

Enclosure Openings, The Often Overlooked “Holes” in Data Centers

Improve Your Data Center's Cooling Infrastructure with Innovative Airflow Management Products from Upsite Technologies

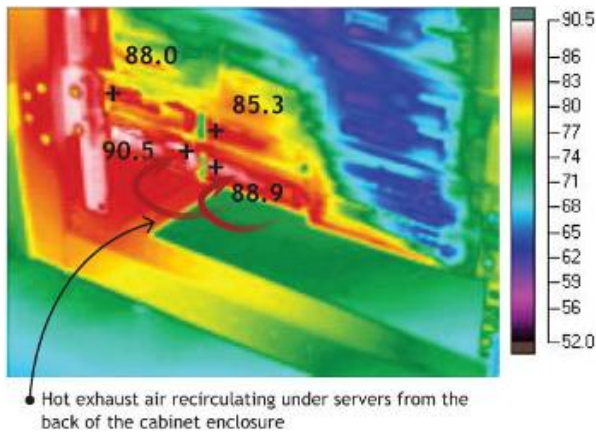
As a result of rising computer room densities, companies are pressured to reduce operating costs and increase cooling capacity. Given that cooling infrastructure often consumes approximately half of total data center power, improving airflow management (AFM) is the proverbial low hanging fruit in terms of cooling infrastructure improvement.

Initially, a lot of focus was placed on optimizing the raised-floor plenum to help deliver conditioned air to IT equipment. Today, it's common practice to seal openings in the raised floor, such as those resulting from cable cutouts.

Now, data center operators are turning their attention to aisle-level AFM strategies. Aisle containment, hot and cold, is becoming more common. However, with all the focus placed on these aisle-level solutions, significant unsealed openings at the rack level are often overlooked. Similar to the holes in the raised floor, sealing these “holes” in the rack are foundational to other AFM initiatives, including containment solutions. Two of these overlooked “holes” are inside the rack and one exists under the rack.

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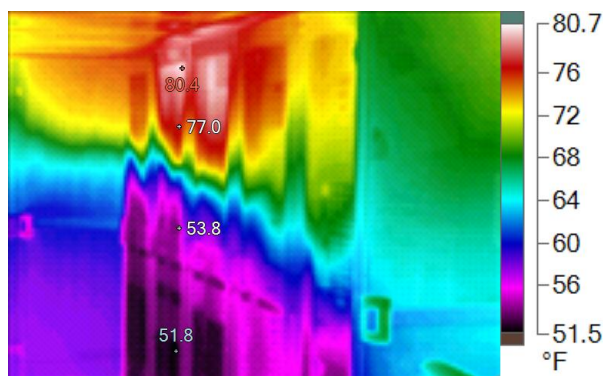
Even though it is a well-known best practice to install blanking panels in open spaces between IT equipment in racks, many data centers have yet to install them and most have not completed the job. Considering the distance between mounting rails in a rack is approximately 17.7” wide and a single U space is 1.75” high, this results in 31 sq. in. of open area per U space. Assuming a conservative average of 10 open U per rack, an average rack has 310 sq. in., or 2.1 sq. ft. of open space. For each 100 racks, there are 31,000 sq. in., or 215 sq. ft. of open space. This is equivalent to the open area of 215 standard 25% open area perforated tiles, or 107 50% open-area grates.



Open spaces at the bottom of the cabinet and between the mounting rails and side of the cabinet allow hot exhaust air to re-circulate to the front of the cabinet where it is ingested by IT equipment. Sealing these openings will help to ensure conditioned air is delivered properly to IT intakes.

The open space between server mounting rails and the sides, top and bottom of the enclosure is particularly important to seal. As these spaces are so close to IT equipment intakes, server exhaust air often circulates through these spaces and is ingested by IT equipment. A typical 42 U rack has an open area of 74” x 2” on each side of the rails. This equates to 148 sq. in. or approximately 1 sq. ft. per rack. This translates to 100 sq. ft. of open space per 100 racks.

Lastly, the space under a rack is also important to seal. A typical cabinet is approximately 2” above the raised floor. At 24” wide, the open area under each rack is 48 sq. in. This equates to 4,800 sq. in. or 33 sq. ft. per 100 racks.



Even in a fully contained cold aisle, low raised-floor static pressure and open spaces in cabinets cause variances in intake temperatures. Conditioned air that reaches the aisle is lost through the open spaces in the racks. Servers pull exhaust air from the back of the racks through open spaces at the top. Sealing cable openings and installing blanking panels help improve cooling unit efficiency.

Combined, these often-overlooked openings represent 348 sq. ft. of area per 100 racks. Any site that would put the equivalent of 348 perforated tiles per 100 racks would see a significant, adverse effect on AFM at both the cabinet and room level.

For this reason, Upsite has introduced three new solutions that seal these openings and help data center operators improve the efficiency of the cooling infrastructure and right-size data center cooling capacity.

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The new HotLok® Full Rack Blanking Panel (FRBP) Kit and Rack Airflow Management (RAM) Kit seal open spaces inside racks and enclosures. Upsite’s Under Rack Panel seals the space between the rack and floor. Depending on your circumstances, these innovative sealing solutions will prevent server exhaust re-circulation and prevent the loss of valuable conditioned air from the cold aisle.

The **HotLok FRBP Kit** is designed to fill large openings that exist in empty racks or between IT equipment in populated racks. 3U, 9U and 12U blanking sheets easily integrate with award-winning HotLok Blanking Panels to seal these gaps. Unlike other panels that can be flimsy and disposable, the HotLok FRBP can be re-configured and re-used, saving users money and time.

Also designed to combat re-circulating hot air and to help direct cold air across the face of racks to server intakes, Upsite’s new **RAM Kit** seals openings between server mounting rails and the side, top and bottom of server cabinets, forming a full “perimeter” seal. The RAM Kit will seal around brackets and allow cable passage as necessary. The flexible membrane contours to the cabinet producing an air seal between the equipment rail and side of cabinet.

Please visit upsite.com or click on the product links below to learn how Upsite’s innovative solutions can help improve the efficiency of cooling infrastructure.

[Full Rack Blanking Panel Kit - 36U](#)
[Full Rack Blanking Panel Kit - 42U](#)
[RAM Kit 90° Extrusion & Sealing Membrane](#)
[RAM Kit 45° Extrusion & Sealing Membrane](#)
[Under Rack Panel](#)

The **Under Rack Panel** is available in two lengths (27.5" and 31.5") and is customizable to seal a variety of gaps under the server rack. The tool-less application features a rigid PVC support frame, with a double-sided adhesive, provides a permanent and non-particulating attachment to the rack. The softer, flexible sealing material easily forms under the rack and can be customized as needed

The new HotLok FRBP, RAM Kit and Under Rack Panel complement Upsite’s KoldLok®, Hotlok and AisleLok™ product families designed to improve airflow management on the data center raised floor, in the rack and in the aisle. Upsite products are foundational to any airflow management strategy. With or without aisle containment, Upsite products help conditioned air reach its destination, improve cooling capacity and reduce operating expenses.