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PLENAFORM® SYSTEMS

KEEPING DATA CENTERS SIMPLY COOL™



ADAPTABLE

EFFICIENT

FLEXIBLE

SCALABLE

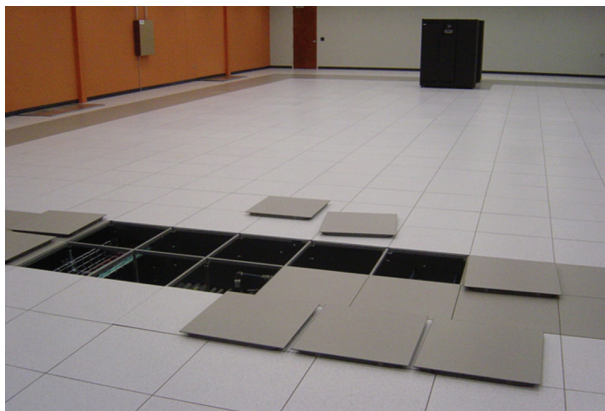
SUSTAINABLE

VERSATILE



PLENAFORM® SYSTEMS

Material Specifications for **PLENAFORM®** Baffles, 19" & 23" **PLENAFILL®** Blanking Panels



FLEXIBLE: The racetrack shaped holes allow for the baffles to securely attach to raised floor pedestals for any degree of attachment angle. Panels may easily be cut with scissors for the passage of conduit, cable trays, etc. Cutout sections may also be patched with sections of additional baffles if the cutout is no longer required. Each baffle is 24"h x 48"w.

SCALABLE: Any infinite height or width can be achieved by adding or removing sections in 1" horizontal and 1-1/2" vertical sections. PlenaForm baffles attach to pedestals with 11.42" releasable 50 lb. test cable ties. Baffles affix to one another with PF-RR 2 piece screw rivets. Cable ties and rivets are included with every order.



EFFICIENT: PlenaFill scalable blanking panels quickly fill any size unoccupied rack space, lowering equipment operating temperatures. PlenaFill 27U panels for 19" racks are perforated in 1U increments. They are thin enough to fit behind face plates and can be easily cut if necessary.

VERSATILE: PlenaFill 19" & 23" blanking panels can be installed together in network equipment racks that have 23" to 19" reducing brackets.

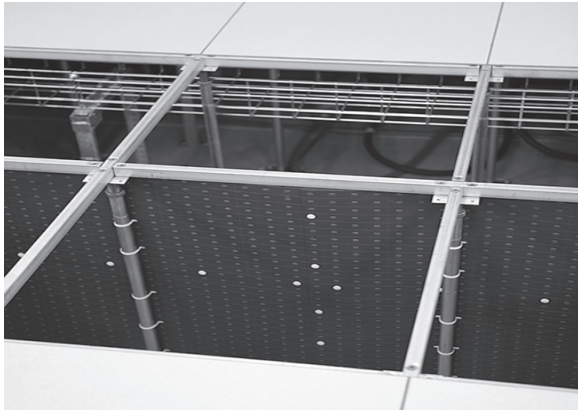
See pages 3 & 4 for product dimensions or at our website:

www.plenaform.com for additional information.

PlenaForm raised floor partition system and PlenaFill blanking panels are die cut Formex GK-40BK which is a flame retardant polypropylene compound.

| Physical Properties: | Test Method | Formex GK-40 | Electrical Properties: | Test Method | Formex GK-40 |
|--|-------------|----------------|--|-------------|-------------------------|
| Density - gm/cc | ASTM D-792 | 1.035 | Non-Conductive | | |
| Flammability | UL94 | V-0 | Dielectric Breakdown - Volts | ASTM D-149 | 37,800 |
| Oxygen Index | ASTM D-2863 | 29 | Dielectric Strength - volts/mil | ASTM D-149 | 945 |
| Water Absorption | ASTM D-570 | 0.06% | Volume Resistivity - ohm-cm | ASTM D-257 | 3.97 x 10 ¹⁵ |
| Heat Deflection Temperature at 66 psi | ASTM D-648 | 121° C/ 250° F | Dielectric Constant | ASTM D-150 | 2.3 |
| Relative Thermal Index | UL746B | | Dissipation Factor | ASTM D-150 | 0.0019 |
| Electrical | | 115° C/ 239° F | High Current Arc Ignition-arcs to ignite | UL746A | 200+ |
| Mechanical Without Impact | | 115° C/ 239° F | High Voltage Arc Tracking-in/min | UL746A | 0.0 |
| Surface Energy -dynes/cm (as produced) | ASTM D-2578 | ≥ 50 | Hot Wire Ignition - seconds | UL746A | 12 |
| | | | Comparative Tracking Index - volts | ASTM D-3638 | 600+ |

