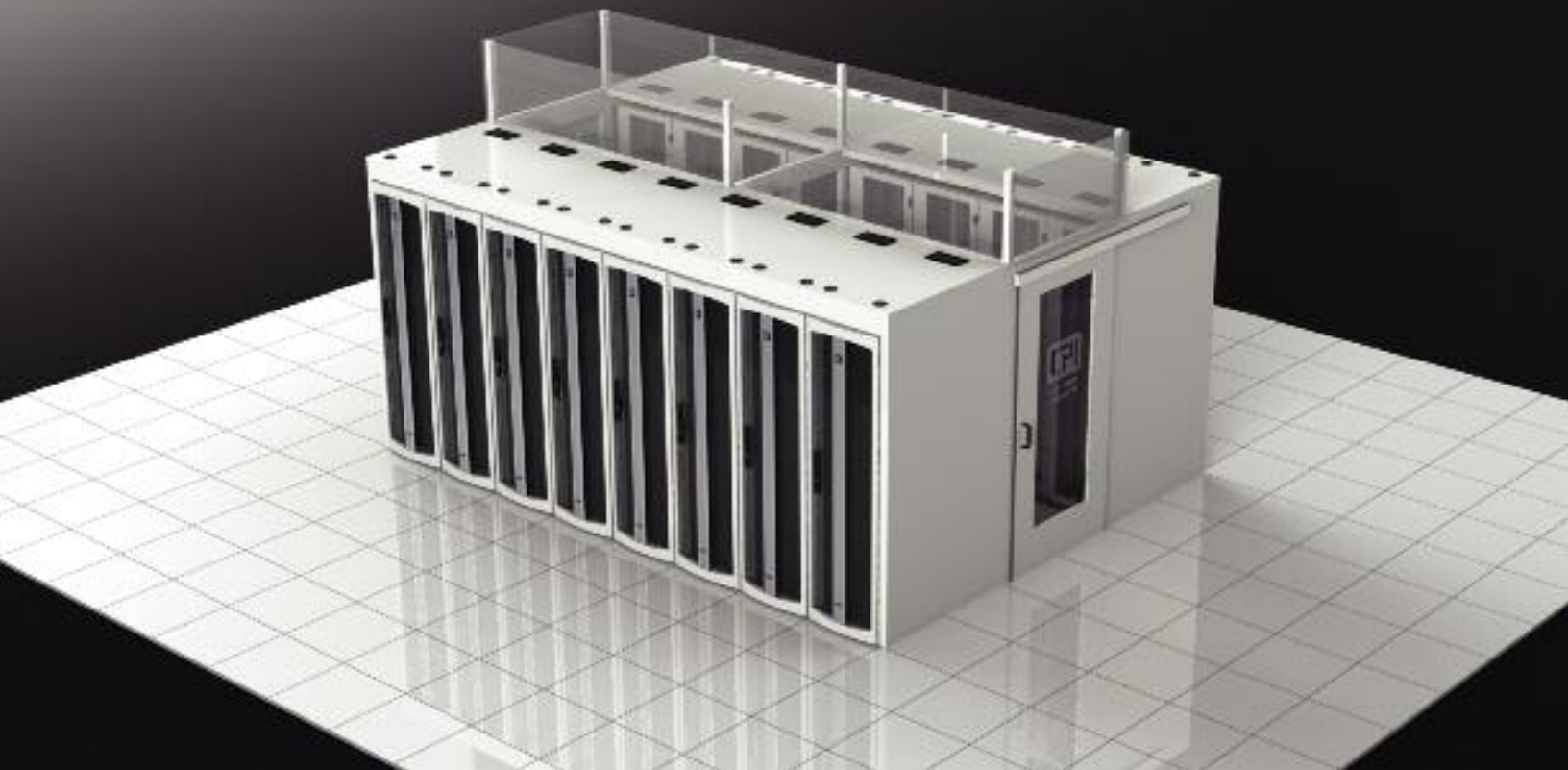


 Signature Solutions ...

Data Center Solutions



CHATSWORTH
PRODUCTS, INC.

Optimize.
Store.
Secure.

CPI Data Center Solutions

As the trend toward virtualization and cloud storage continues to advance, so does the IT infrastructure needed to support it. Dense blade servers and network switches are pushing the thermal envelope further and further, leaving IT and facility managers struggling to keep up with skyrocketing energy costs. In fact, electrical consumption for data centers has more than doubled over the last six years. To reduce this budgetary strain and still maintain a facility that optimizes equipment, operations and business, you need a holistic approach. At Chatsworth Products, Inc. (CPI), we get you there with flexible cabinet solutions, power monitoring, cable management and air containment strategies that can reduce energy consumption by up to 90 percent. This unique combination of exceptional quality, solutions and services will help you achieve all of your data center objectives.



