Thermal Baseline Report [Example]

Client Name: Sun Air Airlines

Date: June 12, 2023

Data Center Location: Colocation Facility in Bradenton, FL

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

Executive Summary

This assessment analyzes the thermal conditions in critical areas and pinpoint areas for optimization. Temperature, humidity, and dew point were collected at three heights for each rack within a Colocation Data Center, which has both contained and uncontained aisles. This report outlines assessment findings, and you can access rack-level data and temperature outliers in the provided .CSV file.

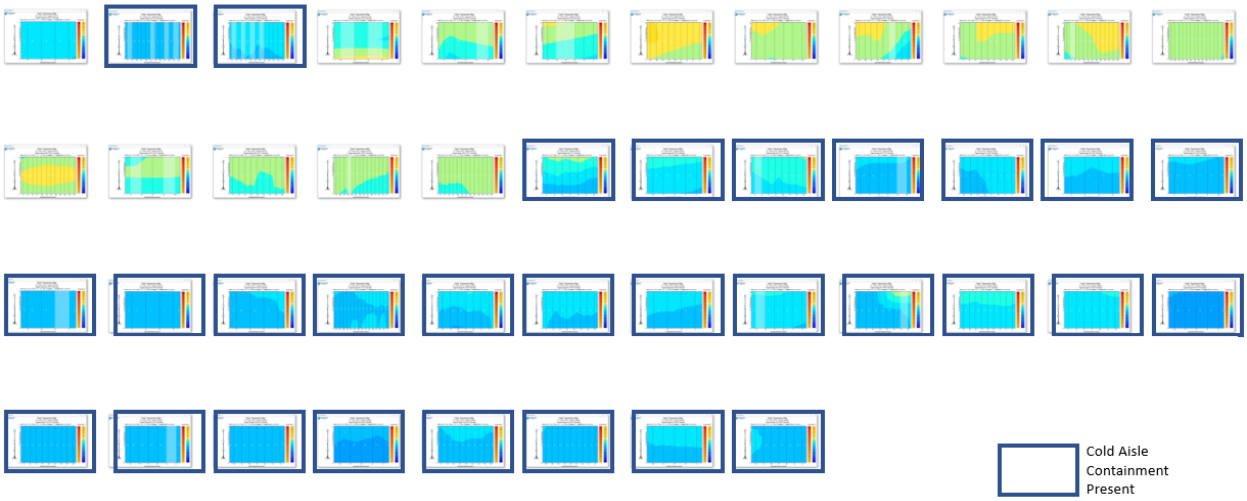
Measurement Summary

Total Number of Cages	30
Total Number of Aisles	65
Total Number of Cabinets	420
Total Number of Aisles with Observations	11
Total Number of Aisles with Outliers	4
Total Number of Outlier Values Measured	30

Outlier Summary

Values	Target Range	Within Target Range	Notes
Temperature	60.4-80.6°F	No	30 Values above 80.6°F, max temp of 85.6°F
Humidity	8%RH – 70%RH	Yes	
Dewpoint	15.8°F to 59.0°F	Yes	

Aisle Uniformity Metric



The high-level view of every aisle static temperature heat map shows that contained aisles have a more uniform temperature distribution, as opposed to the uncontained spaces which have less uniformity and mixing of air.

Average cold aisle temperature (contained)	74.1 °F
Average cold aisle temperature (uncontained)	77.3 °F
Uniformity Metric (contained)	0.83
Uniformity Metric (Uncontained)	0.87

➤ Purkay Labs uses the Uniformity Metric to evaluate the thermal conditions of the aisles. The Uniformity metric is a quantitative measurement used to assess the degree of uniformity or consistency across a specific area.

Uniformity Rating Table	**Value**
0 to .49	Very Good
.5 to .99	Good
1.0 to 1.49	Fair
Above 1.5	Needs Improvement

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Aisle Analysis

Cage No.	Aisle	Contained	Uniformity	Rating	Outliers	Observations
101	304-307	Yes	0.43	Very Good	None Noted	None Noted
101	405-408	Yes	0.46	Very Good	None Noted	None Noted
101	503-507	Yes	0.52	Good	None Noted	None Noted
102	102-119	Yes	0.42	Very Good	None Noted	None Noted
102	201-219	Yes	0.62	Good	None Noted	None Noted
102	305-319	Yes	2.00	Needs Improvement	None Noted	Missing Blanking Plates, Grommets,Hot Air in Cold Aisle
102	502-505	Yes	1.42	Fair	One Over Temp Outlier	Missing Blanking Plates, Grommets
103	1003-1015	No	1.11	Fair	11 Over Temp Outliers	Missing Blanking Plates, Grommets
103	1201-1210	No	0.67	Good	None Noted	None Noted
103	1502-1515	No	0.52	Good	None Noted	None Noted
103	1601-1615	No	0.78	Good	None Noted	None Noted
103	1702-1715	No	0.71	Good	None Noted	None Noted

