



Independent Study Shows the Importance of Using Blanking Panels

A complete seal is necessary to achieve full benefits

You've probably thought about your data center airflow problems in terms of below-, through-, and above-the-floor issues. But you may not have seriously considered the challenge of air recirculation within your server cabinets. Recirculation within a server cabinet occurs when the hot exhaust air from the rear of the server or from the hot aisle migrates toward the front of the cabinet and mixes with the cold, conditioned stream of air intended for the equipment air-intakes. This condition increases equipment intake-air temperatures, which can contribute to hotspots, the potential for reduced reliability of IT equipment, and the potential for wasted energy (which can lead to increased operating expenses).

Dr. Robert F. Sullivan, senior consultant at Uptime Institute, Inc., has measured the temperature and volume of air being drawn into equipment air-intakes in cabinets not furnished with blanking panels. Dr. Sullivan found that as much as 20 percent of the total volume of air was hot exhaust air recirculated within the server cabinet. Mixing hot equipment exhaust air and conditioned air from the underfloor plenum can create air-intake temperatures that exceed the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)-recommended 77° F maximum. This is especially true with cabinets that are more than 50 percent populated. Equipment located toward the top of the rack is affected more severely.

The best way to cope with this problem is to use blanking plates or filler panels. HotLok™ Blanking Panels are the most effective and easiest to install.

Upsite Technologies, Inc., the designer and manufacturer of HotLok Blanking Panels, recently commissioned Innovative Research, Inc., an independent, third-party organization, to study and compare internal airflow in and around IT equipment cabinets under three conditions: (1) in the absence of blanking panels; (2) using blanking panels with horizontal air gaps between adjacent panels that measured 1/16 inch and 1/8 inch between the panels and servers; and (3) using Upsite Technologies' HotLok Blanking Panels that do not permit air gaps between the blanking panels or between the blanking panels and servers. The study was conducted using two-dimensional, computational fluid dynamics (CFD) modeling. The findings are published in Upsite's white paper Two Dimensional Computational Fluid Dynamics Analysis of Blanking Panel Solutions.

Condition 2 (blanking panels with horizontal air gaps) reduced server air-intake temperatures by 11 to 22 percent over Condition 1 (using no blanking panels in the equipment cabinet). Condition 3 (HotLok Blanking Panels) proved to be 15 to 32 percent more effective in reducing server air-intake temperatures than Condition 1, and showed an improvement of up to 14 percent over Condition 2.

The study showed that HotLok Blanking Panels virtually eliminate internal recirculation between the equipment mounting rails, resulting in uniform inlet air temperatures from the bottom to the top of the cabinet.

The CFD model was confirmed using infrared (IR) thermal photography that shows high internal cabinet temperatures radiate through horizontal gaps between blanking panels without a complete seal. IR thermal photography of the HotLok Blanking Panels demonstrates the highly effective sealing technology.

There are significant benefits to using blanking plates, particularly HotLok Blanking Panels, including:

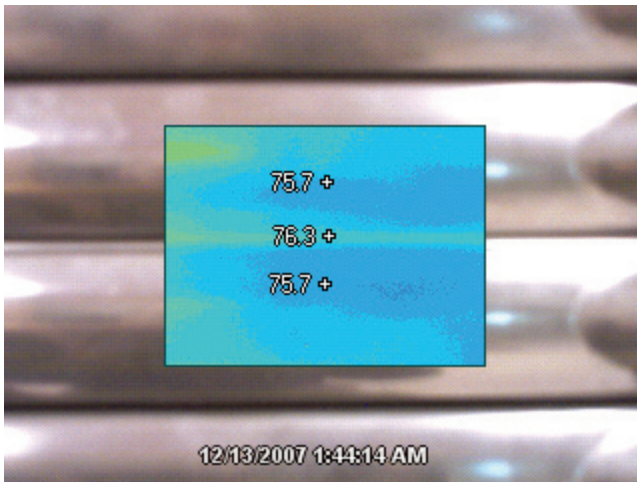
- Reduction and stabilization of equipment air-intake temperatures
- Elimination or reduction of the number and severity of hotspots within equipment cabinets
- Increased availability, performance, and reliability of IT equipment within the cabinets, especially in the top one-third of the equipment cabinet
- Elimination of exhaust air recirculation within the cabinet, which allows for the optimization of cooling and the reduction of energy consumption and operating expenses
- The possibility of deferring capital expenses to add additional cooling capacity or the ability to add more computing power to the data center
- The potential of greening the data center by reducing its carbon footprint



What differentiates HotLok Blanking Panels from others? HotLok Blanking Panels offer the following advantages:

- Engineered to provide one of the most effective seals available on the market
- Designed for quick, safe, tool-free installation
- Ergonomically and aesthetically pleasing
- Easy to use, compact to store and keep in stock for reconfiguring
- RoHS compliant and UL-certified
- Competitively priced

Image 1



In a data center with a conditioned airflow temperature of 72 °F, a series of Upsite Technologies' HotLok Blanking Panels are installed. The consistent temperatures shown on the face and gaps between the panels reveal the highly effective sealing technology.

Image 2



In a data center with a conditioned airflow temperature of 72 °F, and a series of non-HotLok Blanking Panels installed, the measured temperature of the heat radiating through the horizontal gaps is 91.5 °F, which is much higher than the ASHRAE-recommended 77 °F.