Whether you need it fast or tailored to your needs, we have solutions for your IT infrastructure equipment.

Utilize Your Space

Our solutions allow your data center to grow one cabinet at a time or all at once. To fully utilize each square foot of space, you need to design around specific architectural concerns like access floor height, ceiling height and layout challenges, as well as various requirements for airflow, power and network connections. Our IT infrastructure products are designed with these challenges in mind, ensuring that the final layout of your data center will fit together just as you envisioned.

Quick Return on Investment

Utilizing airflow management strategies to isolate hot and cold air, CPI Passive Cooling® Solutions provide the most cost effective and efficient thermal solutions on the market. Your investment in CPI technology provides both a near-term pay back and long-term capacity to grow.

Optimize Cooling

CPI Passive Cooling® Solutions are your Simply Efficient™ choice to optimize cooling in the data center. This innovative thermal management technique allows you to isolate hot air and cold air at the cabling level, cabinet level and aisle level to meet the needs of any data center layout.

Monitor and Control Power Usage

High-density computing means complex power distribution, monitoring and reporting. CPI offers a wide range of power products that help reduce the complexity of delivering power to equipment, including 3-phase PDUs equipped with power monitoring that stretches across the enterprise. Also accessible through an IP connection, your IT team can monitor anything from anywhere—all the way down to the device level.

Connect Equipment

A simple way to organize and manage equipment connections starts with clearly defined pathways for network cables. CPI has the solutions to manage cables from connection-to-connection with rack-mounted vertical and horizontal cable managers, as well as overhead or under floor cable trays and runway.

Protect Equipment

Electronic locking systems give the added protection of cabinet-level access control. CPI's Electronic Locking System is IP addressable, easy to configure and provides an electronic record of who enters each cabinet. Also protect equipment by grounding and bonding racks, cabinets and metal pathways, which can help protect against ESD damage and is essential for a properly designed and installed infrastructure.

Monitor the Environment

Remote environmental monitoring is the key to identifying issues before they become a problem. CPI gives you the flexibility to remotely monitor, record and analyze environmental security and safety conditions.

“ The key benefit that we were looking for was a **‘fast to deploy,’ flexible solution** that allowed us to accommodate equipment from almost any manufacturer, available at a price close to standard rack technology. ”


Adriaan Oosthoek,
Managing Director,
UK and Ireland for
TelecityGroup

CPI Passive Cooling[®], The Simply Efficient[™] Choice

The innovative, airflow management techniques utilized by CPI Passive Cooling[®] Solutions allow you to maximize cooling efficiencies without the use of additional CRAC/H units, in-row air conditioners or risky liquid cooling solutions. From small applications with heat loads of 2 kW per cabinet to enterprise data center applications with heat densities beyond 35 kW, CPI Passive Cooling Solutions are proven to provide advanced thermal management with zero points of failure. This trusted and Simply Efficient[™] choice allows facility managers to deploy the latest servers, switches and blade servers with the confidence that they can still reduce cooling costs and meet tiered requirements.

CPI Passive Cooling Solutions allow you to:

- Deploy the latest servers, switches and blade servers from leading manufacturers like HP, IBM, Dell, Cisco, Juniper Networks and Brocade
- More effectively leverage heat exchange and economizer technologies to realize a potential 90% reduction in cooling and energy costs
- Support 4x higher heat and power densities
- Design for future growth and increase cooling equipment efficiency without pre-installation of unneeded power and cooling equipment
- Lower construction costs relative to active cooling solutions
- Have higher Delta T's (ΔT 's) between the data center cooling air and exhaust air to improve the efficiency of CRAC units
- Minimize environmental impact and support green initiatives
- Support day-to-day functionality with the best operational interface



**We understand
your need for IT
infrastructure
solutions that
optimize
equipment,
operations and
business.**

Isolation Solutions on Every Level

As an early trailblazer in lowering energy costs through the development of proven concepts such as Passive Cooling, CPI has earned a solid reputation for reducing energy costs with air containment products and strategies that focus on the cable, cabinet and aisle levels of infrastructure deployment. As the innovators of Passive Cooling as a data center cooling concept, we proved early on that it could be a cost effective and efficient thermal solution at every level of infrastructure deployment. The key principle in effectively maximizing your cooling efficiencies in high-density data centers is to achieve isolation between the chilled supply air and the heated return air. By segregating hot air and cold air you achieve higher operating efficiencies, lower energy costs and an environment with minimal complexity.

