



Superior, reliable performance

Niagara Wet Surface Air Coolers for fluid cooling and vapor condensing





Designed for heavy industry cooling

Alfa Laval Niagara Wet Surface Air Coolers (WSAC®) are efficient closed-loop, evaporative cooling systems designed for the power, process, wastewater, natural gas and petrochemical industries. These fluid cooling and vapor condensing systems are optimized for industrial applications where rugged designs, and cost-effective, efficient closed-loop cooling and condensing duties are required.

The Alfa Laval Niagara WSAC system is one of the most efficient and durable evaporative coolers available – capable of cooling process fluid to within 5°F of the surrounding wet bulb temperature. Our wet surface air coolers are constructed with heavy gauge steel double flange flanged on all four sides, and welded in all corners – providing extreme rigidity, extending service life and increasing overall durability to customers worldwide. Our WSAC system offers improved efficiencies over traditional heat exchangers used throughout the industries.

System advantages

- Superior construction
- Engineered to order
- Units are hot dipped galvanized after fabrication or can be stainless steel for increased rust and corrosion protection
- ASME and TEMA code designs available
- Designs available to 3500 psi
- Fireproof construction
- Easily accessible spray system
- Fans designed to required sound limits
- Materials of construction meet environmental and process requirements

Industries and applications

Industries

- Refining
- Power
- Natural gas (NGL, LNG, and FLNG)
- Wastewater
- Pulp and paper
- Metals
- Mining
- Ethanol and biodiesel
- Gas transmission and compression
- General industrial
- Food and beverage

Applications

The Alfa Laval Niagara WSAC solution has the ability to cool a broad mix of fluids and vapors. Typical applications include, but are not limited to the following:

Fluid cooling

Up to 180°F max inlet temperature

- Water and wastewater
- Moldwater
- Glycols
- Oils
- Hydrocarbons
- Drilling mud
- Gasoline
- Sour water/gas

Vapor cooling

Up to 450°F max inlet temperature

- CO₂
- Natural gas
- Nitrogen

Vapor condensing

As low as 1.4" HgA minimum

- Steam
- Ammonia
- Hydrocarbons – propane, ethane, propylene
- Refrigerants



WSAC[®] systems for fluid cooling

The Alfa Laval Niagara WSAC systems are designed for heavy-duty industrial standards, and are engineered to meet the most demanding applications. These systems are tailored to customer specifications for inlet and outlet temperatures, as well as worst case ambient conditions.



Packaged WSAC systems

- Skidded, pre-piped and pre-wired for reduced installation costs
- Full redundancy of fans and pumps
- Includes control cabinet and water treatment
- Factory tested
- Freeze protection
- Plug-and-play installation



Modular WSAC systems

- Expand or contract based on process requirements
- Direct drive fan system
- Heavy duty 10-12 gauge steel
- High flow, low pressure industrial pump system
- No plastic fill
- Nut and bolt assembly – no “zip” screws
- Access package available

and vapor condensing

Field erected WSAC systems

- Poured in place reinforced concrete
- Pultruded FRP structure
- Interchangeable modules
- Reduced footprint for large systems
- Lowest optimized cost
- Economized layout
- Field supervision available for installation



