KoldLok® Family

Raised Floor Grommet

designed and manufactured by upsite technologies

KoldLok Grommets are designed to virtually eliminate bypass airflow, increase capacity, enable higher density, and dramatically lower energy consumption..

KoldLok® Wave®

Dimensions and Tile Cutting Requirements	
KoldLok® Wave® (PN # 20100)	Millimeters (W x D)
Overall size (diameter x height)	279 x 229 x 48 mm
Product height above floor	10 mm
Usable cable area	197 x 149 mm
Minimum cut required to install Grommet in interior of the tile	235 x 172 mm

KoldLok® Round 4"

Dimensions and Tile Cutting Requirements	
KoldLok 4" Round (PN # 40001)	Millimeters (W x D)
Overall size (diameter x height)	143 mm x 48 mm
Product height above floor	10 mm
Maximum cutout size sealed	105 mm
Usable cable area	6,194 sq. mm
Hole cut diameter	102 mm

KoldLok® Round 6"
PN # 40003

Dimensions and Tile Cutting Requirements	
KoldLok 6" Round (PN # 40003)	Millimeters (W x D)
Overall size (diameter x height)	192 mm x 48 mm
Product height above floor	10 mm
Maximum cutout size sealed	156 mm
Usable cable area	14,548 sq. mm
Hole cut diameter	152 mm

KoldLok® Integral

Dimensions and Tile Cutting Requirements	
KoldLok Integral (PN # 1010)	Millimeters (W x D)
Overall size (diameter x height)	279 x 210 x 41 mm
Product height above floor	3 mm
Cut required to install Grommet in interior of the tile	235 x 172 mm
Cut required to install long side of the Grommet on the tile edge	235 x 191 mm

KoldLok® Split Integral

Dimensions and Tile Cutting Requirements	
KoldLok Split Integral (PN # 3030)	Millimeters (W x D)
Overall size (diameter x height)	279 x 210 x 41 mm
Product height above floor	3 mm
Cut required to install Grommet in interior of the tile	235 x 172 mm
Cut required to install long side of the Grommet on the tile edge	235 x 191 mm

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KoldLok® Mini

Dimensions and Tile Cutting Requirements	
KoldLok® Mini (PN # 10077)	Millimeters (W x D)
Overall size (diameter x height)	195 x 144 x 38 mm
Product height above floor	2,54 mm
Usable cable area	127 x 64 mm
Minimum cut required to install Grommet in interior of the tile	152 x 102 mm

KoldLok® Surface

Dimensions and Tile Cutting Requirements	
KoldLok Surface (PN # 2020)	Millimeters (W x D)
Overall size (diameter x height)	279 x 210 x 29 mm
Product height above floor	32 mm
Maximum cutout size sealed	254 x 184 mm
Usable cable area	6.194 mm²

KoldLok® Surface Large

Dimensions and Tile Cutting Requirements	
KoldLok Surface Large (PN # 2030)	Millimeters (W x D)
Overall size (diameter x height)	305 x 298 x 33 mm
Product height above floor	37 mm
Maximum cutout size sealed	254 x 248 mm
Usable cable area	210 x 102 mm²

KoldLok® Surface Extra Large

Dimensions and Tile Cutting Requirements	
KoldLok Surface Extra Large (PN # 2040)	Millimeters (W x D)
Overall size (diameter x height)	305 x 381 x 33 mm
Product height above floor	37 mm
Maximum cutout size sealed	254 x 330 mm
Usable cable area	210 x 102 mm²

KoldLok® Extended 3"

Dimensions and Tile Cutting Requirements	
KoldLok Extended 3" (PN # 10012)	Millimeters (W x D)
Overall size (diameter x height)	610 x 128 mm
Maximum cutout size sealed	610 x 102 mm
Usable cable area	559 x 64 mm
Product height above floor	25 mm with mounting kit installed