Isolation Benefits

- Improves CRAC unit efficiency because of the higher supply-to-return temperature differences (Delta T's)
- Increases CRAH cooling capacity two to three times, allowing higher equipment densities and energy cost savings
- Reduces the number of CRAH units needed which saves on capital expenses
- Equalizes room temperature, creating a consistent environment
- Supplies equipment intake temperatures that are the same from top to bottom across the cabinet
- Allows increased room temperature and higher set-points on cooling equipment and chilled water temperatures for more free cooling hours using low-cost economizers

Challenges in space, facility limitations and budget can impact your data center design and operation. CPI offers ways to isolate hot and cold air and make the most of your data center cooling with three levels of solutions.

1. Cabling Level

Cabling is a vital part of the data center, but it can leave openings in the floor and cabinet that allow hot and cold air to mix. To improve thermal performance, take the first step in isolating hot and cold air by sealing the cable openings entering and exiting the data center space and cabinets.



KoldLok Wave™ Split
Integral Grommet

2. Cabinet Level

By using the cabinet to create a one-way path for airflow, the ability for hot exhaust and cold supply air to mix is eliminated. The result is a uniform room temperature with no re-circulation of hot exhaust air, which is critical to improving cooling system utilization and providing an ideal work environment. Also used with a Vertical Exhaust Duct, cabinet level solutions allow you to increase cabinet density and use existing standard cooling equipment for both Brownfield and Greenfield situations. Other advantages are a thermal seal quality of 95 percent and above, a greater thermal ride through mass since the hot air is exhausted and isolated in the plenum, and a larger room of cool air for equipment to draw upon.



F-Series TeraFrame®
Cabinet System with
Vertical Exhaust Duct

3. Aisle Level

Cold aisle and hot aisle containment allow isolation by creating enclosed cabinet rows. This type of containment increases efficiency, allowing you to utilize 90 percent of the airflow in the containment space with greater cold air volume. The flexibility of aisle level containment allows use in both access floor and slab floor environments and the overall ease of installation will work for a simplified retrofit or new installation. CPI's hot aisle containment solutions are a smart investment for utilizing room level cooling systems - you would need six to eight times the CRAHs to cool the same equipment using in-row or liquid rack technologies.



Hybrid containment application
using Hot Aisle design and
Vertical Exhaust Ducts



Cabling Level

The first step to improving data center thermal performance is to ensure that the cold air being supplied to the data center and equipment is being maximized—not wasted. Unsealed cable holes in access floor environments allow 50-80 percent of valuable supply air to bypass critical equipment. By sealing access floor openings and cable access holes you can eliminate wasted bypass air and instantly increase your data center cooling capacity up to 40 percent. Bypass airflow contributes to hot spots, cooling unit inefficiencies and increased infrastructure costs. Both TIA-942 and BICSI recommend this as a best practice to make the data center more efficient. To reduce bypass airflow and improve data center cooling, block unsealed cable holes with Raised Floor Grommets in the access floor and in the cabinet.

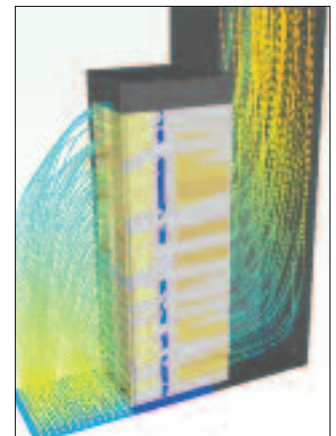


Cabinet Level

The cabinet is no longer just a box for housing IT equipment. It has become an integral part of the data center architecture that secures the isolation between supply air and return air. This shifting paradigm allows you to take airflow management beyond current best practices and open the door to numerous other benefits of air containment and isolation.

CPI Cabinets Feature:

- The ability to configure your own solution to meet data center and equipment requirements
- Pre-installed options and accessories for reducing data center installation time
- Thermal management options and configurations for green energy-savings
- Extensive cable management options and features to keep cables organized and to simplify moves, adds and changes
- Industry leading performance standards like high static load and dynamic load ratings, and ease of deployment solutions like shock pallet options
- Extreme heat load support of 35 kW and above
- Distinctive styling for an attractive, uniform look in showplace data centers



Cabinet level isolation provides streamlined air flow and can easily support over 35 kW of IT power consumption.



CPI solutions have the best operational interface and allow for a quick refresh to your data center at the rack and cabinet level.