PLENAFORM® Raised Floor Partition System



PF-2448 PlenaForm baffle (single baffle)
Baffle weight: approx. 1.75 lbs. each (.79Kg)
includes 6 releasable cable ties and 4 screw rivets

PF-2448-12 PlenaForm baffle kit (twelve baffles)
Pack of twelve 25 lbs (11.12Kg)
includes 72 releasable cable ties and 48 screw rivets

Baffle Dimensions: 24" x 48" x .040 (60.96 x 121.92 cm)

Inches x 2.54 = cm cm x .03937 = Inches

For product estimator go to: www.plenaform.com

- Cuts easily for passage of cable ties, conduit, cable trays
- Fits any raised floor pedestal style or raised floor height
- Non-conductive, Non-Hygroscopic, Inert
- RoHS and WEEE Compliant

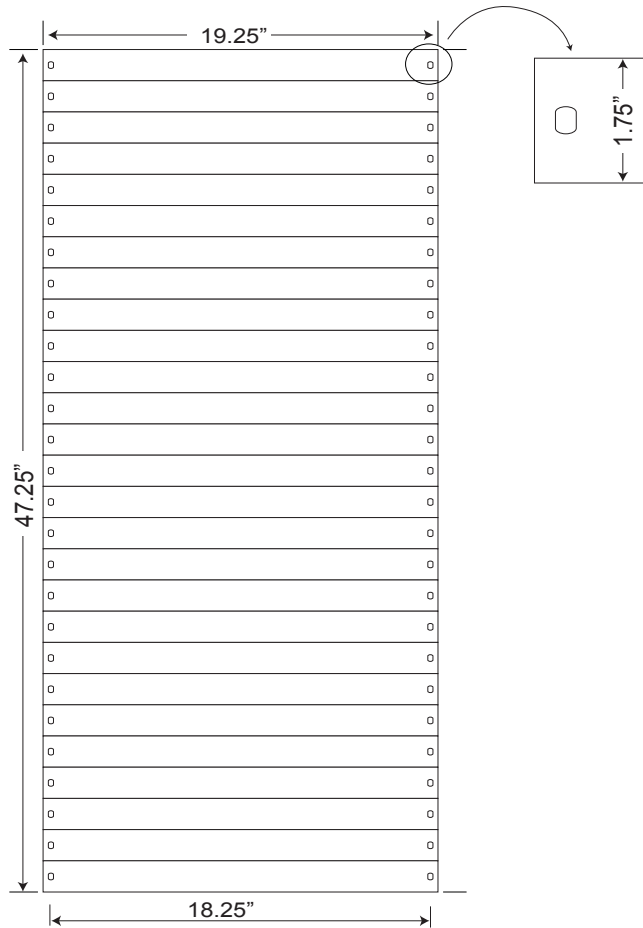


ADAPTABLE: Creating dedicated cold aisles and partitioning off unoccupied raised floor areas with PlenaForm baffles increases static pressure, delivering a higher volume of cooling through perforated tiles. The Venturi effect is attained as air flow distribution is directed from the CRAC units to further distances, improving equipment cooling.

PlenaForm baffles are scored both vertically and horizontally so that sections can be removed, or new sections added, to meet any height or width requirement. All angles of bend radius may be accommodated, and the continuous pop-out hole pattern allows attachment to any raised floor pedestal type or height.