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KoldLok® Family

Raised Floor Grommet

KoldLok® Extended 6"
PN # 10013

Dimensions and Tile Cutting Requirements	
KoldLok Extended 6" (PN # 10013)	Millimeters (W x D)
Overall size (diameter x height)	610 x 205 mm
Maximum cutout size sealed	610 x 178 mm
Usable cable area	559 x 140 mm
Product height above floor	25 mm with mounting kit installed

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Raised Floor Grommet

KoldLok® Grommets Are the Superior Sealing Solution for Existing Facilities and New Construction of Any Size

Studies have shown that 60 percent of the available cooling airflow volume in a typical data center flows through unsealed openings, rather than through perforated floor tiles. This wasted air, called bypass airflow, results in damaging hotspots, increased operating costs, and reduced cooling capacity.

KoldLok® grommets provide a virtually perfect seal for cable cutouts and other openings in the raised floor to instantly reduce bypass airflow and increase the underfloor static pressure. Previously lost airflow is recaptured and forced to flow to the perforated floor tiles located at the computer cabinet intakes, delivering increased conditioned airflow where it is most needed.

Installing KoldLok® grommets instead of competing products offers a financial payback in just a few short months by decreasing cooling costs and increasing efficiency. With KoldLok®, you're not just plugging holes, you're controlling the high costs of cooling, reducing the carbon footprint of your facility and enabling installation of higher density IT equipment.

Actual Temperatures in the UNM Data Center

Before KoldLok®

Two studies demonstrate the energy saving capabilities of KoldLok® Grommets in Existing Facilities and New Construction

University of New Mexico Uses KoldLok Grommets to Reduce Cooling Costs and Increase Cooling Capacity Before Adding More Servers

The data center at UNM's Albuquerque campus supports over 6,000 employees, 25,000 students, a hospital, and a complete medical campus. As demands were growing for this 900ft2 facility, UNM approved the purchase of 60 new servers. However, its data center was already showing signs of stress.
"Heating and cooling contractors were telling us that we had adequate cooling power, but 60 percent of the air was going to the wrong places," said Kelly Lesher, Manager of the Enterprise Command Center at UNM. "In some cases we had equipment with air intakes of more than 90° F." The data center staff attempted to improve cooling efficiency by plugging floor holes with foam, keeping doors closed, and adding up to 10 fans on the floor. When these steps failed, UNM chose to invest in Upsite professional services to seal cable openings and tune the cooling systems. Immediately after installation of 50 KoldLok® Grommets to seal tile cutouts, the data center showed significant gains in cooling efficiency.

After KoldLok®

Before, 29 percent of racks had intake temperatures over UNM's desired maximum of 74° F. After KoldLok®, all racks measured within ASHRAE recommended ranges.

The average static pressure of the raised-floor plenum nearly tripled. In addition, the airflow from perforated tiles increased by an average of 175 percent.

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Raised Floor Grommet

Financial Impact Study of Installing KoldLok® Grommets in a Newly Built Data Center

This analysis examined a newly built data center with KoldLok® Integral Grommets installed during construction.

Without sealing the cable cutouts, it is calculated that 30 percent of available cold air would have bypassed the perforated floor tiles through cable cutouts.

It is calculated that 16 cooling units would be required to meet airflow demand for the 10,000ft2 facility, and return air would have an average temperature of 70°F.

The superior sealing provided by KoldLok® results in a significant decrease in bypass airflow and only 13 cooling units are required to meet airflow demand for the new facility.

A full Return on Investment was achieved on the KoldLok® Grommets in less than three months, and five year total savings were $311,480.

The total savings from the installation of KoldLok® in this new facility include capital cost savings from installing 3 fewer cooling units, electrical energy savings from running fewer units, energy savings from increased cooling efficiency, and savings on latent cooling penalty and maintenance.

For complete study details, see the next page.

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Financial Impact Study of Installing KoldLok® Grommets in a Newly Built Data Center

This analysis examines a newly built data center with KoldLok® Integral Raised Floor Grommets installed during construction. This analysis calculates the reduced number of cooling units required based on sealing unmanaged openings that waste cooled air. Using the calculations, data centers can easily determine the financial impact to their business. This same calculation can also be used in data centers that operate with chilled water systems. By sealing cable cutouts, data centers can reduce the number of cooling units in operation. This number can be determined using simple calculations involving bypass airflow and thermal cooling demand. Previously lost bypass air is recovered and forced to flow to the perforated floor tiles that should be located at the computer cabinet air intakes, thus delivering increased airflow where it is needed most.