The F-Series TeraFrame® HD Cabinet System is designed to ship fully loaded with equipment from an integrator's facility to a customer site with shock pallet and reusable cushioned carton and optional welded steel ramp.



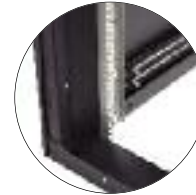
Cabinet Isolation System

Begin maximizing the cold air supplied and use the cabinet to prevent hot air from recirculating over and around equipment. By blocking airflow through open rack spaces with filler and blanking panels, less hot air is re-circulated to the front of the cabinet. However, hot air can still go around the sides, top and bottom of the equipment mounting space. CPI's Air Dam Kit blocks this space by creating an effective front-to-rear barrier to airflow. When you use the Snap-In Filler Panels, Air Dam Kit and a Bottom Panel, this separates the hot and cold air within the cabinet so cold air must flow one-way through the equipment and hot air must exit the cabinet, eliminating re-circulation and hot spots.



Snap-In Filler Panels

Panels block airflow through open rack-mount spaces in between equipment.



Air Dam Kit

Block airflow around the top, bottom and sides of equipment in cabinets.



Bottom Panel

Block airflow into and out of the base of the cabinet.

Vertical Exhaust Duct System

Use CPI's Vertical Exhaust Duct System to isolate hot air from the room and return it to the primary cooling system through the drop ceiling plenum or ducted return positioned high above the cabinet. Because hot air is isolated in the duct, you can place vented access floor tiles anywhere in the room to deliver additional cold air to equipment. The resulting lower room temperature eliminates the need for supplemental liquid or active cooling solutions and supports higher heat and power densities. The Vertical Exhaust Duct System can be used in both access floor and slab floor environments and has the flexibility to work in Greenfield and Brownfield applications.



GF-Series GlobalFrame® Cabinet System with Vertical Exhaust Duct

Side-to-Side Airflow Duct System

Network switches using side-to-side airflow need a solution to combat thermal management challenges which can support the isolation of hot air and cold air. By employing CPI Passive Cooling Solutions, CPI's Network Switch Exhaust Duct can manage high-density switches, while maximizing the energy efficiency of your data center.

- Support network switches and directors from Cisco, Juniper Networks and Brocade
- Control side airflow from large modular network switches to allow deployment anywhere in the data center or cabinet row
- Additional interior space for airflow and cable management
- Supports Cisco Catalyst 6500E series, MDS 9500 series and Nexus 7018 series switches and directors
- Support high-density switch connections and emerging 40- and 100-Gigabit Ethernet networks with cable management accessories for pre-terminated fiber
- Matches F-Series TeraFrame® styling and sizes for side-by-side use



N-Series TeraFrame® Cabinet System for Equipment that utilizes side-to-side airflow

CPI Containment Solutions allow quick deployment of integrated cabinets and can accommodate varying cabinet sizes.



Aisle Level

Just as no two data centers are the same, the solutions needed to lower their energy and cooling costs are rarely the same either. That's why Chatsworth Products, Inc. (CPI) specializes in designing energy efficient solutions for the individual. Recognized as professionals that can create, design, manufacture and supply numerous Aisle Containment Solutions, CPI is lowering the operating costs for data centers across the globe with customized Aisle Containment Solutions that work from the floor up—literally.

Aisle Containment Solutions maximize returns from your cooling equipment and provide a thermal solution for cabinets and racks by enclosing either the hot or cold aisle of adjacent cabinet rows. This strategy prevents the mixing of hot and cold air between aisles and increases cooling efficiency by up to 3x.

Available for new data centers or the expansion of a current design, CPI's Aisle Containment Solutions can be installed around an array of unique requirements and needs. Whether the hurdle is architectural design, fire suppression, piping, security or monitoring, our strategies have the flexibility to meet many of these demands while achieving the efficiency needed to support IT functions.



Hot Aisle Containment

Hot Aisle Containment isolates the hot aisle, captures the hot exhaust air from IT equipment and directs it back to the CRAC/CRAH, keeping it segregated from the cold air.



Cold Aisle Containment

Cold Aisle Containment isolates the cold air, preventing it from mixing with the hot air in an entirely closed off area targeted at cooling equipment instead of the room.

Customized Containment

CPI's Global Application Engineering Services Group is familiar with a wide range of containment strategies and dedicated to offering expert isolation solutions. From basic concepts of closing off the ceiling for hot and cold aisle containment to regulatory requirements for specific industries, CPI engineers consult directly with each customer to deliver the entire containment package. That also means supplying the pieces and parts of containment—quality cabinets, end-of-row doors, blanking panels, floor grommets, vertical exhaust ducts and more. While other manufacturers merely supply ducts and enclosures, CPI stands out by offering standard and customized parts, professional designs, and seals that have been engineered to perform 200 percent better than the competition.

