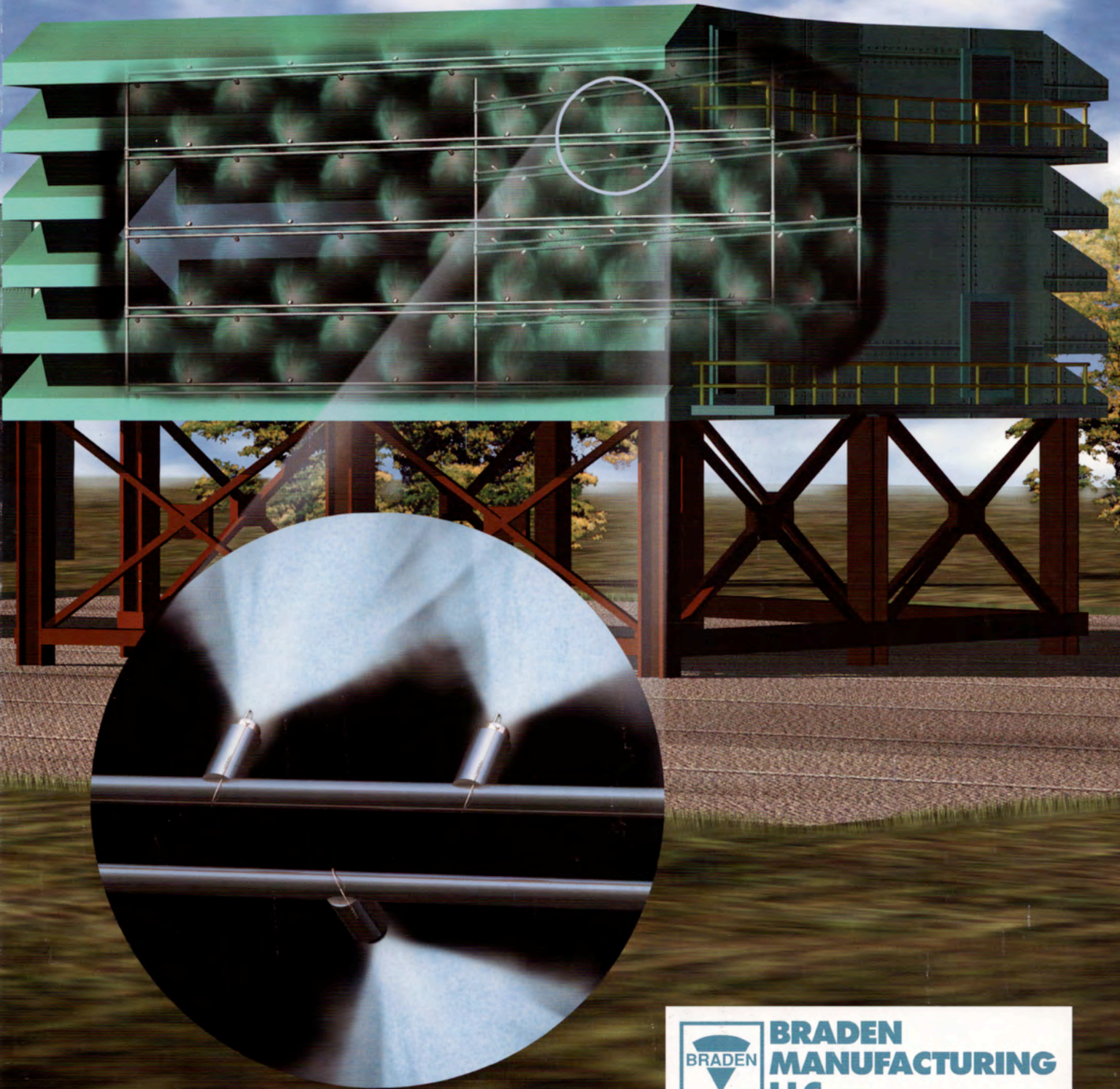


Pressurized Fog Cooling Systems For Gas Turbines



**BRADEN
MANUFACTURING
LLC**



Why Fog Cooling?

