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Wet Surface Air Cooler (WSAC)
vs.
Other Evaporative Coolers

The following are some of the many advantages that the WSAC offers over other Evaporative Coolers;

1) Rugged Industrial Construction: The Niagara/Resorcon WSAC is designed and built for continuous operation and long life for all rugged industrial applications. Some of the features that contribute to the long life are;
   a) Design: The Niagara WSAC's are induced draft co-current flow, which means that the air and spray water are both traveling in a downward direction across the tube bundle. This configuration guarantees that spray water is evenly distributed over the entire tube surface. Others use a counter-current flow, air traveling up with the spray water traveling down, which creates turbulence on the bottom of the tube. This turbulence results in incomplete distribution of the spray water over the tube, which leads directly to fouling of the tube surface and a drop off in thermal performance.
   b) Heat Transfer Surface: The WSAC uses only prime surface (tube) for 100% of the effective heat transfer surfaces. Others use cooling tower fill in parallel with prime surface to complete the same heat removal duty. This split duty demands separate airflows over the two types of surface, requiring continuous air balancing adjustment as the cooling tower fill becomes plugged, fouled or frozen.
   c) Casings: The WSAC is constructed using heavy gauge (10 & 12 Ga.) steel, others use 16 or 18 Ga. The casing panels are a double break panel design, to provide increased structural integrity. All casing panels are Hot Dip Galvanized After Fabrication (HDGAF) to insures that all surfaces and machined edges are coated. Niagara uses the ASTM A123 specifications to insure galvanizing quality. Other manufactures use mill galvanized material with cold-coated machined edges. Niagara joins its panels using a drill through with nut and bolt design. Others use sheet metal screws.
   d) Direct Drive Fans: The WSAC uses direct drive fans with the fan mounted directly on the motor for smaller fan systems and right angle drives for larger systems, to insure long life and low maintenance. Others use belt drives, which require continuous adjustment and maintenance.

2. Lower Parasitic HorsePower: The co-current design of the Niagara WSAC does not require mist eliminators to remove the water droplets from the discharge air stream. Mist eliminators increase the static pressure load by approximately 15%. This increased pressure drop requirement directly equates to higher power consumption. The Niagara WSAC also has a lower unit profile which reduces the spray water pumping head requirement by approximately 20%.

3. Lowest Maintenance Costs: The Niagara WSAC is designed for minimum maintenance requirements. Some of the design features that contribute to this statement are;
   a) The rugged unit construction as described above.
   b) The spray system of the WSAC is fully visible and maintainable while in service and does not require the removal of any appurtenances. Counter-current units have mist eliminators that must be removed prior to inspection and/or maintenance.

4. Intrinsic Freeze Protection: The WSAC's co-current design forces the cold air to come in immediate contact with the heat source (tube bundles) thus instantly heating the air and preventing freezing inside the basin. Counter-current units introduce the cold air through the basin of the unit and into immediate contact with the spray water. This causes freezing at the inlet louvers and inside the basin. Often counter-current units require that the fans be run in reverse during cold weather to alleviate some of the freezing. Please review the Niagara Paper "A Discussion of Co-Current Air and Water Flow versus Counter-Current Flow for Spray Heat Exchangers I Cold Climates" for further illustration of this statement.