- Available as either Hot or Cold Aisle Containment
- Applies to new designs and retrofit installations
- Designed for ease-of-assembly
- Offers architectural aluminum sliding doors with auto-closing mechanism
- Create unique design solutions by working with our team of Application Engineers
- In-depth solutions include floor grommets, blanking panels, sealing gaskets and air dams

Because flexibility is a signature attribute of CPI's Air Isolation Solutions, data center managers are in complete control of designs for new installations and retrofits on existing infrastructure. As always, a new installation offers the greatest amount of flexibility with strategies that allow you to choose a cooling unit and its layout, engineer cable pathways that complement the isolation strategy, and maximize airflow performance through hot air isolation or vertical exhaust ducts. CPI engineers will also find the best solution for a retrofit installation by implementing proper airflow tactics across existing cabinets and cabling infrastructure that conform to the cooling system's current configuration.

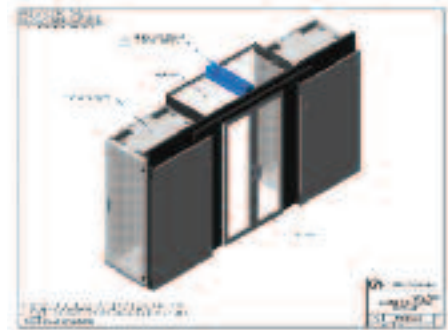
Benefits and Savings

The ability to populate cabinets at higher densities while still lowering operating costs has driven air isolation strategies into the spotlight of data center design. CPI has built a reputation on solidifying this goal by utilizing supply air from the ceiling, wall or floor, which helps increase heat and power densities by as much as 4x their original level and increases cooling efficiency by nearly 3x. Further improving this balance of power and cooling costs are additional advantages such as the elimination of hot spots, the transfer of equipment Delta T's directly back to the HVAC unit and the optimization of economization techniques that promote "free cooling."

- Achieve 4x higher heat and power densities with maximum sealing performance
- Increase cooling efficiency by nearly 3x
- Implement "free cooling"

CPI optimizes numerous economization strategies that help promote "free cooling." Whether it's through signature CPI Passive Cooling® or more specific approaches like energy recovery wheels and indirect adiabatic cooling, CPI representatives are able to find the right solution for you.

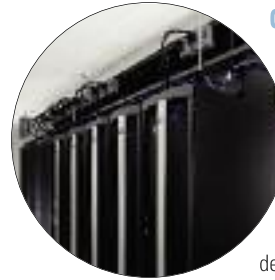
CPI works with cutting-edge technology manufacturers to create solutions for today's IT needs.



CPI can provide you with conceptual and design drawings to take your project from an idea to reality.

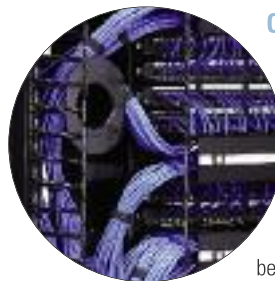
CPI Product Solutions

The world's leading businesses and technology companies turn to CPI for their IT infrastructure needs. CPI provides ideal structural support solutions for a wide variety of applications, industries, business needs and strategic alliances that are shaping the future of IT structural support across the globe.



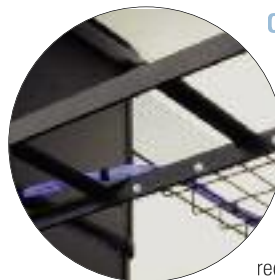
Cabinet & Enclosure Systems

Store multiple servers or various pieces of computer equipment with CPI Cabinet and Enclosure Systems. Provide extra security and enhanced thermal management or hide cables and devices for a more professional appearance.



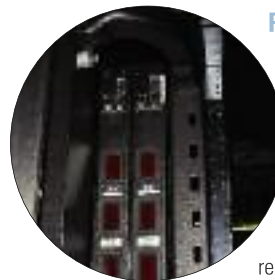
Cable Management Products

Organize cables and cords throughout your network with CPI's end-to-end Cable Management Products. Rack-mount cable managers provide critical support for cable bundles by defining cable pathways, resulting in better cable organization and performance.