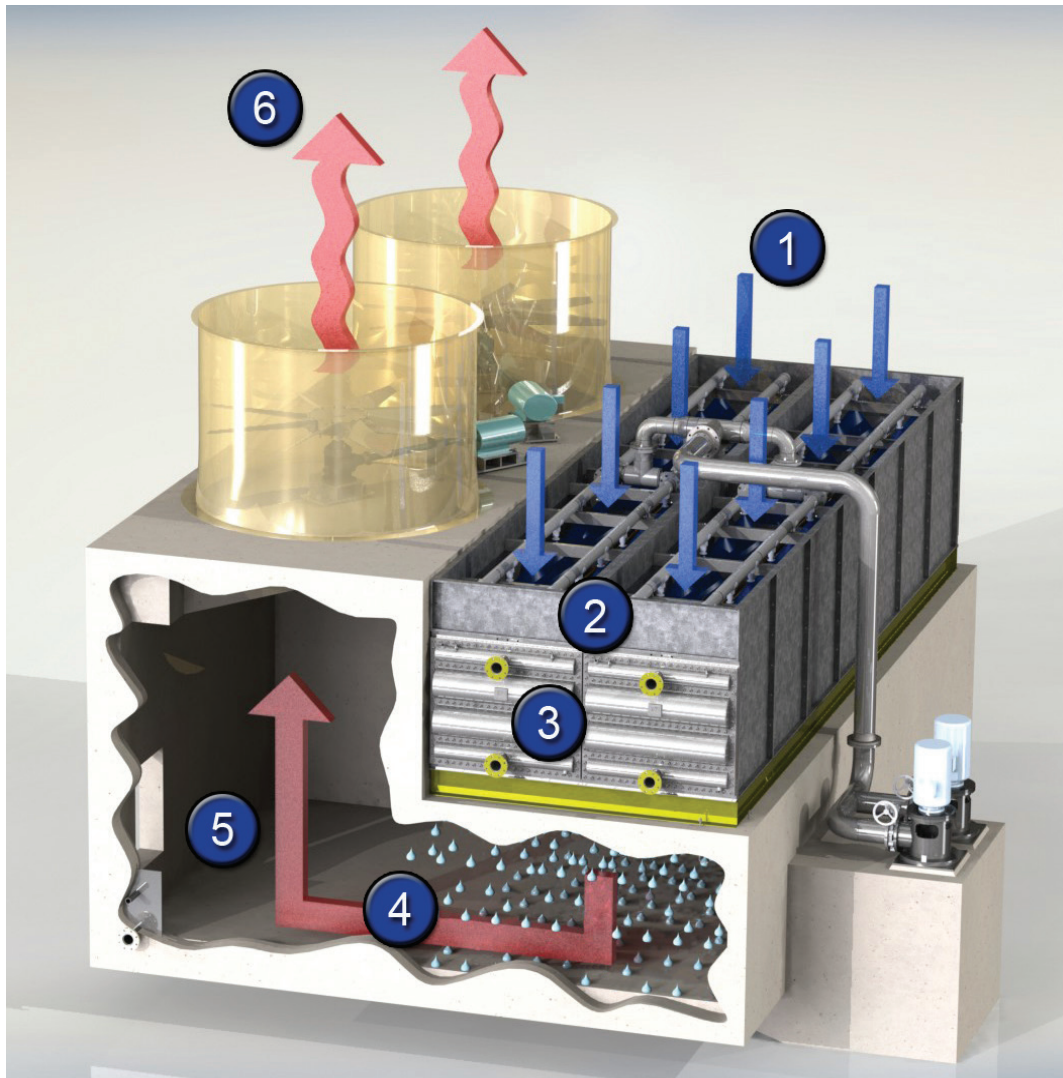
Benefits

- Produces coldest possible process outlet temperature
- Increased water conservation due to higher concentration cycles
- Less drift
- Low quality water can be used as makeup
- Compact footprint
- Lower parasitic energy (HP)
- Competitive installed cost
- Minimal maintenance required



How it works

- 1 Air is induced downward over the tube bundles.
- 2 Water flows downward along with the air.
- 3 Heat from the process stream is released to the cascading water.
- 4 Vaporization transfers heat from the cascading water to the air stream.
- 5 The air stream is forced to turn 180° providing maximum free water removal.
- 6 Fans discharge air vertically at a high velocity to minimize recirculation.



Tube bundle options

	Straight through / cleanable	Serpentine
Pros	ASME code design Lowest pressure drop Individual tube access Various materials (C.S., S.S., Exotics)	ASME code design Cost effective High pressure (3,500 PSI) Various materials (C.S., S.S.)
Used for	Steam condensing Liquid cooling	Gas cooling / condensing Liquid cooling
Cons	Lower pressure (300 PSI) Costly to produce	Pressure drop can be high Mechanical cleaning cannot occur

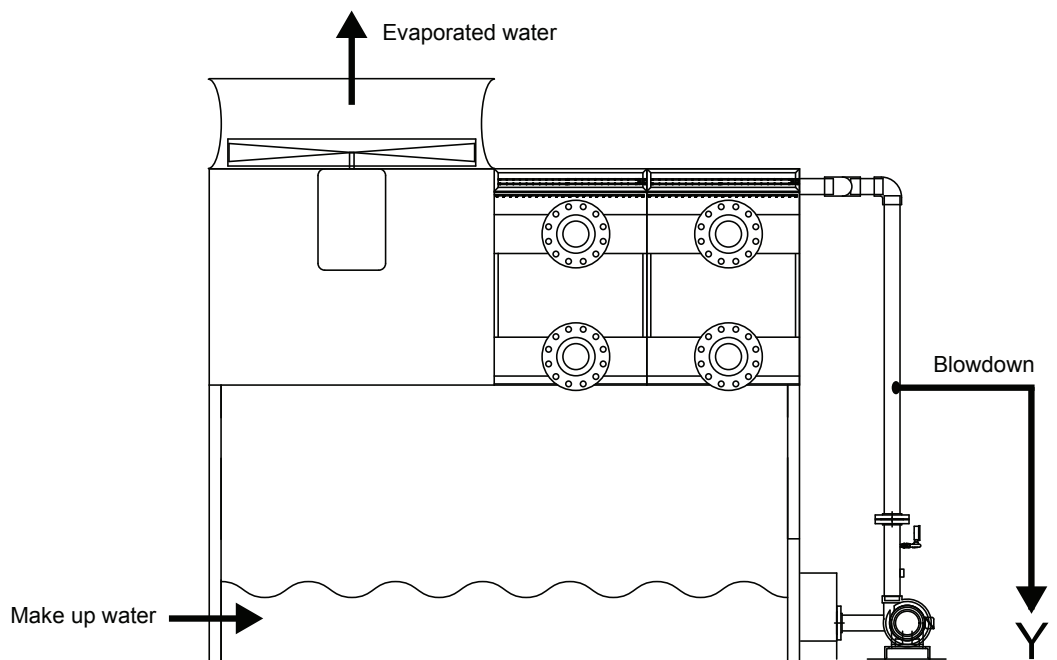
Straight through / cleanable



Serpentine



Water usage



Total make up = evaporation + blowdown
 Evaporation = based on heat load
 Blowdown = based on cycles of concentration

Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineered solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

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