

HBO - Data Centre Cooling

Executive Summary

- "Overall **35%** energy saving", HBO Chief Engineer
- Return on Investment in less than 1 year
- 1000s hours more Free Cooling
- Over 35% increase in dry cooler heat rejection
- Compressor run-time hours slashed by an average of 46%, increasing equipment life
- Annual saving in EACH CRAC unit of 65,000 kWh energy forecast, which equates to the emission of 29 tonne CO₂



A TimeWarner company, Home Box Office, Inc (HBO) has installed Hydromx[®] to improve the efficiency of their data centre cooling in Hauppauge, New York. HBO is the world's most successful pay-tv service and a major satellite broadcast company, their data centres are mission critical.

The implementation of Hydromx came after HBO completed a 6 month study of the product and HBO are now looking at many more projects with Hydromx, including heating in large corporate buildings.

"the efficiencies with Hydromx were so much greater than the glycol, we were able to run Free Cooling up to 62F ambient temperatures, whereas the glycol was somewhere around 49 to 51F ambient depending on humidity levels outside."

Michael Butigian, Executive VP , ComputerCool IceAge Mechanical Corp



The Study - System Protection

Prior to installation **HBO** and their contractor **ComputerCool IceAge Mechanical Corp (CCIA)**, performed due diligence to assure themselves that Hydromx would not affect rubber seals, metal seals, pumps, or chillers, in fact anything that would take the Data Centre out of operation. After running the system for six months HBO and CCIA reported no problems relating to Hydromx, confirming their conclusion that it has no detrimental effect on the chillers. The only problem that did occur was that the units were setting off low temperature alarms and shutting down because they were too cold; Hydromx was making them too efficient!

The Study - Energy Efficiency

To prove the energy efficiency delivered by Hydromx CCIA set up two data rooms for a side by side comparison, each with three Liebert 70 kW DX down flow CRAC units and matching dry coolers on the roof.

- 1st Data room: 18 ton cooling load with ethylene glycol (30%)
- 2nd Data room: 21 ton cooling load with Hydromx

Compressor kWh meters were installed to log the utilisation of both compressors in each of the three CRAC units. Thermocouples were installed to measure the temperature of the fluid entering and leaving the dry coolers, with the fluid flow being measured using ultrasonic flow metering. The results were qualified against Building Management System log data.

CCIA ensured that all six DX down flow units were setup with identical temperature and humidity set points etc, to ensure that each set of units had the same operating conditions in each room.

Independent Monitoring & Verification

Utilivisor, a leading energy advisory firm providing energy monitoring and metering solutions, verified the efficiency savings from kWh meters and confirmed HBO's results.



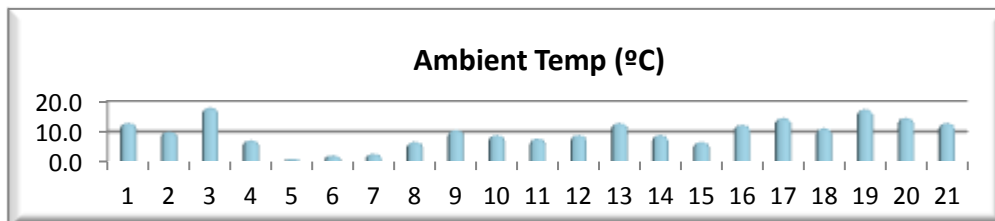
Results

With the CRAC units 100% fully loaded the average difference in the temperature of the fluid entering the dry coolers, compared to the temperature on leaving, increased from 4.8°C with ethylene glycol to 7.5°C with Hydromx; an increase in heat rejection of over 35%. At higher outside ambient temperatures the heat rejection was even higher and the differential rose to c. 4°C.

When the free cooling coil reached c. 4°C lower than the Liebert unit’s return air temperature the free cooling valve began to open, the free cooling coil started handling some load and the compressor(s) began to unload. As the entering fluid temperature dropped, the first stage compressor turned off and then the second compressor, resulting in savings from more partial free cooling (compressors unloading and cycling) and much more complete free cooling (compressors off).

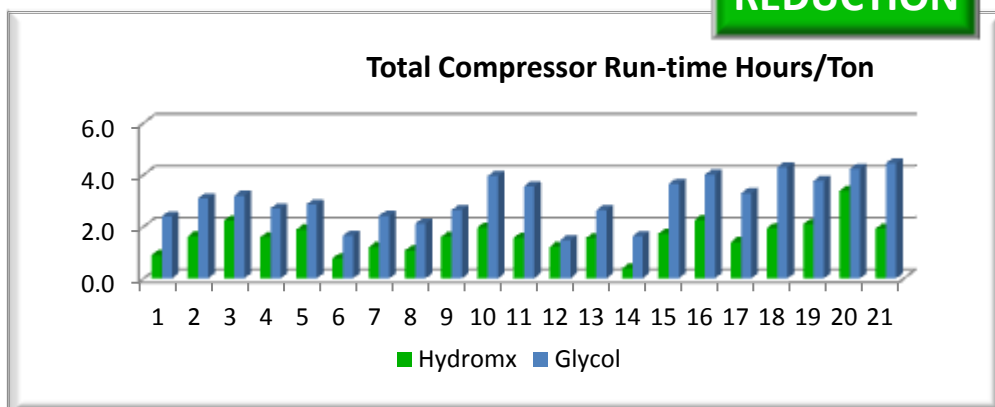
Annual savings from 1000s of hours of extra free cooling results in a predicted saving of 65,000 kWh per CRAC Unit.

These savings are confirmed by assessing the compressor run-time hours between the two data rooms. The total run-time, per ton of cooling load, for the six compressors in each room for a 21 day period is compared below. In this period the ambient temperatures ranged from a minimum of 1°C, a maximum of 18°C and a mean of 10°C.



The resulting graph below shows astounding reductions in compressor run-time of between 17% and 79%, with an average of 46.4%.

**AVERAGE
46.4%
REDUCTION**



Advantages of using Hydromx[®]

- Increased heat rejection extends free cooling coil capacity and Free Cooling to an ambient temperature 3-4°C higher than with a glycol.
- Compressor runtimes are being reduced by several thousand hours per year.
- The reduced temperatures allow the compressors in the Hydromx unit to run with lower head pressures and gain efficiency and longevity.
- Lower head pressures also cause the condenser water regulating valves to reduce fluid flow, resulting in pump energy savings.

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Hydromx[®] is available from PBA Energy Solutions authorised resellers and agents.

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