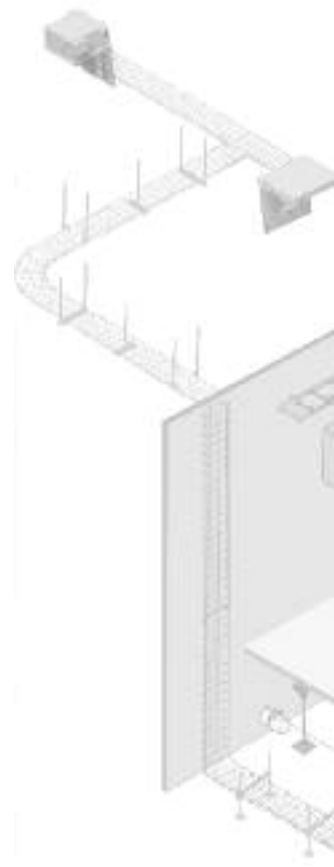
Cable Runway & Tray Products

Easily manage and protect cables while maximizing network infrastructure uptime. With a variety of options and accessories available, CPI Cable Runway and Tray Products can be tailored to meet the specific requirements of each facility and are adaptable for future growth.



Power Management Products

Increasing power densities have turned power management into an integral part of the overall management of enterprise data centers. Basic, monitored, switched and IP-accessible power solutions are needed to monitor real-time power usage and provide intuitive reporting across your entire power infrastructure.



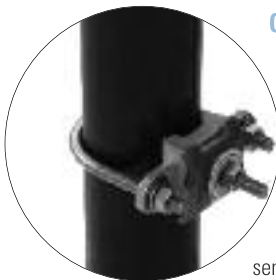
Rack Systems

CPI's industry-leading Rack Systems provide unsurpassed strength, stability and durability for supporting patch panels, high-density blocks, cabling and other equipment.



Grounding & Bonding Products

CPI offers a comprehensive line of UL® Listed Grounding and Bonding Products, which provide protection and help prevent transient voltages from damaging sensitive electronic equipment.



Seismic Protection Systems

Seismic Protection Systems from CPI reduce the risk of equipment damage from seismic events. CPI offers Seismic Protection Systems for racks, cabinets and cable runway that provide additional bracing required in earthquake zones.



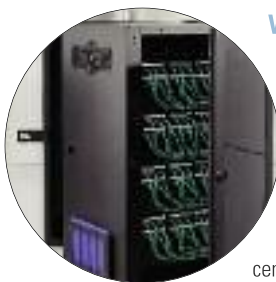
Environmental Monitoring & Security Systems

Remotely monitor, record and analyze environmental conditions in data centers and equipment rooms and monitor access to equipment cabinets.



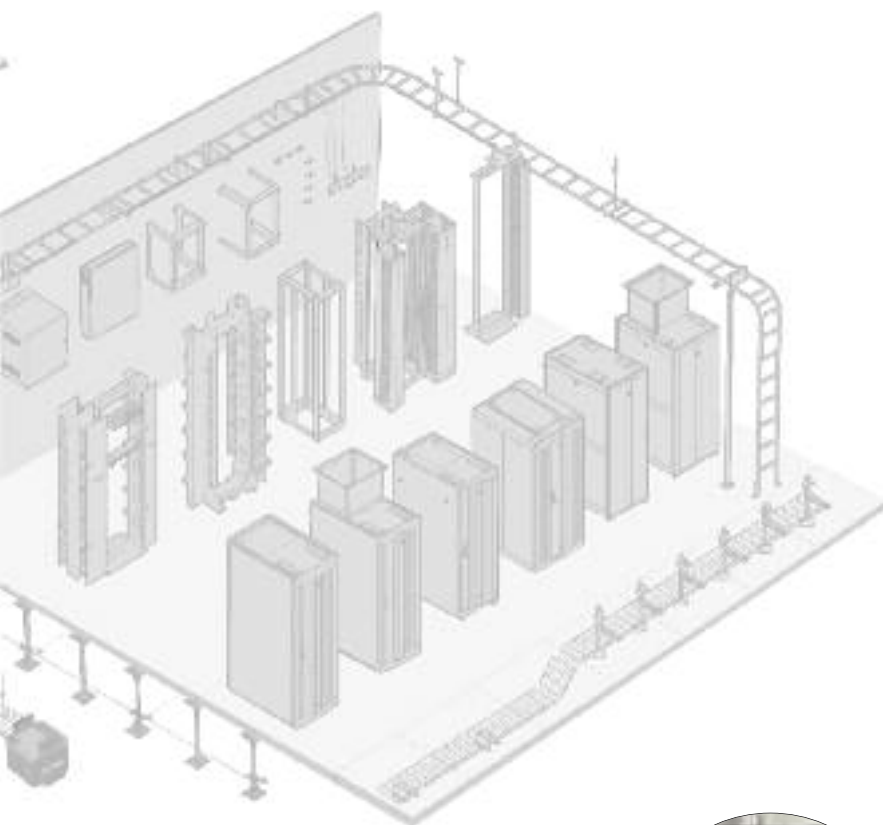
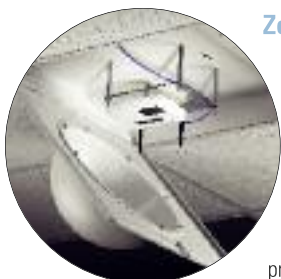
Wall-Mount Systems

