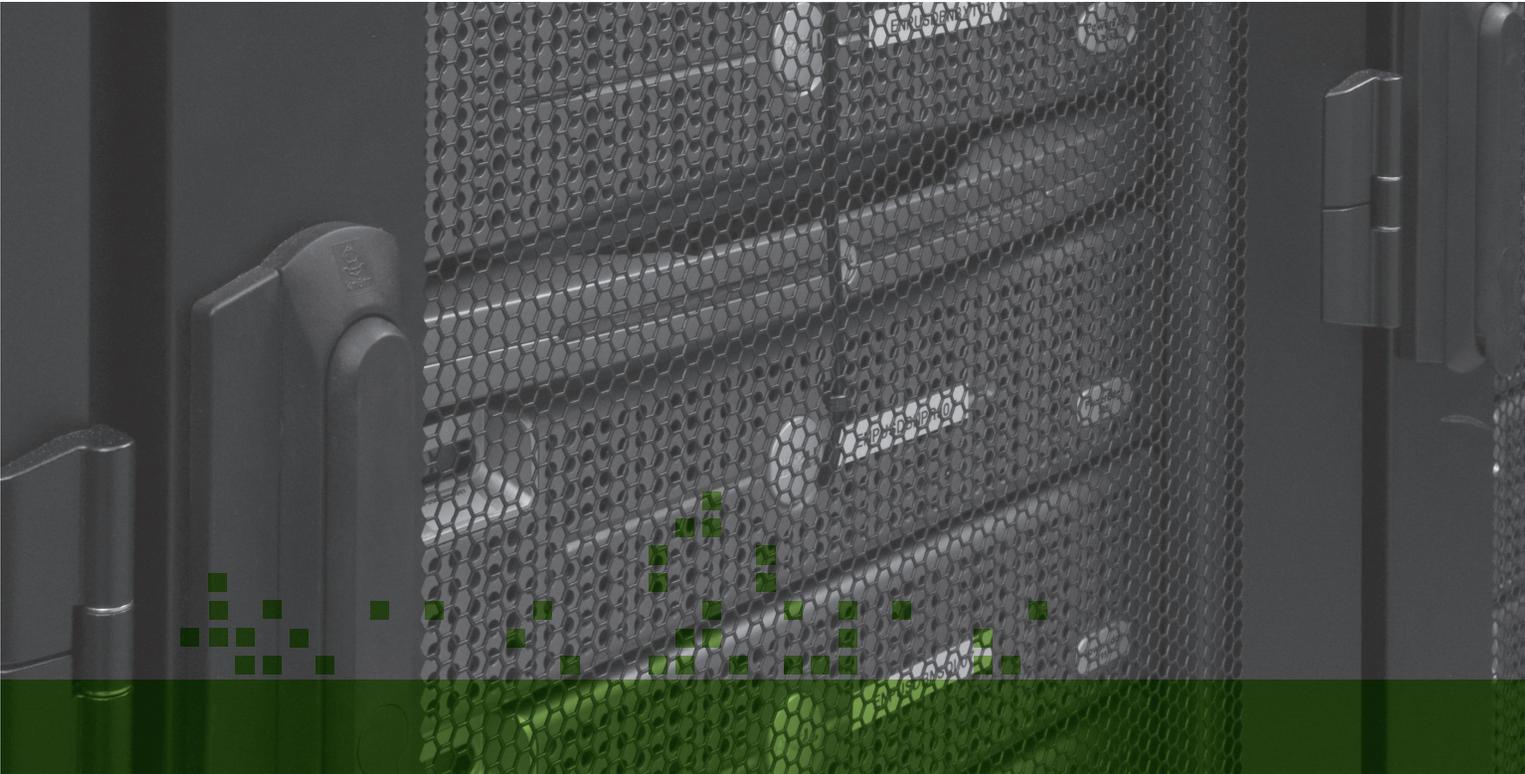


Cooling Cost-Saving Strategies

Comfort Cooling vs. Precision Cooling



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- EXECUTIVE Summary
- HEAT REMOVAL Ratios
- Comparing Annual OPERATING COSTS
- Conclusion

Executive Summary

- Computer systems are critically sensitive to extreme variations in temperature and humidity. High heat or humidity can cause failure, degrade performance and shorten equipment life. Important differences exist between precision cooling and building air conditioning (comfort cooling) in controlling these environmental conditions. These differences dramatically impact the cost effectiveness of these systems. In this paper, we compare both cooling systems' ability to maintain favorable environmental conditions, and their energy efficiency and annual operating costs.

EXECUTIVE Summary

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■ Case Study: Sequent

YouTube

> Click to watch
 "Precision vs. Comfort Cooling
 in Smaller IT Spaces"

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HEAT REMOVAL Ratios

- Understanding heat removal ratios is important to understanding the efficiency of cooling systems. There are two types of cooling: latent and sensible. Latent cooling is the ability of the air conditioning system to remove moisture, which is important in comfort cooling environments where people give off humidity. Sensible cooling is the ability of the air conditioning system to remove heat that can be measured by a thermometer. The dryer heat generated by electronic equipment is included in this category.
- The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) recommends guidelines for data center heat and humidity. ASHRAE recommends data center temperatures fall between 18 and 27 degrees Celsius (64.4 to 80.6 degrees Fahrenheit) and that data center humidity levels be measured by dew point and fall within 5.5 and 15 degrees Celsius (41.9 to 59 degrees Fahrenheit).

Comfort cooling systems have a sensible heat ratio (SHR) of 0.60 to 0.70. This means 60 to 70 percent of their energy used is dedicated to lowering temperature, and 30 to 40 percent is dedicated to removing humidity. IT spaces require a 0.80 to 0.90 sensible heat ratio for effective and efficient cooling. Precision cooling systems have been designed with a sensible heat ratio of 0.85 to 1.0. This means 85 to 100 percent of their effort is devoted to cooling and only 0 to 15 percent to removing humidity; therefore, it will take a larger comfort cooling unit to cool the same IT environment as a precision system. In general, it takes three tons of comfort cooling capacity to equal two tons of precision cooling capacity.

EXECUTIVE Summary

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Conclusion

Because they are more effective at removing sensible heat and controlling humidity levels, precision cooling systems require less power to operate than comfort cooling systems. When initial costs and operating costs both are taken into account, precision cooling systems represent the most cost-effective solution to cooling critical IT equipment.

If you're looking for more information on this subject, check out a "[Feel the Heat: Precision vs. Comfort Cooling in Smaller IT Spaces](#)" webcast.

Additional Resources

If you're interested in learning more about trends and topics related to powering, cooling or monitoring data centers, [check out these white papers from Emerson Network Power](#).

Best practice case studies of how other companies have solved data center challenges are available in [narrative](#) and [video](#) forms. Case studies are from small to large companies across numerous industries.

If you have specific questions, a Liebert Representative from Emerson Network Power or a Liebert certified IT reseller can help you out. [Click here to find your local contact](#).

Finally, be sure to follow [Emerson Network Power on Twitter](#) or visit the [Emerson Network Power YouTube Channel](#) to be one of the first to see new solutions or view new white papers and case studies.

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