The cooler the air, the denser it is. Dense air provides higher mass flow rates and pressure ratios, increasing gas turbine power output. Inlet air cooling is the most cost-effective way to improve gas turbine efficiency.

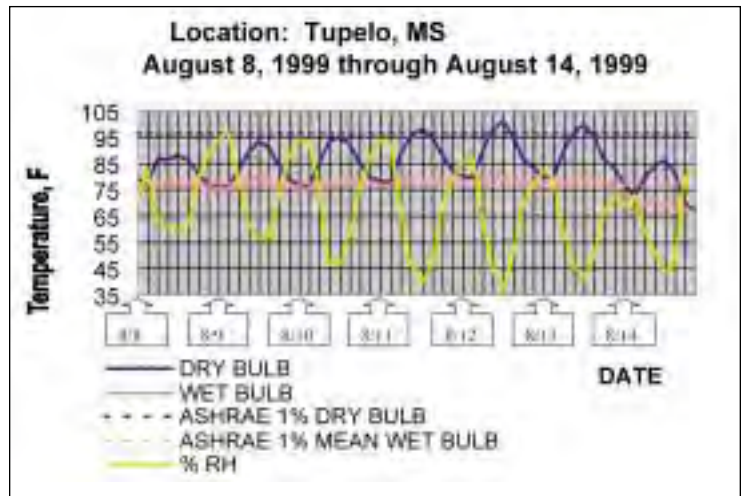
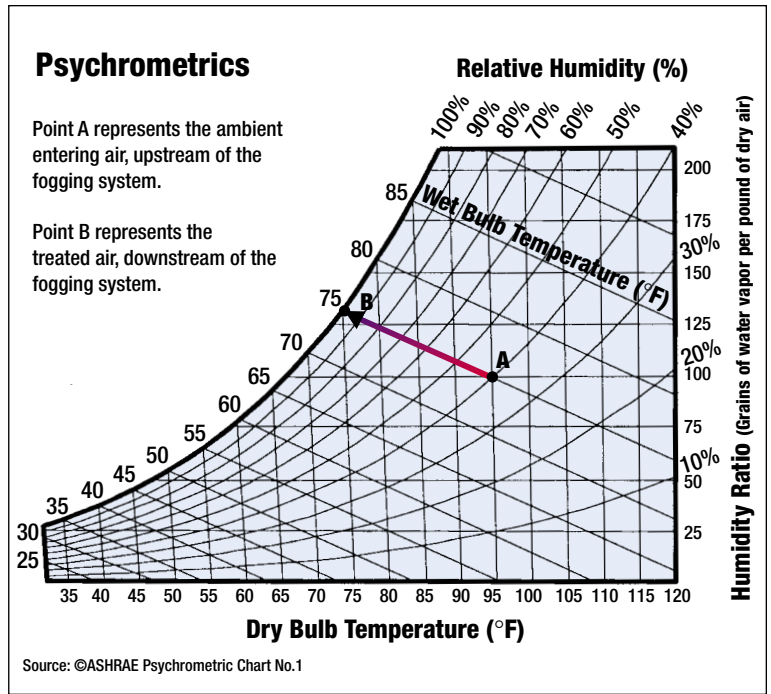
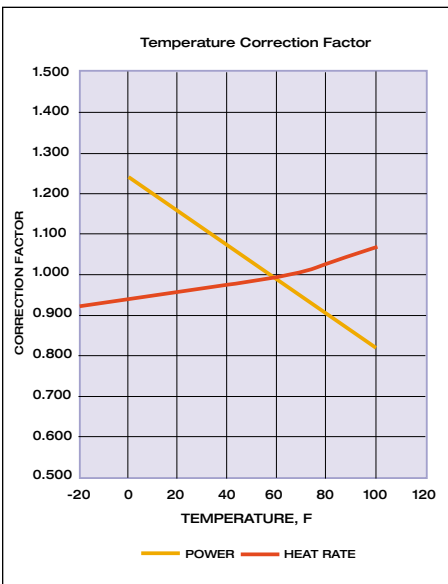
Inlet air can be cooled using a variety of systems, including cooling coils, evaporative cooling, and fog cooling. Since Braden designs all three types of cooling systems, your application will receive an unbiased technical recommendation.