CPI offers several styles of open and enclosed wall-mount systems to create accessible locations where space is limited or does not exist. Store and secure equipment on the wall inside or outside of the data center or equipment room and connect remote groups of users to the network.



Zone Cabling & Wireless Enclosures

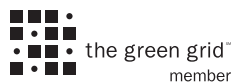
Zone Cabling Enclosures allow you to pre-wire network connections to reduce the overall cost of adding or moving network cabling. Wireless Enclosures secure and protect network connections for wireless access points.



Industry Expertise

At Chatsworth Products, Inc. (CPI), we're committed to innovative design and cost-saving technological advancements within the IT infrastructure industry. Always striving for product solutions that implement the U.S. Green Building Council's LEED® certification program, CPI also participates on standards committees and recommends accepted industry best practices of The Green Grid, AFCOM, ASHRAE, TIA and more to fulfill its commitment to true energy efficiency.

- Industry Advisory Council (IAC)
- Underwriters Laboratories, Inc. (UL)
- The Green Grid
- US Green Builders Council (USGBC)
- AFCOM National and Local Chapters
- ASHRAE
- TIA
- BICSI Platinum Level Prestige Corporate Member (PCM) with one of the largest groups of RCDDs
- BICSI Standards Committee
 - Data Center Rack and Cabinet Editor
 - Mechanical Group
 - Thermal Consultant
 - BIM Best Practices Subcommittee
- Society of Telecommunications Consultants (STC)
- International Organization for Standardization (ISO)
- Armed Forces Communications and Electronics Association (AFCEA)
- ESOP Association



Research, Development and Training

Designed with our customers in mind, the Research, Development and Training Center (RD&T) offers visitors the ability to observe real-world data center thermal testing and allows CPI to perform top-notch in-house product testing. Not only does this 10,200 square-foot (947.6 square-meter) center boast state-of-the-art test facilities, but it also provides a fully equipped Training Center, Product Showroom and modern Customer Meeting Center.

Thermal Test Lab

The Thermal Test Lab allows CPI to model real-world data center issues, demonstrate the efficiencies of CPI Passive Cooling® Solutions in real time and discuss with customers how to effectively design their data centers for optimum thermal management.

- Allows testing of various CPI Passive Cooling configurations
- Offers access, slab and shared floor environment testing
- Designed with three return air paths: open hot aisle/cold aisle, suspended ceiling, and ducted exhaust
- Set up with various cabinet configurations to demonstrate recommended best practices
- Contains load simulators to mimic different equipment

Product Test Lab

CPI's Product Test Lab provides the technology and equipment required for precise mechanical testing, electrical testing and prototyping of products.

Product Showroom

Interact with multiple CPI Products in one environment in the Product Showroom, which allows customers to experience a total solution.

Training Center

The Training Center offers a fully equipped location for effectively training CPI employees, partners and customers.



Support and Service

CPI has a highly trained Technical Support Team to help solve your IT infrastructure needs. Based on your specific requirements, our Technical Support Team can answer your questions as well as provide a detailed bill of material (BOM) with layout and assembly drawings, CAD drawings (also available in PDF format) and the one-on-one support you need to complete your project on budget and on schedule. The Technical Support staff specializes in working with value-added resellers, distributors, contractors, information systems teams, schools, government agencies, end users and new customers who would like the job "done right the first time."

Likewise, our Customer Service Representatives are considered the best in the business and have the experience and know-how to ensure you get the right product when you need it. Our friendly and professional Customer Service Representatives work closely with distributors to maintain product availability—ultimately helping to preserve your project's scheduling requirements—and are available to answer questions about your order.



Utilize our vast library of over 200 BIM drawings for Autodesk® Revit®.

Dedicated to delivering what you need, CPI's unequalled customer service and technical support are the benchmark of our business.