SUSTAINABLE: Velocity is the time rate of motion, therefore velocity pressure is the pressure caused by air in motion. When air from a CRAC unit is forced through a partitioned air flow space, static pressure is created. Without dedicated partitioning, as the air moves further away from a CRAC unit, the air velocity decreases. To maintain velocity pressure to particular 'hot zones', PlenaForm baffles help maintain the static pressure further away from a CRAC unit.

PLENAFill® 27U Scalable Blanking Panels for 19" EIA 310D Compliant Equipment Racks



- Perforated in 1U increments for easy sizing
- Stops server exhaust air recirculation
- No cage nuts or assembly required
- No air gaps between U's
- Thin enough to fit behind face plates
- Particulate Free
- Non-conductive, Non-Hygroscopic, Inert

PF - 27U - 10 (pack of ten 27U black panels = 270 rack units)
PF - 27U - W10 (pack of ten 27U white panels = 270 rack units)

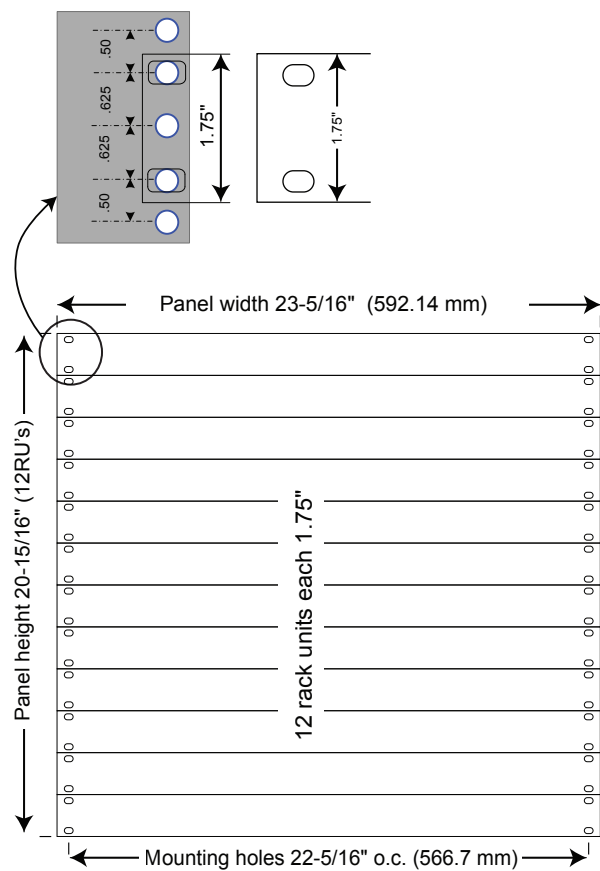
For 19" EIA Mounting Rails (482 mm)

Panel Dimensions: 47.25"h x 19.25"w x .040 (120.015 x 48.895 x 1016 cm)

