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VersaEdge™ Wall-Mount Cabinet Thermal Performance Report

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The edge is evolving rapidly as organizations deploy higher compute densities, AI-enabled applications, and data processing closer to users, sensors, and workloads. Traditional wall-mount and micro–data center solutions are no longer equipped to meet rising performance, airflow, and thermal requirements in these distributed environments.

The VersaEdge™ Wall-Mount Cabinet introduces a new class of compact, high-performance infrastructure designed specifically for the modern edge. With a space-efficient footprint, high-density equipment support, integrated power and cooling flexibility, advanced cable management, and enterprise-grade security, VersaEdge™ enables reliable and scalable operation wherever compute needs to be deployed.

The VersaEdge Wall-Mount Cabinet is purpose-built for a wide range of space-constrained and distributed IT environments. It supports AI, IoT, and sensor-driven edge deployments that require more compute at the perimeter; branch locations in retail, healthcare, and finance with increasing local processing needs; telecom and broadband networks expanding last-mile capabilities; higher-education and research labs supporting localized compute; and smart buildings or campus networks where networking, AV, and security systems converge.

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Solutions

The VersaEdge™ Wall-Mount Cabinet delivers an integrated, edge-optimized approach to supporting modern IT equipment. Key solution attributes include:

- Compact, space-efficient footprint designed for environments where floor space is limited or unavailable, with a modular architecture that adapts to varied edge deployments.
- High-density equipment support with robust load capacity and adjustable rails that accommodate evolving hardware requirements.
- Enhanced thermal design capable of passively dissipating up to 10 kW of heat without the use of external fans. Optional modular cooling kits provide additional airflow for higher thermal demands and high-density equipment loads.
- Flexible power-distribution compatibility, including seamless alignment with CPI intelligent PDUs and monitoring solutions for scalable power management.
- Optional Universal Accessory Panel supports copper and fiber service loops, power supplies, and cable management systems.
- Enterprise-grade access control and security options, including combination and electronic locks, delivering controlled, audit-ready physical security for regulated and distributed edge environments.
- Removable components and installation-friendly features reduce deployment time, while streamlined equipment access enables fast maintenance and upgrades without disrupting operations.

Testing Methodology

The VersaEdge Wall-Mount Cabinet's versatile design facilitates use in a variety of applications, from low- to high-density deployments. The advanced thermal design allows for passive and active cooling applications. Both methods were validated using a high-capacity resistive load bank installed to mimic real-world applications. Testing was not intended to validate the use of specific IT equipment, but rather to provide general performance envelopes that can be applied to a wide range of equipment combinations. Testing included best-practice cold and hot air separation using the provided air dams.

The passive tests simulated real-world server airflow conditions by configuring the load bank to push 1145 CFM of exhaust air. This represents approximately 127 CFM per rack mount unit (U), a typical airflow level for high density enterprise IT equipment. Temperature measurements were used to evaluate the impact of potential airflow restrictions, as well as the effects of both internal and external hot-air recirculation on installed equipment under heat loads from 5–10 kW.

Active testing measured thermal performance when fan kits were installed in the wall-mount cabinet. During active tests, the load bank's internal fans were disabled so that the cabinet-mounted fans provided all airflow. A magnetic blanking panel was installed on the door exhaust vent so all hot exhaust air was drawn out through the installed fans.

Calculations / Test Results

The VersaEdge™ Wall-Mount Cabinet intake and exhaust locations and internal air dams keep hot air from recirculating, so equipment mounted per instructions will experience external room ambient temperatures at their intake. VersaEdge™ allows full-rated equipment cooling performance without airflow restrictions for up to 690 CFM for 3U, 1150 CFM for 6U, and 1550 CFM for 9U configurations while staying within IT industry standard air velocities of <800 fpm. Aggregated and normalized passive thermal test data shows that the 9U VersaEdge cabinet effectively manages thermal loads up to 10 kW when equipment supplies approximately 1145 CFM of airflow.

The presence of patch panels, cabling, nearby walls, and other obstructions did not significantly change system behavior, indicating that typical equipment installations do not significantly degrade thermal performance. Complete coverage of any intake or exhaust open area will correspond to reduced maximum airflow capacity, or higher air velocities.

Active cooling with installed fan kits provides a wide range of thermal load capabilities, depending on external ambient temperatures and installed equipment mounting locations and temperature ratings. The values shown below correlate to the heat loads the exhaust fans can remove from the cabinet with the stated ambient temperatures, resulting in the internal exhaust temperature. Equipment mounted with its cooling fan intake in the hot (exhaust) space of the cabinet should be rated for at least that corresponding exhaust temperature.

The VersaEdge Wall-Mount Cabinet introduces a new standard for high-performance, edge-ready infrastructure. Engineered to meet the growing thermal, density, and operational demands of modern distributed IT, VersaEdge delivers strong passive cooling capabilities, a modular design adaptable to future technologies, and a robust accessory ecosystem aligned with CPI's broader infrastructure solutions. When combined with CPI's power distribution and monitoring products, VersaEdge provides a scalable and reliable foundation for today's rapidly evolving edge environments.

