

HotLok® Blanking Panels Reduce Intake Air Temperatures to Save Energy, Increase Capacity and Reduce Operating Expenses

As utility costs increase, budgets become tighter, and the need for higher densities grows, there is a rising demand to get as much capacity out of your existing data center space as possible—all while reducing operating expenses, and preserving availability and reliability.

Remediating airflow problems is often the most effective and least costly way to dramatically improve your data center's power usage effectiveness (PUE).

Installing HotLok Blanking Panels prevents circulation of hot exhaust air to reduce IT equipment intake-air temperatures. Efficiency improvements increase the cooling capacity of your data center infrastructure, so your business can reliably cool higher densities with existing infrastructure.

Two separate studies demonstrate the HotLok Blanking Panel energy savings capabilities

Independent Two-Dimensional Computational Fluid Dynamics Modeling Study Results

Upsite commissioned an independent *Two-Dimensional Computational Fluid Dynamics Modeling Study* to compare hot exhaust air circulation in server cabinets with and without Hotlok blanking panels installed.

(See results on right)

Top

In a cabinet with unsealed open spaces, 40 percent of the IT equipment intake air is hot exhaust that has circulated from the back of the cabinet.

Bottom

The effective seal of HotLok Blanking Panels reduced the average intake-air temperatures by 7°F (3.9°C), saving operating and capital costs, and increasing current cooling efficiency. For complete study results visit upsite.com.

Financial Impact Case Study Results

Upsite also conducted a *Financial Impact Study* to demonstrate how installing HotLok Blanking Panel allows data center managers to raise computer room temperatures and spend less of their budgets on cooling.

This resulted in a 29% reduction in annual operating costs, and full Return on Investment (ROI) was achieved in less than two months.

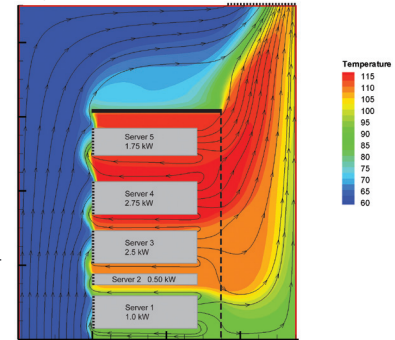
The test facility contained 400 cabinets in a computer room with 10,000 ft² of raised floor. Before installing HotLok, the facility required 61 CRAH units with a set point of 65°F to keep IT equipment intake air temperatures within acceptable ASHRAE levels.

After installing HotLok, the facility was able to turn off 18 CRAH units, and raise the CRAH temperature set points to 72°F, while still maintaining IT intake air temperatures within the acceptable ASHRAE recommended range. This resulted in a 29% reduction in annual operating costs, and full Return on Investment (ROI) was achieved in less than two months.

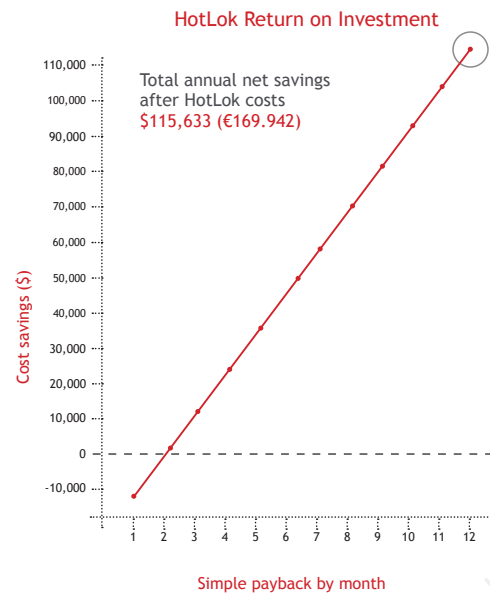
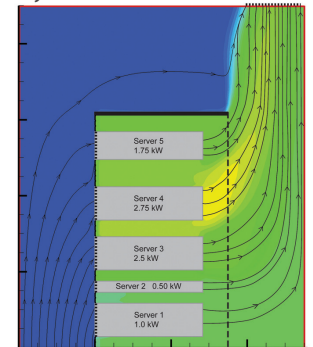
For complete study details, please see the back of this page.