“ We were extremely pleased with the results and the top-notch product quality, therefore we decided to move forward with CPI Solutions for our new data center facility. ”

Eric Patterson, Data Center Manager, CDW



Configuration Tools and Planning Assistance

CPI offers the tools and assistance needed to help you develop high performance, enterprise data center designs that tightly integrate standard or customized CPI Products into a total design approach, delivering dramatically lower operating costs and data center optimization.

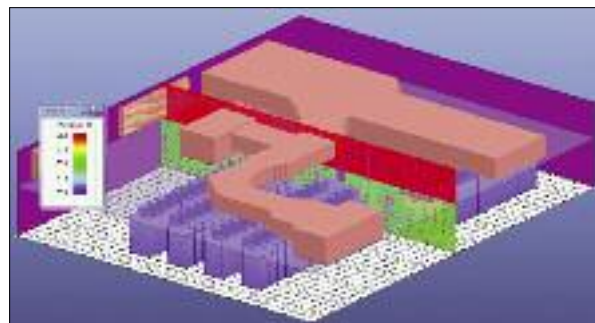
Planning Assistance

With CPI's Design and Consultation Services, highly trained CPI experts evaluate and determine your solution needs and assist in developing collaborative designs unique to your data center environment. This includes:

- Field Expert Site Visits – CPI field experts meet with you on-site to evaluate requirements and discuss product and solution options.
- Computational Fluid Dynamics (CFD) Analysis – Using state-of-the-art three-dimensional software, CPI provides simulation and analysis of your data center's airflow and temperature patterns.

Value-Added Online Tools

- CPI PUE CalculatorSM – Determine your potential data center cost savings when combining CPI Passive Cooling[®] Solutions with today's most effective cooling strategies.
- Free Visio[®] Shapes to help you plan your next project and free AutoCAD Blocks (dwg files) to help you quickly and accurately develop a room layout.
- Building Information Models (BIM) drawings – Get a jump-start on your next project by utilizing our vast library of over 200 BIM drawings for Autodesk[®] Revit[®]. Our continuously growing selection will give you the design tools you need to create a dynamic and flawless layout.
- Product Configurator – CPI's easy-to-use online Product Configurator guides you through the steps and selections necessary to create personalized product solutions. Choose from a variety of options and accessories that can be integrated directly into cabinet or rack systems, simplifying data center installation. Receive a complete itemized bill of material, total list price, rendered drawings and a selection of distributors or global resellers for your configured solution.
- Documentation Center – Search product documentation.
- PDF Catalog – Review CPI's most recent printed catalog.
- eCatalog – Locate detailed product specifications, photos, drawings and literature.



Computational Fluid Dynamics (CFD) Analysis



CPI's easy-to-use online Product Configurator



CPI PUE CalculatorSM



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Westlake Village, CA
818-735-6100

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Georgetown, TX Operations
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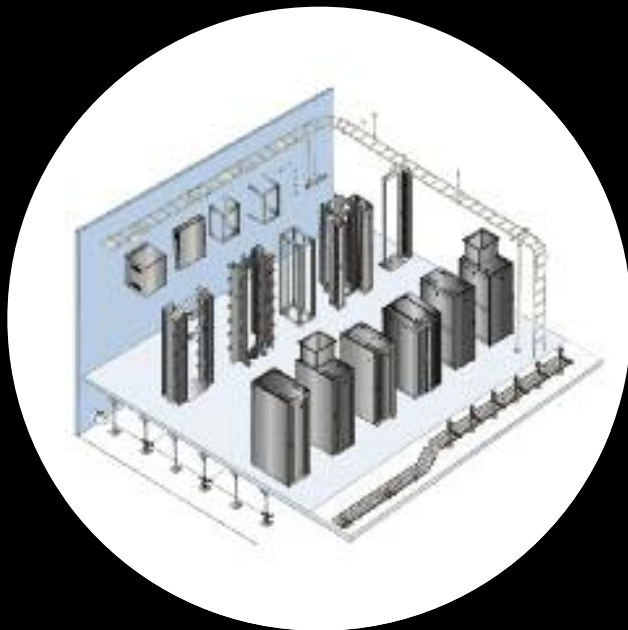
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Middle East & Africa

Dubai, United Arab Emirates
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The CPI Total Solution Includes:

- Cabinet & Rack Systems
- Equipment Support
- Cable Management
- Cable Pathways
- Grounding & Bonding
- Security & Monitoring
- Thermal Management
- Power Distribution
- Seismic Bracing

Find more information about CPI Solutions at
www.chatsworth.com

+1-800-834-4969 (U.S. & Canada)
or techsupport@chatsworth.com



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PRODUCTS, INC.**

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