

# Background

## Cost effective cooling system

A large iron foundry in Northeastern Ohio requires huge quantities of water to cool the outer shells of their plasma cupolas. This cooling water has a relatively narrow temperature range. If it is too hot, it will not sufficiently cool the cupolas; if it is too cold, it could damage the water jackets.

# Problem

The water was pumped into a 2 acre cooling lagoon where, under ideal conditions, the water was cooled from 104° F (40° C) to about 92° F (33° C). In the heat of the summer, the ambient temperature averages 80° F (27° C), and the relative humidity about 78%, there is insufficient retention time to properly cool the water. The management of the foundry needed to look for alternatives to speed the cooling.

They looked at three alternatives: a cooling tower, spray trees and small floating sprayers (fountains). The management did a cost/benefit analysis and decided that the TEMPEST Evaporative Cooler provided the greatest cooling per dollar of capital/operating cost and provided the greatest flexibility.



*Single TEMPEST at work.*

# Solution

The foundry purchased 28 - 10 HP TEMPEST Coolers in the spring of 2001 for several reasons. First, the pumping capacity of 280 HP of TEMPEST coolers was greater than the capacity of 300 HP of the cooling tree. The foundry could get more cooling capacity with a smaller power requirement. Second, using small units gave the operators the ability to fine tune the cooling capacity by turning units on and off based on the output of the foundry and the ambient air temperature, resulting in even greater savings.

One TEMPEST pumps about 1,100 GPM and shears the flow into a fog-like mist. Through evaporation and contact with cooler ambient air, the water is cooled to the target temperature. As conditions dictate, units are cycled on and off to assure that the water pumped to the cupolas is within the desired temperature range.

The TEMPEST has no small nozzles to plug, and the submersible motors require little of no maintenance, so the cooling system is highly reliable.



*28-10 Hp TEMPEST's in a 2 acre cooling lagoon.*

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