



**Experience
Uninterrupted
Performance**

Ensuring optimal flow for direct-to-chip cooling with the Belimo Energy Valve™

In the fast-paced world of data centers, reliability, scalability, and efficiency are paramount. The Belimo Energy Valve™ rises to the challenge, offering a comprehensive solution designed to ensure optimal flow across cold plates, safeguarding your critical infrastructure from potential damage and downtime.

BELIMO®

Reliable flow, scalable cooling, smarter operation



Reliable

Flow Rate Assurance: By maintaining the required differential pressure across the rack, the Belimo Energy Valve ensures the necessary flow rate at all times for direct-to-chip cooling – even during server maintenance.

Regulated Quantity of Water: The Energy Valve limits the maximum flow rate and thus prevents the erosion of the cold plate channels, caused by excessive flow velocities. This ensures uninterrupted operation.

Stand-Alone System: With differential pressure setpoint configuration directly on the device, the Energy Valve can operate independently, eliminating the need for external control signals.

Power Efficiency: The Energy Valve can be powered via Ethernet (PoE), eliminating the need for additional transformers near your racks and simplifying installation.



Scalable

Future-Proof Design: The Energy Valve can be tailored to meet evolving cooling needs without compromising performance at current loads. This ensures scalability as server capacity requirements increase.

Digital Management: When servers are upgraded and require more cooling, the Energy Valve can be reconfigured remotely via the building management system (BMS) or an optional cloud connection. This offers a new level of flexibility and adaptability.



Efficient

Comprehensive Data: Flow rate, valve position, pressure, water temperature, heat removal, and much more are continuously monitored by the Energy Valve. Leverage this information to make proactive, informed decisions instead of merely reacting to problems as they arise.

Glycol Monitoring: By monitoring glycol concentration in the system, the Energy Valve ensures optimal usage to maintain heat transfer characteristics while preventing bacterial growth. This promotes efficient and sustainable operation.



Effects of proper flow for direct-to-chip cooling

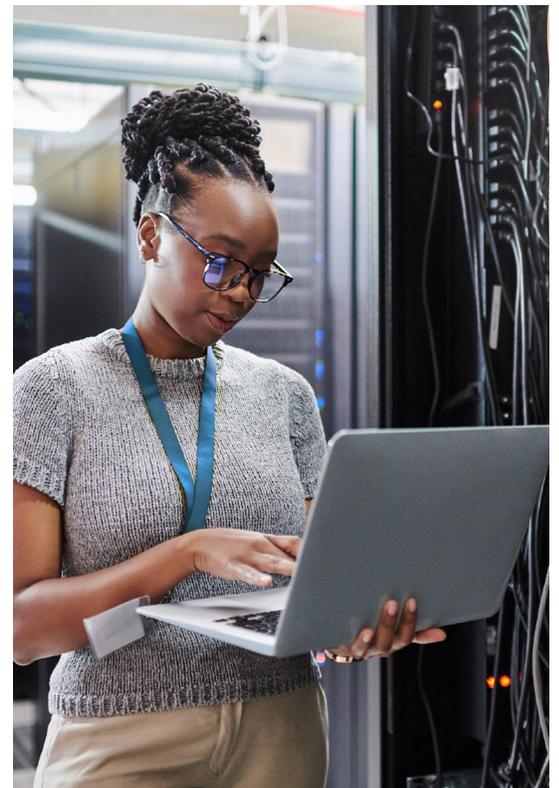
Maintaining proper flow for direct-to-chip cooling is essential for ensuring efficient cooling, system reliability, and the longevity of both the cold plates and the components they cool.

Why is proper flow for direct-to-chip cooling important?

