any questions on securing points for this credit.



### WE Credit: *Optimize Process Water Use*

#### Intent:

To conserve low cost potable water resources used for mechanical processes while controlling corrosion and scale in the condenser water system.

#### Credit Applies to:

New Construction, Core & Shell<sup>2</sup>, Schools, Retail, Data Centers, Warehouses & Distribution Centers, Hospitality, Healthcare

#### Requirements for Credit:

**Option 1. Cooling Tower and Evaporative Condenser Cycles of Concentration (1-2 points except CS, 1-3 points CS).** For cooling towers and evaporative condensers, conduct a one-time potable water analysis, measuring at least the five control parameters listed in Table 1 below.

<sup>1</sup> LEED Version 4.1 <https://www.usgbc.org/leed/v41>

<sup>2</sup> **Core and Shell Development.** For projects where the developer controls the design and construction of the entire mechanical, electrical, plumbing and fire protection system but not the design and construction of the tenant fit-out.

**Table 1.** Maximum concentrations for parameters in condenser water

PARAMETER	MAX LEVEL
Ca (as CaCO <sub>3</sub> )	600 ppm
Total alkalinity	500 ppm
SiO <sub>2</sub>	150 ppm
Cl <sup>-</sup>	300 ppm
Conductivity	3300 μS/cm

ppm = parts per million  
μS/cm = microsiemens per centimeter  
μS/cm = mmho/cm

**The objective of this credit:** Maximize cycles of concentration while avoiding the maximum values for any of the parameters in Table 1. Parameters are based on galvanized steel unit construction.

## EQUATION 1:

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

1. For the project to earn **ONE (1) LEED point**, calculate the maximum 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 makeup water analysis. See Table 2 below.
2. For the project to earn **TWO (2) LEED points**, meet the requirement in Item 1 above, then increase cycles of concentration by 25% using enhanced water treatment methods in condenser or MAKEUP water systems.
3. For Core & Shell (CS) projects only, earn **THREE (3) LEED points** by meeting the requirements in Item 1 above, but increase cycles by 30% by using enhanced water treatment methods for condenser or MAKEUP water systems.

**Table 2.** Points for cooling tower cycles

COOLING TOWER CYCLES	POINTS (ALL EXCEPT CS)	POINTS (CS)
Maximum number of cycles achieved without exceeding any maximum concentration levels or affecting operation of condenser water system	1	1
<p>Meet the maximum calculated number of cycles to earn 1 point, and increase the number of cycles by a minimum of 25% by increasing the level of treatment and/or maintenance in condenser or makeup water systems</p> <p>OR</p> <p>Meet the maximum calculated number of cycles to earn 1 point and use a minimum 20% recycled nonpotable water</p>	2	2
<p>Meet the maximum calculated number of cycles to earn 1 point, and increase the number of cycles by a minimum of 30% by increasing the level of treatment and/or maintenance in condenser or makeup water systems</p> <p>OR</p> <p>Meet the maximum calculated number of cycles to earn 1 point and use a minimum 30% recycled nonpotable water</p>	—	3

## EXAMPLE OF THE EVAPCO WATER SAVER™ BENEFITS

The EVAPCO Water Saver utilizes capacitive deionization technology to reduce dissolved ion concentrations, thus lowering the makeup water conductivity prior to use in an evaporative cooling system. Makeup water entering the Water Saver passes through individual cylinders which contain oppositely charged supercapacitors. Dissolved ions (except silica) are removed from the water as they are absorbed onto the charged capacitors.



A typical 50% ion reduction allows the operating cycles of concentration to be safely doubled without an increase in scale or corrosion potential. The analysis shown below is from a water sample pretreated with the Water Saver. The ion reduction capability of the Water Saver is confirmed by the results under the **CLEAN** column.

ATTRIBUTE	MAKEUP	CLEAN	UNITS
Conductivity	532	265	umho/cm
pH	7.8	7.7	
Total Hardness	241.3	112.2	ppm as CaCO <sub>3</sub>
Ca Hardness	174.5	80.1	ppm as CaCO <sub>3</sub>
Mg Hardness	66.8	32.1	ppm as CaCO <sub>3</sub>
Alkalinity	177	95	ppm as CaCO <sub>3</sub>
Silica	20	20	ppm
Chloride	41.0	17.4	ppm

ATTRIBUTE	MAKEUP	CLEAN	UNITS
Sulfate	15.5	7.0	ppm
Fluoride	< 0.1	< 0.1	ppm
Phosphate	< 0.1	< 0.1	ppm
Sodium	22.6	12.4	ppm
Iron	< 0.1	< 0.1	ppm
Copper	0.2	0.1	ppm
Zinc	< 0.1	< 0.1	ppm
Manganese	< 0.1	< 0.1	ppm

In another example, the below makeup water analysis is a water sample from San Diego, CA.

## MAKEUP WATER ANALYSIS\*

ATTRIBUTE	MAKEUP	UNITS
Conductivity	816	umho/cm
pH	7.8	
Total Hardness	255.8	ppm as CaCO <sub>3</sub>
Ca Hardness	153.3	ppm as CaCO <sub>3</sub>
Mg Hardness	102.5	ppm as CaCO <sub>3</sub>
Alkalinity	140.8	ppm as CaCO <sub>3</sub>
Silica	12	ppm
Chloride	95.3	ppm
Sulfate	160.5	ppm
Phosphate	< 0.1	ppm


ATTRIBUTE	MAKEUP	UNITS
Sodium	78.7	ppm
Iron	< 0.1	ppm
Manganese	< 0.1	ppm

Based on this San Diego makeup water chemistry and LEED credit requirements, a cooling tower would operate at 3.5 cycles of concentration. The cycles in this example are limited by alkalinity levels, using Equation 1:

$500 \text{ ppm CaCO}_3 / 140.8 \text{ ppm CaCO}_3 = 3.5$  cycles of concentration, and the project would be awarded ONE (1) LEED point.

However, when the EVAPCO Water Saver is applied as a pretreatment system to the makeup water, it allows the cycles of concentration to more than double! For this example, the cooling tower application is approved to operate safely at 7.0 cycles of concentration.

 **The increase in COC for this project makes it eligible for THREE (3) LEED Points with a Core & Shell project!**

 **NOTE: This project is eligible for an Innovation Credit as well, due to exemplary performance, by going beyond the 30% increase in COC.**

The EVAPCO Water Saver™ system is just another example of EVAPCO'S Full Spectrum of Water Treatment products and commitment to sustainable technologies. If you have any questions about this Green Piece or how to earn LEED points for this credit on your project, contact me at EVAPCO'S World Headquarters.

Best regards,

*Daryn S. Cline*



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