Cooling Goals

- The Best Cooling System for the Investment
- The Shortest Possible Payback
- A Design based on Actual Needs (not over or under-designed)
- Fabrication to the Highest Quality Standards
- A Comprehensive Maintenance Program for Continued High Performance

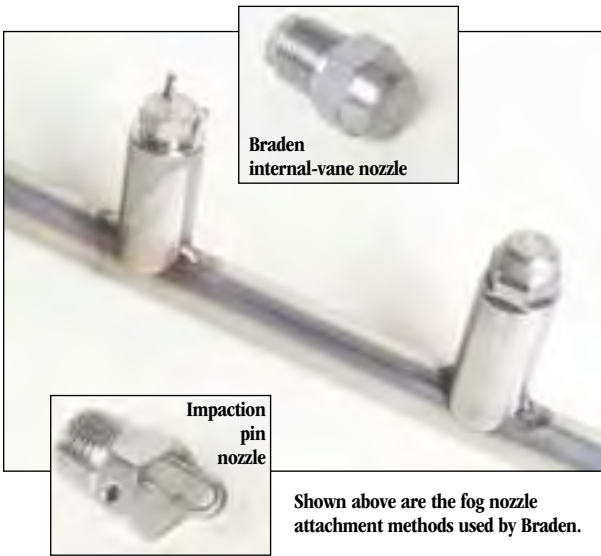
Site-Specific Cooling Requirements & Design

Braden selects the city closest to the installation site with hourly weather data. Braden then plots the hourly Dry Bulb and Wet Bulb temperatures during the target cooling week for that city so as to calculate the actual cooling needs.



Comparison of Fog Cooling vs. Evaporative Cooling

Saturation Level	Near 100% (or more, if desired)	88-90% with 12" - 14" media
Cooling Control	Electronically-Controlled to any cooling level	Less precise cooling control
Pressure Drop	<0.25" @ 650 FPM velocity	0.4" @ 650 FPM velocity and 88% efficiency
Installed Cost	Less than evaporative	More than fogging
Water Use	Less than evaporative; Demineralized water required	More than fogging; Uses service water
Installation Time	3 to 4x faster than evaporative	3 to 4x slower than fogging
Shutdown to Install?	Yes, but can be installed in 2 days	Must shutdown (one week or more)
Other Considerations	Requires careful pump-skid design & maintenance; Requires demineralized water; Over-saturation causes corrosion & run-off considerations	Particulate scrubbing capability; Time-tested process; Retrofit may require rainhoods & additional structural supports



**Braden
internal-vane nozzle**

**Impaction
pin
nozzle**

**Shown above are the fog nozzle
attachment methods used by Braden.**

How Fog Cooling Works

A series of stainless steel tubing arrays distribute demineralized water under high (800 to 3500 psi) pressure to specially-designed nozzles. The nozzles, in turn, atomize the water into droplets. Droplet size is dependent upon the pressure and flow.

The shorter the residence time of the water droplets (i.e. prior to entering the compressor of the combustion turbine), the smaller the droplet needs to be so as to assure complete evaporation.