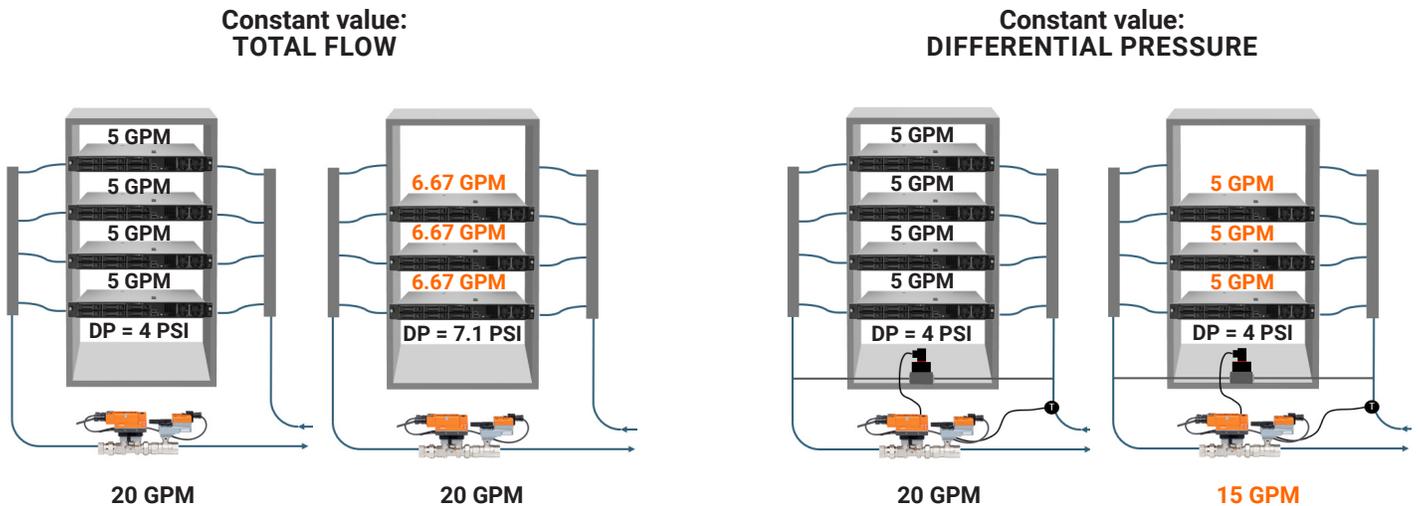
- **Server Damage:** If the flow rate is too low, the server may not be sufficiently chilled, and damage may result. In severe cases, the server must be replaced in its entirety. This can result in costs amounting to \$100,000, or even up to \$250,000 for high-performance models.
- **Unplanned Downtime:** Unexpected shutdowns or server freezes due to overheating can result in significant financial losses. According to Uptime Institute's 2022 survey, 70% of all outages cost \$100,000 or more. In 25% of these cases, the costs even exceeded \$1million.*
- **Excessive Flow Risks:** Excessive flow rates can erode cold plates, thereby changing heat transfer properties and necessitating replacement. Additionally, excessive flow rates increase pumping energy consumption.

Challenges to achieving constant flow rates for direct-to-chip cooling

- **Dynamic Environment:** Regular server removals for maintenance purposes change the total flow requirement for the rack, potentially causing overflow to remaining servers.
- **Flow Distribution:** Even with managed total flow, ensuring equal distribution to each cold plate proves challenging.
- **Variable Server Replacements:** Server upgrades or replacements may alter flow rate requirements, complicating overall flow management.



Smarter cooling with differential pressure control



How flow is controlled makes a significant difference in performance and efficiency.

Constant flow rate

When the flow to the rack is controlled by maintaining a constant total flow rate, it continues to deliver the same amount of coolant even if a server is removed. This causes the remaining cold plates to receive excess flow, resulting in increased pressure across the rack and uneven, inefficient cooling.

Constant differential pressure

In contrast, when a constant differential pressure is maintained across the rack, the flow automatically adjusts based on the number of active servers. If one is taken offline, the flow to each cold plate remains consistent, ensuring balanced and efficient cooling without over-delivery or wasted energy.

-  5-year warranty
-  Global support
-  Tested quality
-  Short delivery times
-  Extensive service
-  Complete product range