

Fluid Cooler Selection Considerations

An evaporative fluid cooler, also known as a closed-loop cooling tower, is a heat exchange system designed to remove excess heat from a process fluid without direct exposure to ambient air. Typical process fluids are water or a water-glycol mixture. The cooler operates by circulating the process fluid through a coil while the ambient air is drawn across it. Heat is then dissipated through sensible and evaporative heat transfer.

Evaporative fluid coolers keep the process fluid clean allowing for minimized fouling risk for other system components. The fluid cooler acts as both the cooling tower and plate heat exchanger with the process fluid within the closed loop. The combined system of cooling tower and plate heat exchanger makes installation easier to manage.

SPX-Marley offers several different evaporative fluid cooler options. Three specific products are the DTW, MHF, and LW series. The DTW models a typical evaporative fluid cooler, utilizing a coil as the heat transfer media.

The MHF and LW are fill/coil hybrid fluid coolers. The fill/coil hybrid fluid cooler utilizes both heat transfer fill media and a coil. The MHF has water distributed over the fill media before being distributed over the coil. The LW has water distributed over the coil before being distributed over the fill media. **Table 1** (shown on page 2) contains a general comparison between the different fluid cooler options.

If a low tonnage tower is required or a quick installation needed, the LW is more advantageous than the other products.

Forced draft fluid coolers are capable of use in ducted and high static applications. These applications are niche and should be avoided for outdoor use due to poor energy efficiency.

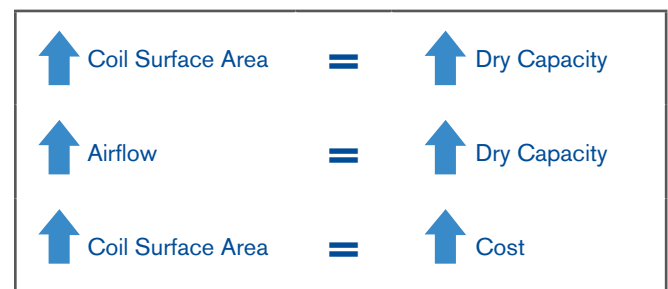
Dry Performance

Both the DTW and LW products have the ability for dry cooling in addition to the evaporative mode. The DTW primarily acts as a dry cooler with the capability for evaporative cooling. The DTW has more coil surface area compared to the LW, which promotes more dry cooling capacity.

Although the LW has the ability for dry cooling, the dry cooling capacity is very low. The smaller coil provides a small heat transfer surface for the air to pass over, reducing its dry cooling capability. **Figure 1** provides a general rule of thumb when selecting for dry performance.

The MHF does not have dry cooling capability. However, the MHF has a higher capacity for evaporative cooling compared to other closed loop towers.

Figure 1: Dry Performance Considerations



Copper vs. Stainless Steel vs. Hot Dipped Galvanized

The DTW and MHF have several coil material options consisting of stainless steel, hot dipped galvanized, and copper (MHF & LW only). The LW only has the option of a copper coil. The coil material affects the tower capacity, total cost, temperature limits, and corrosion resistance.

Table 2 (shown on page 3) compares the three materials with respect to the listed features.

Table 1: General Fluid Cooler Comparison





	MHF	DTW	Finned DTW	LW
				
Fluid Cooler Type	Fill/Coil Hybrid	Induced Draft Counterflow	Induced Draft Counterflow Finned	Fill/Coil Hybrid
First Cost	💰 💰	💰 💰 💰	💰 💰 💰 💰	💰 💰 💰
Footprint	📐	📐 📐 📐	📐 📐 📐	📐 📐
Efficiency	⚡	⚡ ⚡	⚡ ⚡	⚡
Height	📏 📏	📏	📏	📏
Weight	👤	👤 👤	👤 👤 👤	👤
Dry Capacity		☁️	☁️	
Heat Loss		🔥	🔥 🔥	🔥

Table 2: Coil Material Comparison

Features	Coil Material		
	Copper (MHF & LW Only)	Stainless Steel	Galvanized (HDG)
Cost	\$ \$	\$ \$ \$	\$
Performance	⚙️ ⚙️	⚙️	⚙️
Weight	👤 👤	👤	👤
Corrosion Resistance*	🧪		🧪 🧪
Coil Pressure Drop	🕒 🕒	🕒	🕒
System Requirements	Closed	Closed	Closed and Pressurized
Temperature Limit	🌡️ 🌡️ 🌡️	🌡️ 🌡️ 🌡️	🌡️

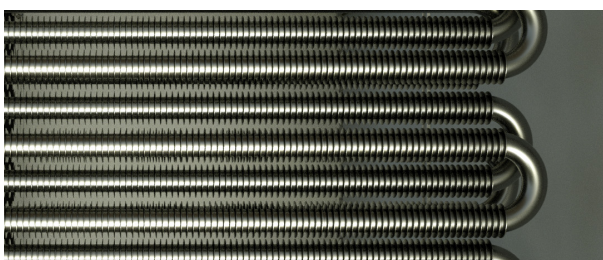
* Stainless steel is better equipped against harsh/chemical/salty environments. Copper has good corrosion resistance but can be reactive to certain ammonia-rich/acidic environments.

Finned Aero-X vs. Aero-X Coils (DTW Only)

DTW models have the option between the HDG Aero-X, stainless steel Aero-X, and finned HDG Aero-X coils. The HDG and stainless steel Aero-X models have a dry bulb switchpoint of up to 10° + higher given the design conditions and application. The finned HDG Aero-X has a switchpoint of up to 20° + higher given the design conditions and application.

The finned HDG Aero-X has an increased coil surface area compared to the non-finned coils. See **Figure 2**. The increase in the area allows for more heat transfer, increasing the total thermal performance capacity.

Figure 2: Finned Aero-X Coil



Key Takeaways

- DTW, MHF, & LW are closed loop cooling towers
- MHF & LW are Fill/Coil Hybrid Fluid Coolers
- DTW & LW have Dry capability
 - Dry Cooling: DTW > LW.
- The MHF has the highest evaporative cooling capability
 - Evaporative Cooling: DTW < MHF
 - Evaporative Cooling: LW < MHF
- Coil material affects tower features and capacity
- Finned coils have higher thermal capacity
 - More Area = Higher Thermal Capacity

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