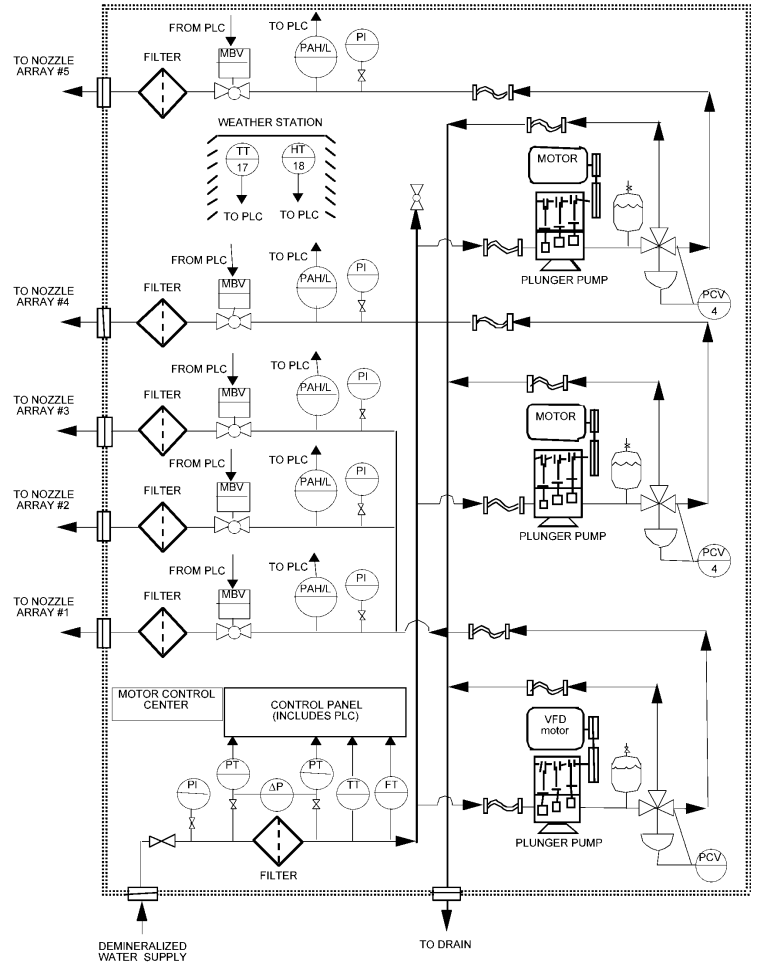
Braden prefers the internal-vane nozzle because it does not drip, unlike the impaction-pin nozzle, where the pin is an obstruction in the water stream. This causes large droplets to form and fall.

The GT OEM's First Choice

Braden is the single-source supplier for all of your GT plant's filtration, cooling, inlet, outlet, silencing and exhaust needs. We have unsurpassed experience in the new construction and retrofit of these systems. Our offerings include complete turnkey capabilities.

In turn, gas turbine OEMs have encouraged Braden to offer fog cooling systems because of our 29 years of knowledge, engineering experience, and accountability for the overall performance and longevity of GT plants.

The turbine manufacturers recognize that no other company is better equipped than Braden to integrate a fog cooling system into a GT plant.



HIGH PRESSURE PUMP SKID

Careful pump-skid design includes the proper sizing of pumps and the standardization of process controls. Braden has engineered pump-skids for over 20 years.



