

Government Studies Suggest:

Legacy Data Centers Improve Energy Efficiency by Addressing Airflow Problems

A recent study by the U.S. Department of Energy on Energy Efficiency & Renewable Energy at the Lawrence Berkeley National Laboratory suggests that as data center energy densities increase, measured in power-use per square foot, energy savings for cooling can be realized by optimizing airflow pathways within the data center.

Airflow retrofits can increase data center energy efficiency by freeing up stranded airflow and cooling capacity and make it available for future needs. Many airflow deficiencies can be expected in legacy data centers that have gone through numerous modifications, rearrangements, and refreshes of server equipment. Air leaks, obstructions, perforated tile locations, cable penetrations, and missing blanking panels can cause poor air distribution that can be remedied with low-cost solutions. Generally fixing what's broke makes the most energy and economic sense in legacy data centers.

The most common airflow problems:

- ◇ Hot spots
- ◇ Leaks
- ◇ Mixing
- ◇ Recirculation
- ◇ Short circuiting
- ◇ Obstructions

Fundamental repairs to airflow problems:

- ◇ Remove or replace as many obstructions to airflow under-floor as possible
- ◇ Fix under-floor air leaks primarily at cable and pipe penetrations and under racks
- ◇ Install missing blanking panels and side panels in server racks
- ◇ Re-locate floor tiles to balance under floor airflow

A study conducted by Data Center Air Management Solutions (DCAMS) determined that Air-Guard cable grommets utilizing nylon brushes significantly reduced bypass airflow in all conditions by over 96% compared to a typical "open hole". The addition of the Air-Guard cable seal grommets resulted in a reduced overall temperature of an operating data center by 8 degrees Celsius (nearly 15 degrees Fahrenheit).

As the U.S. Department of Energy points out, first address the low-cost solutions to airflow management, before undertaking more costly customized solutions with extensive construction costs. And the simplest solutions involve installing missing blanking panels and side panels in server racks. Fixing leaks in the raised floor, primarily at cable and pipe penetrations with cable seal grommets like Air-Guard Cable Seals and installing or relocating floor tiles to balance airflow.

"Unintended openings, such as cable cutouts in the raised floors of data centers, can cause leakage of the supply air from the pressurized supply plenum. Such bypass of the supply air away from the perforated tiles effectively reduces the amount of supply air and available capacity. It further encourages the undesirable airflow patterns in data center rooms, such as wrap around and recirculation between the hot and cold aisles. This can result in higher inlet air temperatures to servers and reduced energy efficiency of a data center."

Cable cutouts in data centers can lead to loss in cooling capacity NewsLink (Fall 2008)

With the Air-Guard Surface Mount, limiting air bypass and improving airflow management is easy.

Air-Guard® Surface Mount

A quick fix to cover existing cable cutouts, the Air-Guard Surface Mount is designed to retro-fit around existing cables without the need to disconnect cables.



For a copy of the DCAMS study—www.pducables.com
For a copy of the U.S. Dept. of Energy study—www.hightech.lbl.gov/documents/data_centers/airflow-doe-femp.pdf

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