Exhaust Temperature								
External Ambient Temp (°C)	Fan Qty	CFM	35°C Exhaust Temperature Heat Load (kW)	40°C Exhaust Temperature Heat Load (kW)	45°C Exhaust Temperature Heat Load (kW)	50°C Exhaust Temperature Heat Load (kW)	55°C Exhaust Temperature Heat Load (kW)	60°C Exhaust Temperature Heat Load (kW)
20	2	230	1.6	2.2	2.9	3.5	4.2	4.9
	4	460	3.2	4.5	5.8	7.1	8.4	9.7
	6	690	4.7	6.7	8.7	10.6	12.6	14.6
	10	1150	7.9	11.2	14.4	17.7	21.0	24.3
	12	1380	9.5	13.4	17.3	21.3	25.2	29.2
25	2	230	0.9	1.5	2.2	2.8	3.5	4.1
	4	460	1.8	3.1	4.4	5.7	7.0	8.3
	6	690	2.7	4.6	6.6	8.5	10.5	12.4
	8	920	3.6	6.2	8.8	11.4	13.9	16.5
	10	1150	4.5	7.7	11.0	14.2	17.4	20.7
	12	1380	5.4	9.3	13.2	17.0	20.9	24.8
30	2	230	0.3	0.9	1.5	2.2	2.8	3.4
	4	460	0.5	1.8	3.1	4.3	5.6	6.9
	6	690	0.8	2.7	4.6	6.5	8.4	10.3
	8	920	1.0	3.6	6.1	8.6	11.2	13.7
	10	1150	1.3	4.4	7.6	10.8	14.0	17.2
	12	1380	1.5	5.3	9.2	13.0	16.8	20.6
35	2	230	0.0	0.3	0.9	1.6	2.2	2.9
	4	460	0.0	0.5	1.8	3.2	4.5	5.8
	6	690	0.0	0.8	2.8	4.7	6.7	8.7
	8	920	0.0	1.1	3.7	6.3	8.9	11.6
	10	1150	0.0	1.3	4.6	7.9	11.2	14.4
	12	1380	0.0	1.6	5.5	9.5	13.4	17.3

Critical Installation Requirement: Rail Blanking and Airflow Separation

To achieve the thermal performance outlined in this report, the 3U, 6U, or 9U equipment rail configuration must be fully blanked using installed equipment and/or CPI blanking panels. Any unused rack units create unintended airflow bypass paths that allow hot exhaust air to recirculate into the equipment intake. Fully blanking the rail area is essential to establishing a defined cold air intake plenum and hot air exhaust plenum, which is the foundation of the passive and active thermal performance of the VersaEdge™ Wall-Mount Cabinet. Failure to blank unused rack space will result in hot and cold air mixing, reduced effective airflow, elevated intake temperatures, and degraded thermal performance compared to the results presented in this report. sensors, and workloads.

Key Benefits

Industry-Leading Passive Thermal Performance (Up to 10 kW)

The VersaEdge™ Wall-Mount Cabinet builds on CPI's advanced airflow strategies to deliver exceptional passive cooling capacity—tested up to 10 kW. This far exceeds typical wall-mount cabinet performance and allows higher-density switches, routers, and servers to operate safely without the added cost, noise, or energy draw of active cooling systems.

Efficient Thermal Control for Most Edge Deployments

Enhanced airflow design and optimized circulation paths maintain equipment reliability by preventing heat buildup and minimizing hotspots—all without requiring active cooling. This supports stable operation across a wide range of typical edge workloads.

Optional Active Cooling for Loads Beyond 6–10 kW

For deployments that exceed the upper threshold of passive dissipation, optional active cooling kits provide additional airflow to support higher thermal loads. This enables a modular, scalable thermal strategy without replacing or redesigning the cabinet.

Thermal Stability That Extends Equipment Lifespan

By maintaining stable operating temperatures—either passively or with optional fans—VersaEdge™ helps protect sensitive IT equipment, reducing the risk of overheating, extending component life, and minimizing service interventions across distributed edge sites.

Ready for AI, IoT, and Future High-Density Growth

The design anticipates increasing thermal demands driven by AI, IoT, and next-generation edge applications. VersaEdge™ supports today's requirements while offering a clear path for scaling to tomorrow's higher heat outputs and performance needs.

Conclusion

The VersaEdge™ Wall-Mount Cabinet introduces a new standard for high-performance, edge-ready infrastructure. Engineered to meet the growing thermal, density, and operational demands of modern distributed IT, VersaEdge delivers strong passive cooling capabilities, a modular design adaptable to future technologies, and a robust accessory ecosystem aligned with CPI's broader infrastructure solutions. When combined with CPI's power distribution and monitoring products, VersaEdge provides a scalable and reliable foundation for today's rapidly evolving edge environments.

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