
AMERICA
ATMOsphere
Business Case for
Natural Refrigerants
June 12-14, 2018 – Long Beach

Adiabatic Cooling with hydroBLU Controls

Description: Adiabatic Cooling of Natural Refrigerants using hydroBLU water metering technology reduces water consumption through intelligent controls

Jacob Wolfe

ATMO sphere AMERICA

GÜNTNER

Developing Technology for Natural Refrigerants.

Extensive Install Base of Evaporators and Gas Cooling

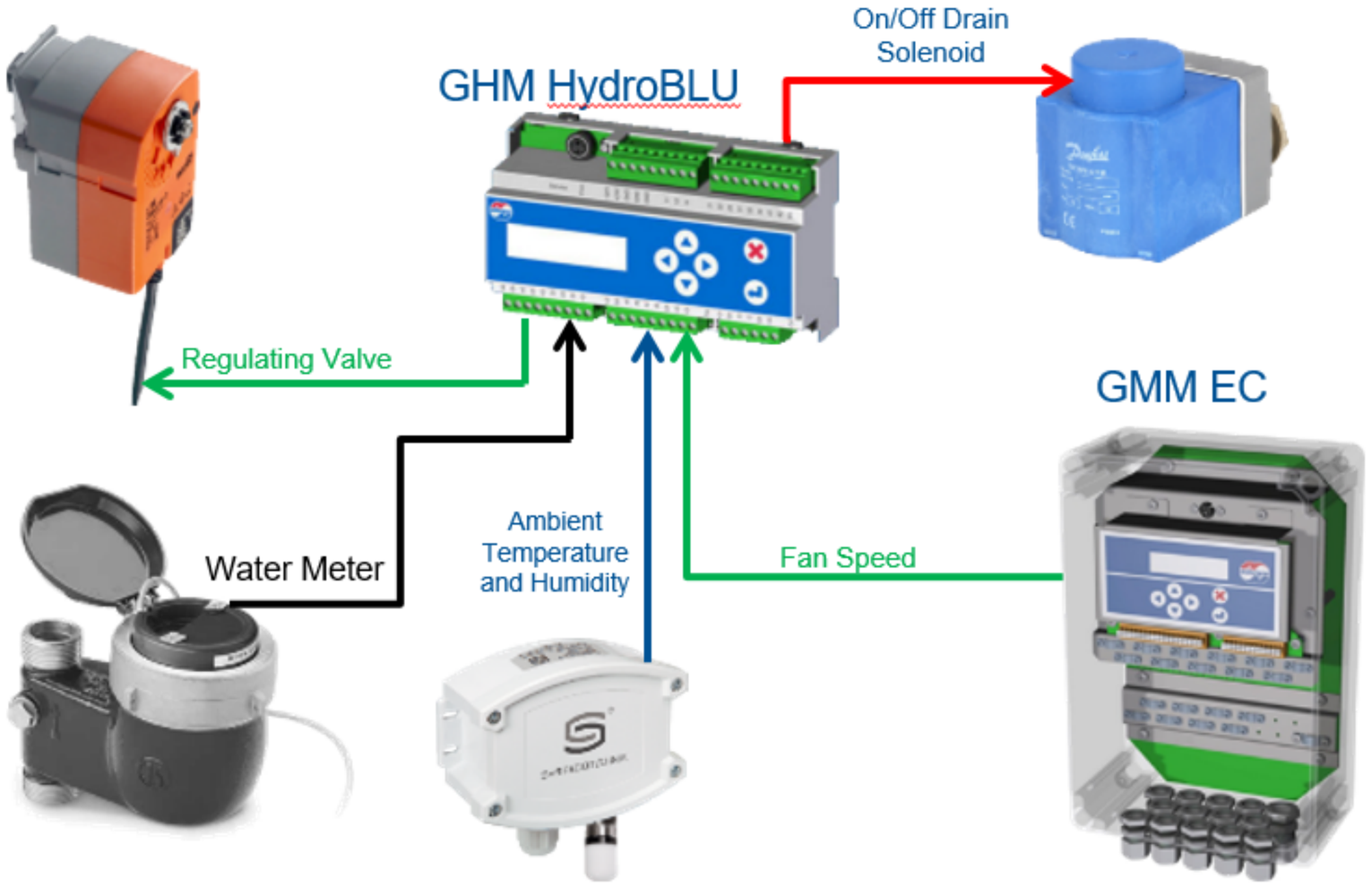
80+ Years of Experience!

