



Thermal Time-Trend Report [Example]

Client Name: Savoy Bank

Date: June 20 – July 22, 2023

Data Center Location: Fourth Street, Burlington, IA

Assessment Methodology: Purkay Labs Thermal Survey, AUDIT-BUDDY™

Executive Summary

This report summarizes findings and recommendations from a trend assessment conducted at Savoy Bank Fourth Street DC from June 20 to June 23, 2023. The assessment measured 15 locations where the Client received occasional high server temperatures complaints. This survey confirmed that three locations exceeded ASHRAE TC9.9 temperature limits. Notably, these temperature spikes aligned with Chicago and London Stock Exchange overlapping trading times.

Measurement Summary

Total Number of Cabinets	15
Total Number of Cabinets with Outliers Values	3
Total Number of Outlier Values Measured	1063

Outlier Summary

Values	Target Range	Within Target Range	Notes
Temperature	60.4-80.6°F	No	3 Cabinets had temps over 80.6°F
Humidity	8%RH – 70%RH	Yes	
Dewpoint	15.8°F to 59.0°F	Yes	



Data Summary

Average Values

<i>Parameter</i>	<i>Average</i>
Avg Temp °F (all 15 locations over measured period)	75.4 °F
Avg Cold Aisle RH% (all 15 locations over measured period)	30.1 %
Avg Cold Aisle DP °F (all 15 locations over measured period)	38.9 °F

Maximum/Minimum Temperature

<i>Parameter</i>	<i>Average</i>
Max Temp °F	86.5°F at Location C15 at 83"
Min Temp °F	67.6°F at Location D12 at 13"

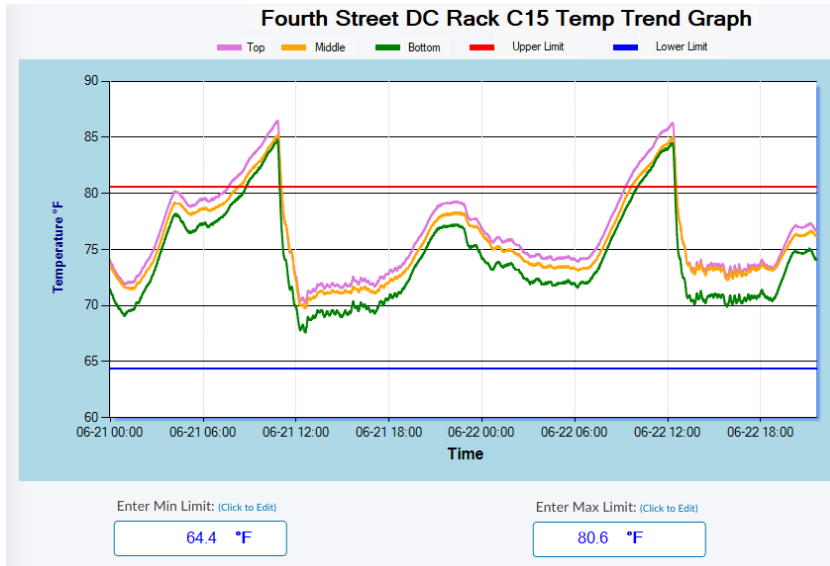
Outliers

<i>Location</i>	<i>Outliers</i>
Rack C15	June 21 – 7:37 AM to 11:00 AM June 22 – 9:15AM to 12:00PM 400 samples
Rack D23	June 21 – 7:50 AM to 11:15 AM June 22 – 9:29 AM to 12:15 PM 362 samples
Rack F7	June 21 – 7:55 AM to 11:00 AM June 22 – 9:25 AM to 11:30 AM 301 samples

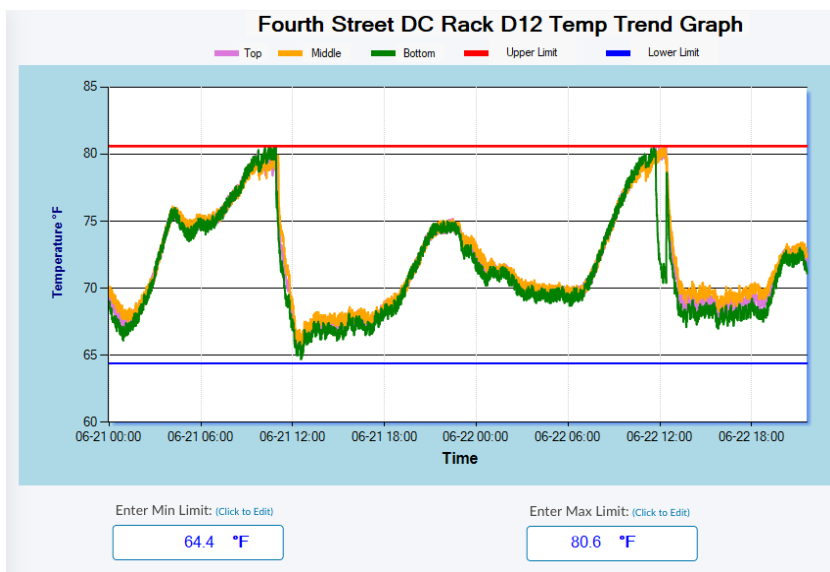
Time-Trend Graphs

Purkay Labs has created time-trend graphs for each cabinet that show the temperature, humidity and dew point trend. Please see attached list of Time-Trend Graphs per Aisle.

Example: Trend Graph of Rack C15 - exceeding Over Temp Limits



Example: Trend Graph of Rack D12 - Over Temp Limits within limits



Observations

The trend graphs show over-temp anomalies occurring at three different racks (C15, D23 and F7) at roughly identical times – namely between 8am and 12: pm. Additional investigation to these specific racks showed that they were linked to specific trading activity that happened when both Chicago and London trading sites were active.

The Data for all 15 locations is attached in the Excel File supplied with each tab having the time stamped data for one location. Temperature, Dewpoint and Relative Humidity data are supplied for each location at 3 different elevations. Other Racks were within limits but were very close to exceeding the ASHRAE limits.

Airflow Best Practices

Given the correlation of extra computation with the increase in inlet air temperature with, one likely root cause is additional hot exhaust air is making its way across to the inlet as recirculation air. There are many industry standard best practices that can be followed to mitigate this issue.

1. Eliminate gaps by Install blanking panels to prevent hot air from recirculating through empty spaces in the rack.
2. Use airflow management accessories such as grommets, brush strips, and foam seals to seal gaps and openings in the racks and cabinets. This also prevents air leakage and recirculation.
3. Eliminate any recirculation air flow by installing barriers on top of the cabinet and around it using curtains.
4. Installing containment.

Adding more cold air to these racks would also alleviate the problem, but it is an expensive option and can affect redundancy of the overall data center. One should implement the best practices suggested before increasing additional air to the rack.

Distributing some of the computation to another server in a different cabinet such as B5 or C12 is an alternative, but it requires additional work from the IT team.



Next Steps

Based on the findings and recommendations outlined in this report, we recommend the following next steps to improve the thermal conditions in your data center:

1. Implement one of the recommended actions
2. Conduct another Purkey Labs Thermal Trend measurement for confirmation that the problem has indeed been corrected.

Conclusion

Purkey Labs is committed to helping you achieve optimal thermal conditions in your data center. We look forward to working with you to enhance temperature, humidity, and dew point management, ensuring the reliability and performance of your critical infrastructure.

For further information, questions, or to schedule a follow-up measurement, please contact us at info@purkaylabs.com.