

HOTLOK®



CASE STUDY

A Fortune 50
Commercial Bank
Reduces Energy
Costs with
HotLok® Products

upsite[↑]
technologies®

CUSTOMER

A Fortune 50 Commercial Bank

DATA CENTER DETAILS

IT Load: 270 kW

CRAH Operating Capacity: 450 kW

Cooling Capacity Factor: 1.5

Problem: Inefficient Cooling

SOLUTION

HotLok® Rack Airflow Management Kits and Blanking Panels

RESULTS

- Increase return air by 3.6° F (2° C)
- Shut off 2 CRAHs
- Saved \$26K USD annually

Global Bank Reduces Energy Costs

A Fortune 50 US-based Commercial Bank in Japan (The Bank) trimmed an equivalent of 5.5% of the annual IT systems demand from their energy costs with an initiative that simply improved airflow management inside the data center equipment cabinets using HotLok® products.

The Problem

The Bank's computer room had 270 kW of IT load, but was running 450 kW of CRAH capacity in an attempt to avoid hotspots and provide the proper cooling the IT equipment required. These conditions resulted in a Cooling Capacity Factor (CCF) of 1.5, clearly indicating the opportunity for improved efficiency.

Despite the excess cooling capacity used, hot spots were still prevalent and there were wide temperature variations in the cold aisles. The CCF of 1.5 revealed that problems were not due to a lack of capacity, but rather a lack of airflow management (AFM), and that AFM improvements could increase both the effectiveness and the efficiency of the cooling infrastructure. The high cost of energy in the data center's location (Tokyo) also made efficiency improvements a high priority.

Finding a Fix

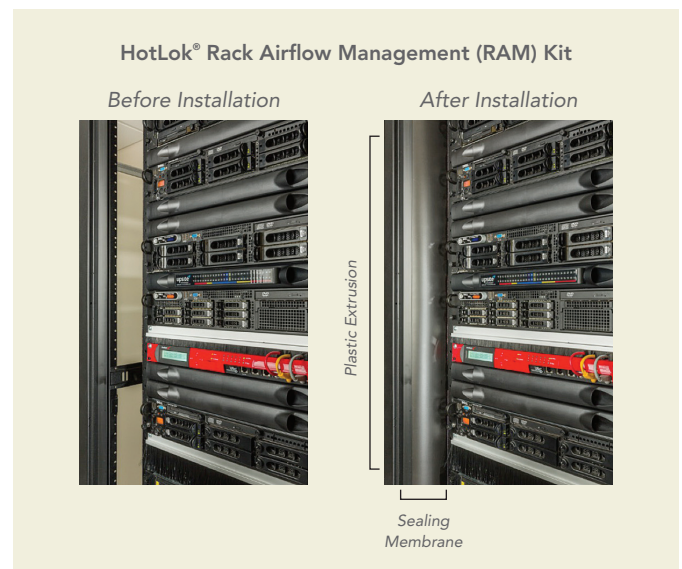
Two major problem areas within the rack were identified: open U spaces in the IT cabinet, and open spaces between the tops, bottoms, and sides of the IT cabinet and the server rails. These spaces created bypass airflow, as conditioned air bypassed the IT equipment and escaped. Additionally, these openings allowed for exhaust air recirculation and contributed to hot spots. A solution was needed that could seal all of these openings, blocking the exhaust air recirculation and preventing the escape of conditioned air.

The Solution

Over a weekend, The Bank installed Upsite's HotLok® Rack Airflow Management (RAM) Kits and blanking panels. The Bank

observed that "the effect of sealing the 'side area' gaps was immediately apparent and most hotspots have disappeared." Previous adverse CRAH performance became more apparent as well: previously high air velocity under the access floor was pulling room air through the perforated tiles, and chilled water supply control values at two CRAH were "hunting" because the fans were moving air, but not providing any cooling. The airflow management improvements quickly fixed this problem and the 'vacuum' effect was corrected. Within a short time, as the environment stabilized, the return air temperature set point was increased 3.6° F (2° C), and two CRAHs were shutdown.

The Bank determined that the energy savings from shutting down two CRAHs and increasing temperatures would save \$26,000 USD annually. Additional savings will be recognized over time since increasing return air temperature at the CRAH, and decreasing the number of operating CRAH, makes the entire chilled water system function more efficiently. This decreases overall system energy consumption, wear and tear on the equipment, and cost of the recurring maintenance program.



The Results

The Bank recovered more than \$26,200 in direct energy costs the first year. The total project spend was about \$24,000 USD (see table below), so all improvements paid for themselves via energy savings in less than a year. These energy savings will continue year over year, and more than justify the investment in making airflow management improvements.

Key Takeaways

Reducing energy costs by managing airflow in the data center is the first step to real savings. Attacking bypass airflow and exhaust air recirculation at one of its most common — but overlooked — areas can be implemented by in-house staff with a minimum of investment. The effects of containing the bypass air in the rack can be felt immediately in the data center. Depending on your energy costs, the cost of the initiative can be recovered in the first year, and continue to offer dividends for as long as the data center is operated.

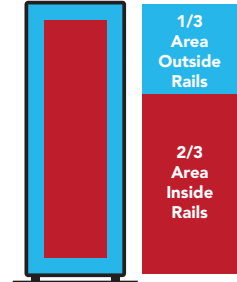
The Bank's initiative revealed the following:

- Gaps between the edge of the IT cabinet and the servers allow for significant exhaust air recirculation.
- Blanking panels are necessary to achieve desired inlet temperatures and avoid hot spots.
- Improvements to rack airflow management are quick and simple to implement, delivering immediate results.
- Improving airflow management at the rack level recovers stranded cooling capacity.

About The Solution

The HotLok® Rack Airflow Management (RAM) kit covers the one-third of the inside-face of the cabinet that installed servers and blanking panels leave open.

Any cold air that gets between or around equipment in the cabinet costs money to produce but provides no benefit to the data center. Every bit of cold air that is prevented from escaping to the hot aisle improves system performance, saves energy costs, and recovers stranded cooling capacity. Blanking panels are effective in controlling airflow between servers and equipment mounted between the rails; the Upsite Technologies' HotLok® RAM Kit stops airflow between the rails and the side of the cabinet.



Typical 28" (700 mm) wide rack (cabinet)

The HotLok® Rack Airflow Management (RAM) Kit from Upsite Technologies is a valuable addition to HotLok® Blanking Panels. A typical 28 inch (700 mm) wide rack (cabinet) has 19 inches (465 mm) between mounting points on the equipment rails, and 9.3 inches (235 mm) in the cabinet outside the rails (about 4.625 inches (118 mm) on each side). The HotLok® RAM kit covers the one-third of the inside face of the cabinet that installed servers and blanking panels leave open.

Air Flow Management Project Hits Payback in First Year

Total Spend for project components:

\$24,000 USD

Annual savings attributed to raising CRAH return air temperature: \$0.20 X 55,000 kW-hr:

\$11,000 USD

Annual saving attributed to shutting down CRAH units: \$0.20 X 76,000 kW-hr:

\$15,200 USD

Total annual saving from airflow management initiative:*

Return on Investment (ROI):

\$26,200 USD

*In addition to the \$26,200 annual direct savings, indirect savings resulted from improved chilled water system efficiency, increased life span for all cooling units, and reduced maintenance. Furthermore, there will be additional savings from deferred capital expenditure for additional cooling units that would have been required to support additional IT growth.