Field measurement of airflow in numerous data centers has determined that 50 to 80 percent of the CFM discharged from cooling units into the underfloor plenum escapes through unsealed openings. Lost air through cable openings can be verified by simple measurements of actual perforated tile and grate openings (ft^2) compared to measurements of cable cutouts and perimeter penetrations (ft^2). Air lost through floor, sidewall, or ceiling penetrations can also be verified by simple cross-sectional area measurements. Operating assumptions are outlined below:

- ✓ Data center consists of 10,000 ft^2 of raised-floor space with an underfloor cooling plenum of 18" or higher for distributing cooled air.
- ✓ Data center has 400 equipment cabinets averaging 2' X 3' X 6'.
- ✓ Data center consumes 600 kilowatts (kW) of power for an average of 1.5 kW per rack and 60W/ft2.
- ✓ Electrical energy, including demand charges, costs $0.06 per kilowatt hour (kWh).
- ✓ Liebert Model VH267W 20-ton cooling units are used to cool the data center. Each cooling unit uses a 5 horsepower (Hp) fan to deliver 10,000 cubic feet per minute (CFM) of airflow and consumes 3.73 kW for airflow demand and 16.7 kW for thermal demand (liebert.com).
- ✓ KoldLok Integral Raised Floor Grommets are installed to seal all 400 cable cutouts as the floor tiles are installed.
- ✓ Alternating hot-aisle and cold-aisle equipment configurations are implemented.
- ✓ Twenty-five percent open perforated floor tiles are installed one per every two racks at the rack air intake for a total of 200 perforated floor tiles.
- ✓ All perimeter penetrations in the subfloor, walls, and ceiling are sealed.
- ✓ The supply temperature is 57°F, exhaust temperature is 74°F, and the temperature increase of the air as it passes through the computer equipment is an average of 17°F.

Without sealing the cable cutouts, 30 percent of available cold air bypasses the perforated floor tiles through cable cutouts averaging 5" x 6" in size (use of larger openings increases bypass air and its negative environmental effects). Thirty percent bypass air results in a return air temperature of 70°F/48 percent relative humidity (Rh). At this condition, each cooling unit provides 219,700 British Thermal Units per hour (BTU/h) of total cooling, of which 93 percent or 203,400 BTU/h (59.7 kW) is sensible cooling. This yields 16,300 BTU/h (4.8 kW) of latent cooling (capacity data provided by Liebert).

By sealing the cable cutouts, only 10 percent of available cold air bypasses the perforated floor tile openings resulting in a return air temperature increase to 72°F/45 percent Rh. For this return air condition, each cooling unit provides 229,900 BTU/h of total cooling, of which 100 percent or 229,900 BTU/h (67.0 kW) is sensible thermal cooling (capacity data provided by Liebert). There is no latent cooling.

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I.C.U.S.

PC & PERIPHERALS
CLEANING & SANITIZING

CERTIFIED PROVIDER KoldProfile upsite technologies

DATACENTER
AUDIT - ACCESSORIES
CLEANING & SANITIZING

Savings Summary

- ✓ Capital cost savings from installing three fewer cooling units ($90,000)
- ✓ Electrical energy savings due to running three fewer cooling units for airflow ($5,880 annually)
- ✓ Electrical energy savings due to running of 1.2 fewer cooling units for thermal demand ($10,534 annually)
- ✓ Electrical energy savings due to avoiding the latent cooling penalty on 10.1 cooling units ($25,482 annually)
- ✓ Maintenance savings due to running three fewer cooling units ($9,000 annually)

KoldLok® Raised Floor Grommets can provide a full ROI in as little as 3 months by reducing operating expenses and significantly improving the efficiency of your data center.

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