What is hydroBLU Technology?

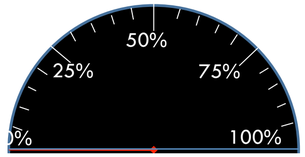
- hydroBLU controls technology for adiabatic coolers and condensers employs metered water control along witn pre-cooling pads to reduce the air temperature before reaching the dry coil.
- This enables process reaches temperatures closer to the wet bulb while using water during peak periods and dry fans during off peak hours
- Efficiencies up to 60 to 90% depending region

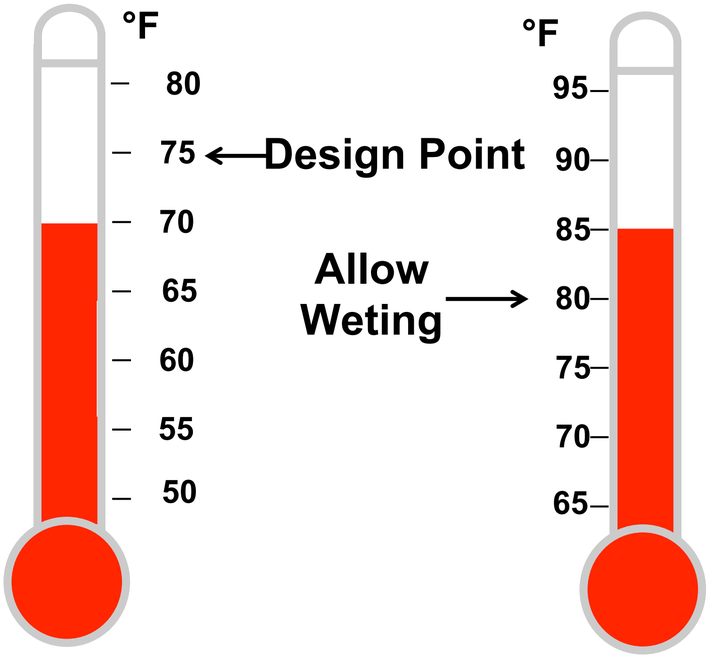
Working Principle

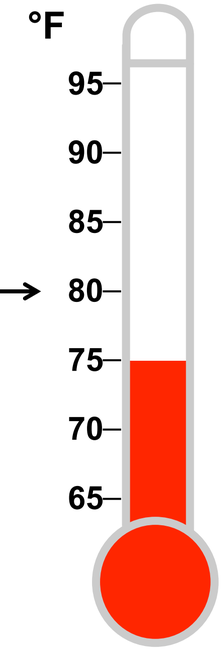
Components


On/Off Drain
Solenoid
GHM HydroBLU
Regulating Valve
GMM EC
Water Meter
Ambient
Temperature
and Humidity
Fan Speed