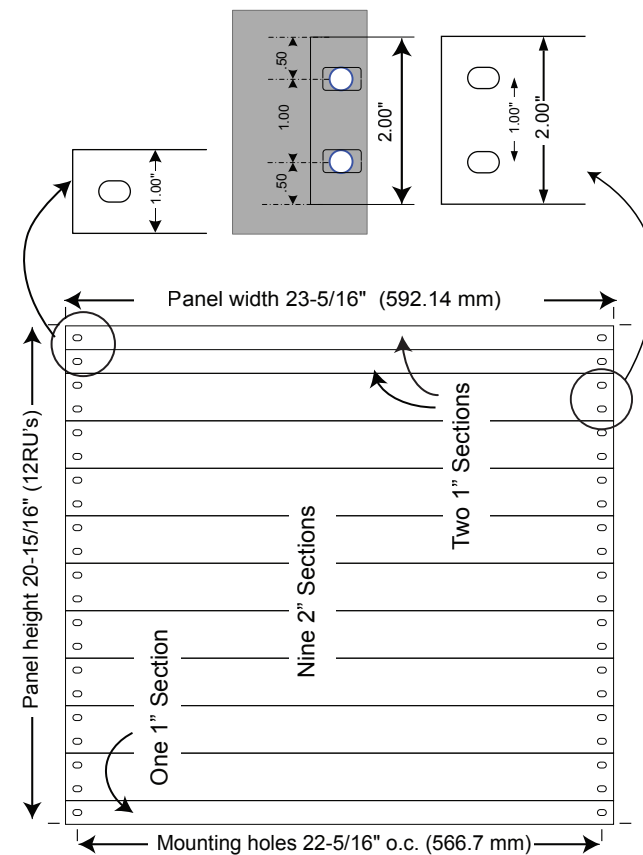


PLENAFill® 23" Wide Scalable Blanking Panels

One of the most cost effective means to manage air flow in a data center is to install blanking panels in server and network equipment racks.

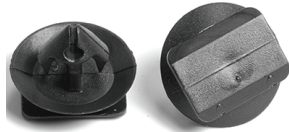
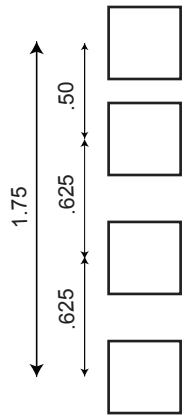


Part No. PF - 12U - 23
For 23" EIA Mounting Rails (584 mm)



Part No. PF - 1 - 23
For 1" On-Center Mounting Rails (584 mm)

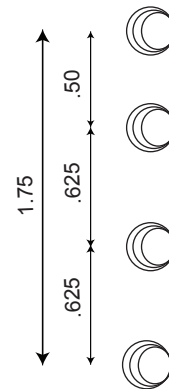
Order attachment rivets & screws according to EIA rail type



Black square hole snap rivet

PF - BR pack of 50
PF - BR100 pack of 100

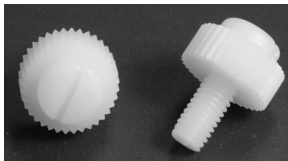
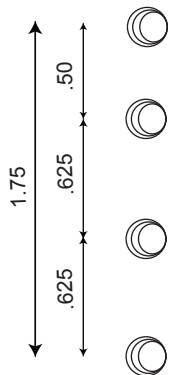
note: this part is Dupont Zytel nylon resin



Black 12/24 push pin rivet
(for 12/24 threaded EIA mounting rails)

PF - PR24 pack of 50
PF - PR24100 pack of 100

note: this part is UL V0



Natural 10/32 threaded thumb screw
(for 10/32 threaded EIA mounting rails)

PF - TR pack of 50
PF - TR100 pack of 100

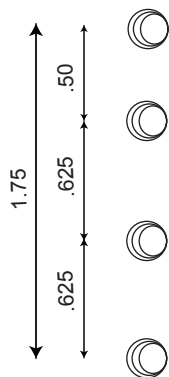
note: this part is natural 6/6 nylon



Black 10/32 threaded thumb screw
(for 10/32 threaded EIA mounting rails)

PF - TRB pack of 50
PF - TRB100 pack of 100

note: this part is natural 6/6 nylon



Black 10/32 push pin rivet
(for 10/32 threaded EIA mounting rails)

PF - PR32 pack of 50
PF - PR32100 pack of 100

note: this part is UL V0



PF-TOOL - Rivet remover for BR rivets



PF-PUNCH - 19" PlenaFill chad remover



PF-23 PUNCH - 23" PlenaFill chad remover



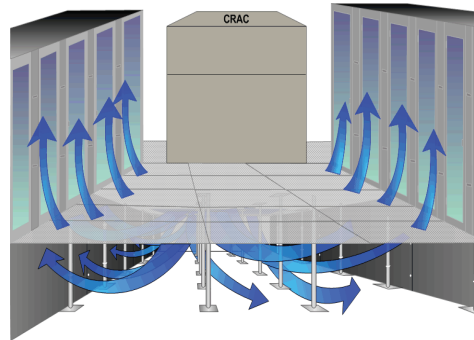
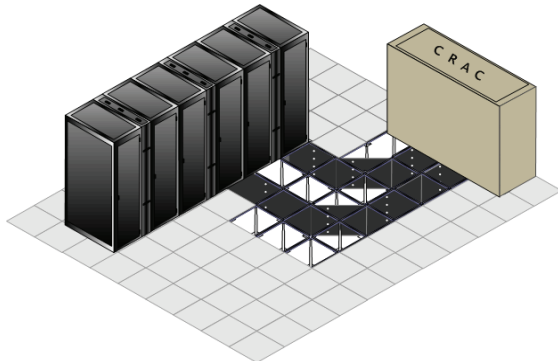
PF-111-4 - Rivet remover for RR rivets

