Aqua-Lator™ Floating Spray Coolers

Water Technologies

SIEMENS

Four-nozzle spray coolers installed at pulp mill

Twelve-nozzle spray coolers installed at steel mill

Aqua-Lator™ Floating Spray Coolers

Aqua-Lator™ Spray Cooler

Optimized design for peak heat transfer efficiency with low power consumption and drift loss.

When Cooling is Required

Wastewater may require cooling to achieve the most favorable biological activity. Process water may need cooling to reach permitted discharge levels or when it is recycled and put back to work to cool intake process water.

...Select The Aqua-Lator™ Spray Cooler as an Alternative or Supplement to Cooling Ponds or Cooling Towers.

Cooling Ponds can require as much as 20 times the land space as ponds equipped with spray coolers.

Cooling Towers have a higher initial cost; are more expensive to maintain; and usually require chemicals for the prevention and removal of scaling

Product Features

- State of the art clog-free nozzles.
- Totally Enclosed Non Ventilated Water Spray Cooled (TENVWSC) motor with space heaters.
- Vacuum impregnated insulation.
- State of the art axial flow propeller pump.
- Simple installation.
- Simple maintenance.
- Economical alternative to cooing towers and ponds.

Flow rates and heat dissipation requirements, and consequently horsepower, vary broadly from one application to another. In addition, land area availability will vary from ponds to canals or to cooling lakes. In some cases, the Spray Coolers will handle the total heat dissipation requirements. In other cases, Spray Coolers can be used as auxiliary cooling equipment, particularly during peak loadings.

Design Example:

- Determine spray cooler horsepower
- Requirements for heat dissipation via spray coolers only

Given:

a. Average Water Flow Rate =10,000 GPM
b. Inlet Water Temperature (TInlet) =110°F
c. Outlet Water Design Temperature (TOutlet) = 90°F
d. Design Air Wet Bulb Temperature = 80°F

Calculating Spray Cooler Equipment Requirements

1. DETERMINE Total Heat to be Dissipated In BTU/HR
BTU/HR = (Avg water flow in GPM) (8.34 lb/gal) (60 min/hr) x (T inlet °F - TOutlet °F) (1 Btu/lb-°F)
- (10,000) (8.34) (60) (110-90) (1)
= 100 x 10^6 BTU/HR

Designed to Meet a Range of Cooling Needs

Model	Horsepower	# of Nozzles	Model	Horsepower	# of Nozzles
FSC-25-4	25	4	FSC-75-4	75	4
FSC-50-4	50	4	FSC-75-12	75	12

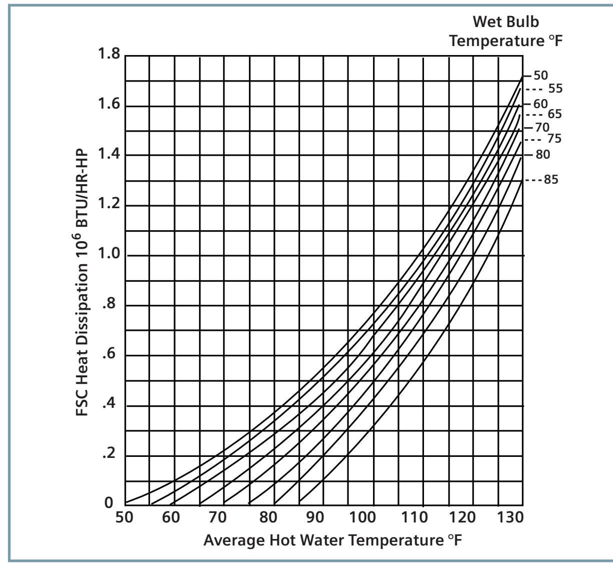

Figure 1. Typical Aqua-Lator™ Spray Cooler performance chart.

2. CALCULATE Average Hot Water Temperature
= (110+90) + 2 = 100°F

3. ENTER Performance Chart (Figure 1) at 100°F
Average Hot Water Temperature to intersect 80°F Wet Bulb Temperature and read a FSC Heat Dissipation Rate of 0.41 x 10^6 BTU/HR-HP

4. CALCULATE Spray Cooler Horsepower Requirement per Performance Chart
= (Heat to be Dissipated via FSC) + (FSC Heat Dissipation Rate)
= (100x106 BTU/HR) + (.41x106 BTU/HR-HP)
= 244 Horsepower

5. AFTER determining the FSC Horsepower Requirement in Step 4 above, and based upon the fact that the Thermal Performance varies with the FSC Model Design, apply one of the following FSC Model Thermal Efficiency Factors (Θ Factor) to adjust the Horsepower to relate to the preferred FSC Model:

Model	Θ Factor	Model	Θ Factor
FSC-25-4	0.845	FSC-75-4	1.281
FSC-50-4	1.000	FSC-75-12	0.845

6. ADJUST the horsepower for the thermal efficiency of each of the SC Models:
Model FSC-25-4 = 206 hp (244 x 0.845)
Model FSC-50-4 = 244 hp (244 x 1.000)
Model FSC-75-4 = 313hp (244 x 1.281)
Model FSc-75-12 = 206 hp (244 x 0.845)

7. NUMBER of Units

$$Units\ \ (25-4) = \frac{206}{25} = 8.24 - 9 \quad 9x25 = 225\ \ HP$$

$$Units\ \ (50-4) = \frac{244}{50} = 4.88 - 5 \quad 5x50 = 250\ \ HP$$

$$Units\ \ (75-4) = \frac{313}{75} = 4.17 - 5 \quad 5x75 = 375\ \ HP$$

$$Units\ \ (75-12) = \frac{206}{75} = 2.75 - 3 \quad 3x75 = 225\ \ HP$$

Nine Model FSC-25-4 spray coolers would require a larger basin and a much higher equipment cost. Five Model FSC-75-4 spray coolers would result in both higher capital and operation costs. In conclusion, the economical choice would likely be three Model FSC-75-12 spray coolers, yet the optimum selection depends on available land space and material handling equipment.

The performance chart shown in figure 1 was plotted based upon performance of the Model FSC-50-4 (50 horsepower 4-nozzle). The thermal performance of the 4-nozzle spray cooler) configuration is inverse to the horsepower rating. Therefore, in employing the use of a single performance chart, use thermal efficiency factors which are designated as Θ factors.

Note

We have an experienced staff of professionals to assist you in the determination of your exact spray cooler equipment requirements, layout and mooring arrangements.

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The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

Phone: 815.623.2111
Fax: 815.623.6416
E-mail Address: aeratorinfo.water@siemens.com

BC-AERATORdr-BR-1209
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