103	203-208	No	1.34	Fair	None Noted	None Noted
103	302-308	No	1.60	Needs Improvement	None Noted	Missing Blanking Plates, Grommets,Hot Air in Cold Aisle
103	403-412	No	1.33	Fair	16 Over Temp Outliers	Missing Blanking Plates, Grommets
103	501-507	No	0.76	Good	None Noted	None Noted
103	603-612	No	1.88	Needs Improvement	None Noted	Missing Blanking Plates, Grommets,Hot Air in Cold Aisle
103	702-714	No	0.83	Good	None Noted	None Noted
103	802-815	No	0.87	Good	None Noted	None Noted
103	901-915	Yes	0.57	Good	2 Over Temp Outliers	None Noted
104	104-111	Yes	2.48	Needs Improvement	None Noted	Missing Blanking Plates, Grommets,Hot Air in Cold Aisle
104	204-210	Yes	1.32	Fair	None Noted	Missing Blanking Plates
104	301-311	Yes	1.04	Fair	None Noted	None Noted
105	101-112	Yes	0.47	Very Good	None Noted	None Noted
106	105-102	Yes	0.48	Very Good	None Noted	None Noted
107	101-109	Yes	0.80	Good	None Noted	None Noted
108	101-105	Yes	0.92	Good	None Noted	None Noted

109	103-106	No	0.87	Good	None Noted	None Noted
110	101-106	Yes	0.90	Good	None Noted	None Noted
110	201-205	Yes	0.40	Very Good	None Noted	None Noted
111	102-106	Yes	0.64	Good	None Noted	None Noted
111	201-205	Yes	0.71	Good	None Noted	None Noted
112	101-116	Yes	0.86	Good	None Noted	None Noted
113	101-103	No	0.57	Good	None Noted	None Noted
114	201-208	Yes	1.35	Fair	None Noted	Missing Blanking Plates, Grommets
114	301-309	Yes	0.80	Good	None Noted	None Noted
114	402-406	Yes	1.30	Fair	None Noted	Missing Blanking Plates, Grommets
115	102-104	Yes	1.00	Fair	None Noted	Missing Blanking Plates
116	202-204	Yes	1.13	Fair	None Noted	None Noted
117	108-109	Yes	0.66	Good	None Noted	None Noted
118	101-107	Yes	0.87	Good	None Noted	None Noted
118	201-209	Yes	1.99	Needs Improvement	None Noted	Missing Blanking Plates, Missing Rail Grommets allowing Hot Air in Cold Aisle
119	101-110	Yes	0.99	Good	None Noted	None Noted
120	201-202	Yes	1.41	Fair	None Noted	None Noted
120	303-302	Yes	0.73	Good	None Noted	None Noted
121	104-103	Yes	0.83	Good	None Noted	None Noted

121	201-204	Yes	0.41	Very Good	None Noted	None Noted
122	307-309	Yes	0.43	Very Good	None Noted	None Noted
123	101-108	Yes	0.56	Good	None Noted	None Noted
124	104-110	Yes	0.30	Very Good	None Noted	None Noted
124	113-124	Yes	0.31	Very Good	None Noted	None Noted
124	203-210	Yes	0.38	Very Good	None Noted	None Noted
124	216-224	Yes	0.25	Very Good	None Noted	None Noted
124	303-308	Yes	0.54	Good	None Noted	None Noted
124	315-324	Yes	0.68	Good	None Noted	None Noted
124	401-403	Yes	0.22	Very Good	None Noted	None Noted
124	414-424	Yes	0.39	Very Good	None Noted	None Noted
124	515-518	Yes	0.31	Very Good	None Noted	None Noted
125	201-206	Yes	0.86	Good	None Noted	None Noted
126	101-108	Yes	0.69	Good	None Noted	None Noted
127	111-114	No	0.69	Good	None Noted	None Noted
128	107-105	No	0.62	Good	None Noted	None Noted
129	104-106	No	0.75	Good	None Noted	None Noted
129	205-206	No	0.76	Good	None Noted	None Noted

130	101-102	No	0.28	Very Good	None Noted	None Noted

Observations:

During the assessment, Purkay Labs checked for common airflow management best practices. The following is a list of on-site observations. Please see the .CSV document for rack-specific observations.

Hot Temperatures	Hot temperatures in the Data center environment can lead to one or more of the following: Equipment Failure and Downtime, Reduced Equipment Lifespan, Data Loss and Corruption, Performance Degradation, Inefficient Energy Usage, Ineffective Cooling, Increased Cooling Costs, Safety Risks, Non-Compliance with Standards, and Risk to Business Continuity.
High Uniformity Metric	A High Uniformity Metric indicates a variance of temperatures across the vertical plane of the aisle being measured. As a result not all servers are receiving the same air temperature at their inlet ports. This can lead to irregular performance and possible equipment failures. This is usually observed in an aisle without a containment solution.
Low Uniformity Metric	A Low Uniformity Metric indicates little variance of temperatures across the vertical plane of the aisle being measured. As a result all servers are receiving similar air temperatures at the inlet portal. This is most commonly observed in aisles with cold air containment.
Missing blanking plate(s)	Blanking panels play a vital role in controlling airflow within a data center. They help optimize airflow, reduce hot spots, enhance cooling efficiency, promote energy efficiency, prevent air short-circuiting, and improve the reliability of IT equipment—all of which are crucial for the smooth and efficient operation of a data center.

Missing floor grommets	Floor grommets underneath data center cabinets are essential for optimizing airflow, maintaining appropriate temperatures, enhancing cooling efficiency, and achieving energy efficiency in the data center. They contribute to a more controlled and reliable environment for the IT infrastructure.

Next Steps

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

1. Insert the missing Blanking Plates where noted
2. Fix the floor grommets where noted
3. Address the Hot air venting to the Cold Aisle where noted
4. Continue to monitor environmental conditions regularly to ensure ongoing optimization.
5. Schedule a follow-up assessment to track progress and validate the effectiveness of implemented changes.

Conclusion

Purkay 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 assessment, please contact us at info@purkaylabs.com.