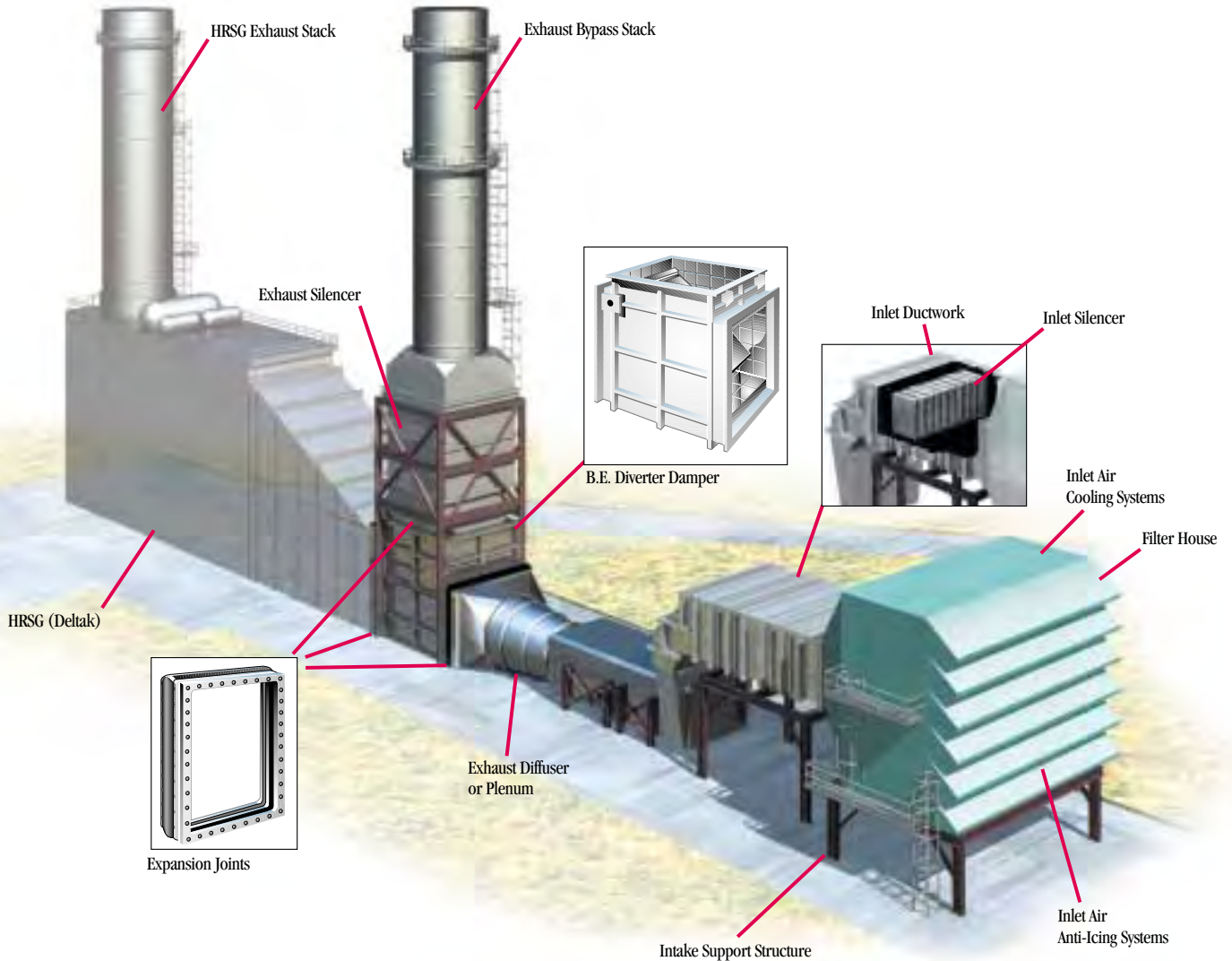
**Braden Fogging System
located at a Texas gulf coast
chemical company sized for
a frame 7EA gas turbine.**



Braden typical installed access door.



Braden Systems For Gas Turbines



Braden Manufacturing, LLC

5199 North Mingo Road
Tulsa, Oklahoma 74117 USA

Tel: 918-272-5371
Fax: 918-272-7414

E-mail: Sales@braden.com
Websites: www.braden.com
www.bradenfilters.com

Braden-Europe B.V.

Grasbroekerweg 114
6412 BH Heerlen
The Netherlands

Tel: 31-(0) 45-5615-420
Fax: 31-(0) 45-5726-161

E-mail: BradenEurope@BradenEurope.com

Braden-Mexico

Libramiento Noroeste KM. 112.2
Garcia, N.L.
Mexico C.P. 66000

Other Global Energy Equipment Group Companies:

Deltak - Heat Recovery Steam Generators

2905 Northwest Boulevard
Suite 150
Minneapolis, MN 55441 USA

Tel: 612-557-7440
Fax: 612-557-4700

E-mail: boilers@deltak.com
Website: www.deltak.com

Deltak Asia

Representative Office
10 Anson Road
#25-12 International Plaza
Singapore 079903

Tel: 65-227-6823
Fax: 65-227-8375