The key to controlling the airflow distribution is the ability to influence the pressure distribution in a raised floor plenum space. For specified (horizontal) floor dimensions and total air flow rate, the pressure distribution is governed by the following parameters:

- Plenum height
- Open area of perforated tiles
- Distribution of open area on the raised floor
- Relative positions of CRAC units and perforated tiles
- Presence of under-floor blockages

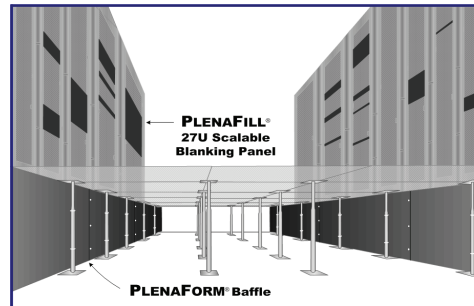
Under floor blockages influence the flow field in the plenum by introducing additional resistance and by reducing the area and volume available for airflow. The pressure non-uniformities caused by the presence of a thick blockage are difficult to control. Further, because of the associated reduction in the plenum air space, there is a limit on the number and sizes of thick blockages that can be introduced in the plenum. Because of these considerations, installation of thick blockages in the plenum is not a practical option for modifying the air flow distribution.

PlenaForm partition system can offer several advantages. The flow resistance of a thin partition can be controlled precisely by varying its open area. Unlike thick blockages, the installation of thin partitions has negligible effect on the space available for airflow. PlenaForm partitions are especially well suited for existing data centers, where very limited options are available for controlling the airflow distribution. PlenaForm partitions can also be used as “flow guides”, that is, they can be used to create cool or hot spot channels within the plenum to direct the flow to specified regions.



Raised floor data centers use the under-floor plenum to supply cooling air to equipment. The CRAC units push cold air into the plenum, from where it is introduced into the computer room via perforated floor tiles, tile cutouts, and floor grilles.

The distribution of airflow through perforated tiles is governed by the size of the plenum, the arrangement of perforated tiles, location and flow rates of CRAC units, and under-floor blockages such as cables, power feeds and cable trays. The complex flow in the plenum sets up a pressure distribution, which controls the flow through the perforated tiles. Installing PlenaForm baffles, which are a thin partition, is an effective means for controlling air flow distribution in raised floor data centers.



PLENAFORM SYSTEMS "Keeping Data Centers Simply Cool"™

Always use blanking panels to fill empty rack space to help maintain proper airflow and minimize equipment overheating. Installing PlenaFill server rack blanking panels is a simple solution that can be implemented in any data center at a very low cost. Power consumption is increasingly important to IT managers because they want to use their budgets most effectively, and electricity is a large portion of the overall budget.

PlenaForm partitions and PlenaFill blanking panels are highly effective tools which data center facility managers can deploy to help keep air flow in control.

Improve energy efficiency with these basic guidelines:

- Use of hot-aisle / cold-aisle cabinet row methodology and greater use of blanking panels.
- Use of smaller floor tile cuts for cables and use of brushes and other systems to prevent loss of air pressure through tile cuts.
- Route cable trays and power feeds overhead rather than under access floors.
- Use cabinets that enhance proper airflow, include doors with 50% or more open space.
- Adopt good cable management habits to avoid blocking airflow from equipment.
- Ease temperature and humidity requirements for computer rooms.
- Isolate hot and cold air streams for more efficient chiller operation.
- Improve airflow distribution by having CRAC units discharge in the same direction, if not their air streams may collide.
- Orient hot aisles perpendicular to CRAC units to maximize hot air return intake.