Water Saving Mode







Setpoint GMM

Start Wetting

Fan speed

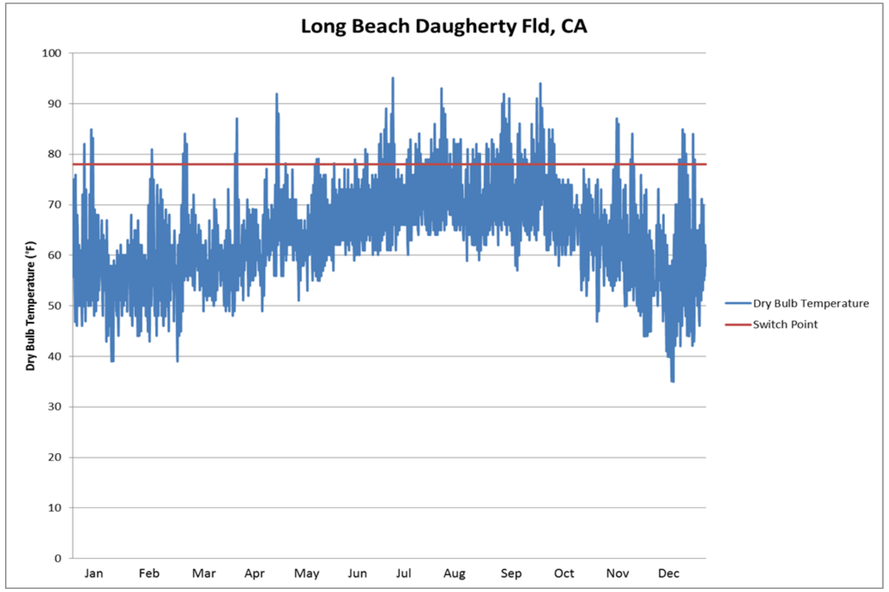
Example – Long Beach, CA

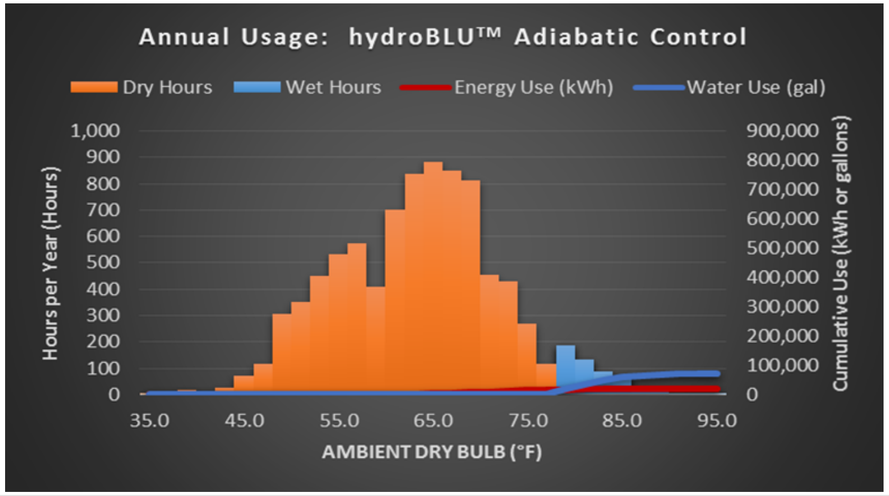
Power and Water Rates:

Electricity rate	**$0.16**	$ / kWh
Demand charge	**$15.79**	$ / kW / mo.
Water supply	**$3.79**	$ / kgal
Sewage	**$2.47**	$ / kgal
Water treatment	**$4.00**	$ / kgal

Unit Data:		**Adiabatic**
Parameter	**Notes**	**hydroBLU**
System		Metered Flow
Water Control		Configurable
Fan Motor Control		EC Motor VSD
Product Application		Cooler
Design heat rejection	Btu/hr	1,723,000
Entering fluid temperature	°F	165.0
Leaving fluid temperature (LFT)	°F	85.0
Inlet dry bulb temperature	°F	95.0
Inlet wet bulb temperature	°F	70.0
Unit heat rejection capacity	Btu/hr	1,723,000
Precooled air (switch point), if appl.	°F	78.0
Total number of fans		6
Total fan power, input	kW	22.2
Total air flow rate	cfm	102,975
Minimum fan speed setting	(if appl)	10%
Spray water pump power, input	kW	0.0
Water intake at design	gpm	5.2
Minimum leaving fluid temperature setpoint	°F	85.0

Fan power, maximum	kW	22.2
Spray water pump power	kW	0.0
TOTAL maximum power	**kW**	**22**
Fan power, annual average	kW	2.2
Spray pump pwr., annual avg.	kW	0.0
TOTAL power, annual avg.	**kW**	**2**
Fan energy	kWh/yr	19,457
Spray water pump energy	kWh/yr	0
TOTAL energy	**kWh/yr**	**19,457**
Cost of fan electricity	USD/yr	7,454
Cost of spray pump electricity	USD/yr	0
TOTAL cost of electricity	**USD/yr**	**7,454**
Water use hours per year	hours/yr	527
Water use hours as % of year		6%
Water use	**kgal/yr**	**72**
Water evaporation	kgal/yr	48
Chemically treated blowdown	kgal/yr	0
Non-treated water blowdown (to other use	kgal/yr	24
Water intake, maximum	gpm	5.2
Average water intake per year	gpm	0.1
Water use, (equiv.) cycles of concentration		3
Water use savings vs evaporative base		>90%
Cost of water	**USD/yr**	**271**
ANNUAL water & energy cost	**USD/yr**	**7,725**





Additional Standard Features

- Water savings typically 60% to 90% (+) vs evaporative towers/coolers condensers
- Minimize water usage through water metering controls
- Ability to input water and energy cost into Güntner GHM control for optimal savings
- No water recirculation, no water treatment
- No pump, less risk of down time
- Freeze Protection Standard
- Maintenance Function
- Low Capacity Motor Management
- Cleaning Function
- Most All Communication Protocols Available for an Adder

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Thank you very much!

Working Principle