Results from Two-Dimensional CFD Modeling Study

Before HotLok®



After HotLok®



HotLok Financial Impact Case Study

HotLok Blanking Panels Seal IT Equipment Cabinet Openings for Significant Energy Savings and Capacity Improvements

Profile of Chilled Water Liebert 600C Computer Room Air Handler (CRAH) Cooling Units in High-Heat Density Facility:

- 400 cabinets in a computer room with 10,000 ft² (approx 1,000 m²) of raised floor
- Each cabinet dissipates 8.5 kW of power, for a total critical load of 3.4 MW
- Heat density yield of 316 W/ft² (approx 3.400 W/m²)
- One third of cabinets (14U) contained no IT equipment and required blanking panels
- Of the one third requiring blanking panels, 40 percent (6U) are filled with 1U Panels and 60 percent (8U) are filled with 2U Panels
- The cost for Panels is the average selling price

Before the HotLok Blanking Panel installation: At 65°F (18.3°C) / 45% Rh, the 600C units have a 70 kW 100% sensible cooling capacity, therefore there is no latent cooling penalty in this calculation. For these return air conditions, a total of 61 CRAH units are required, 49 units at full cooling capacity and 12 for redundancy.

After the HotLok Blanking Panel installation: At 72°F (22.2°C) / 45% Rh, the 600C units have a 98 kW 100% sensible cooling capacity. For the 4.25 MW of total cooling capacity, a total of 43 CRAH units will be required, 35 units at full cooling capacity and 8 for redundancy.

PLEASE NOTE: There is no difference in the total cooling capacity as that takes place in the mechanical room and the chiller(s) will dissipate the same amount of heat no matter how many CRAH units are operating in the computer room. The chilled water flow rate will not be included for simplicity, although in actuality there may be additional savings associated with reduced chilled water flow rates.

Here's a summary of the operating cost savings available by installing HotLok Blanking Panels:

- (1) Increase return-air temperature set point by 7°F (3.9°C)—for this example, 65°F raised to 72°F (18.3°C raised to 22.2°C).
- (2) 18 units placed on inactive stand-by.

Annual Operating Cost Savings

18 units with 10 hp fans X 0.757 kW/hp	136 kW
Annual energy consumption savings (8760 hrs / yr)	1,191,360 kWhrs
Annual cost savings at \$0.07 (€0.12) per kWhr	\$83,395 (€142,963)
Maintenance cost savings on 18 units (\$3,000 or €3,000 per unit)	\$54,000 (€54,000)
Total annual operating cost savings	\$137,395 (€196,963)*

*This represents a 29 percent reduction in the annual operating and maintenance costs of the cooling units.

Simple Payback Analysis

Cost and Savings	
# of cabinets	400
open U (1/3 of 42Us)	5,594
# of 1U Panels	2,238
# of 2U Panels	1,678
Total cost of Panels	\$21,762 (€27,021)
Annual savings	\$137,395 (€196,963)
Monthly savings	\$11,450 (€16,414)

Simple Payback												
Month	1	2*	3	4	5	6	7	8	9	10	11	12
US \$	-10,312	1,137	12,587	24,036	35,486	46,936	58,385	69,835	81,284	92,734	104,183	115,633
EU €	-10.607	5.806	22.220	38.633	55.047	71.461	87.874	104.288	120.701	137.115	153.529	169.942

*ROI Achieved

With the total annual cost savings at \$137,395 or \$11,450 per month (€196,963 or €16,413 per month), simple payback occurs in the second month of the HotLok Blanking Panel installation.

Conclusion

The results of the Two-Dimensional Computational Fluid Dynamics Modeling Study and the Financial Impact Study underscore the importance of installing HotLok Blanking Panels, an industry-recognized best practice for airflow management. Sealing IT equipment server openings with HotLok Blanking Panels is among the simplest and most effective ways to reduce annual operating costs in the data center, improve PUE, and help you prepare for increasing server density, using your existing cooling infrastructure.

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