



IRX

INTERNALLY RETAINED CHECK
VALVE WITH A PATENTED
FLOW ADVANTAGE



ENGINEERED FOR DATA CENTERS
BUILT TO PERFORM



More Power. More Heat. Less Margin for Error.

The AI revolution runs on power, and power creates heat. As rack densities push air cooling past its breaking point, liquid cooling isn't the future; it's now. Modern hyperscale and enterprise data centers depend on closed-loop systems: chilled water, direct liquid cooling (DLC), and coolant distribution units (CDUs), all working to hold server inlet temperatures within razor-thin tolerances.

The CDU is the control center of your cooling loop. From pump to cold plate, flow demands precision and absolute protection. A single thermal excursion above threshold can trigger automatic shutdowns, violate SLAs, and cause irreversible damage to GPU clusters and the infrastructure they power. Lurking in the middle of it all, standard check valves remain the industry's most overlooked risk.

\$540,000 PER HOUR

A single cooling outage costs enterprises an average of \$540,000 per hour in lost revenue, SLA penalties, and remediation, not including hardware replacement.

Source: Oxford Economics/ServiceNow, 2024

The Hidden Threat Inside Your CDU Cooling Loop

Traditional check valves introduce the vulnerabilities your cooling architecture can't afford. Three failure modes are silently working against you:

SYSTEM PRESSURE DROP

High pressure drop across traditional, poppet-style check valves reduces flow and pump efficiency, causing CDUs to work harder to cool.

LEAK PATHS

Multiple connection points and external leak paths from off-the-shelf, traditional check valves can cause catastrophic chip and system failure.

SYSTEM DESIGN

Traditional, off-the-shelf check valves are bulky and lack connection options, causing larger CDU designs and additional piping.



High Cv with zero external leak paths. Configured to your exact system requirements.



When Failure Is Not an Option

US Valve’s patented IRX check valve is engineered and custom-built for your high-flow direct-to-chip liquid and two-phase cooling applications. Our solutions don’t just meet standards; they set them.



Max Flow & Lowest Pressure Drop

High Cv elastomer hinge check valve design improves pump and CDU cooling efficiency, pulling heat from the chip.

Zero Leak Paths

Internally retained valve seat eliminates external leak paths and provides a fortress of protection for servers.

Engineered to Order

Valves are designed for your system, not the other way around. USV engineers utilize CFD and create designs that meet your system’s flow, space, and material requirements.

Numbers that Matter

We provide usable Cv under real operating conditions, not theoretical peaks.

The USV IRX Series is designed to deliver higher usable Cv across actual flow ranges, not just at idealized open positions. Unlike traditional poppet-style check valves that rely on restrictive valve seats, USV IRX valves are engineered to maximize effective flow area when open.

That design difference matters because systems operate across a range of flows, not at a single peak point. The result is measurably lower pressure loss where it counts.

Compare For Yourself

Nominal Size	USV IRX Flow Coefficient	Poppet Style Flow Coefficient	USV IRX Flow Advantage*
1"	37	18	2x
1.25"	65	29	2x
1.5"	83	44	2x
2"	145	55	3x
2.5"	350	80	4x
3"	590	145	4x
4"	920	164	6x
5"	1400	360	4x
6"	2800	458	6x

The **USV IRX** Series delivers 2x to 6x higher usable Cv across valve sizes compared to conventional designs. This performance comes from a fundamental reduction in internal restriction.

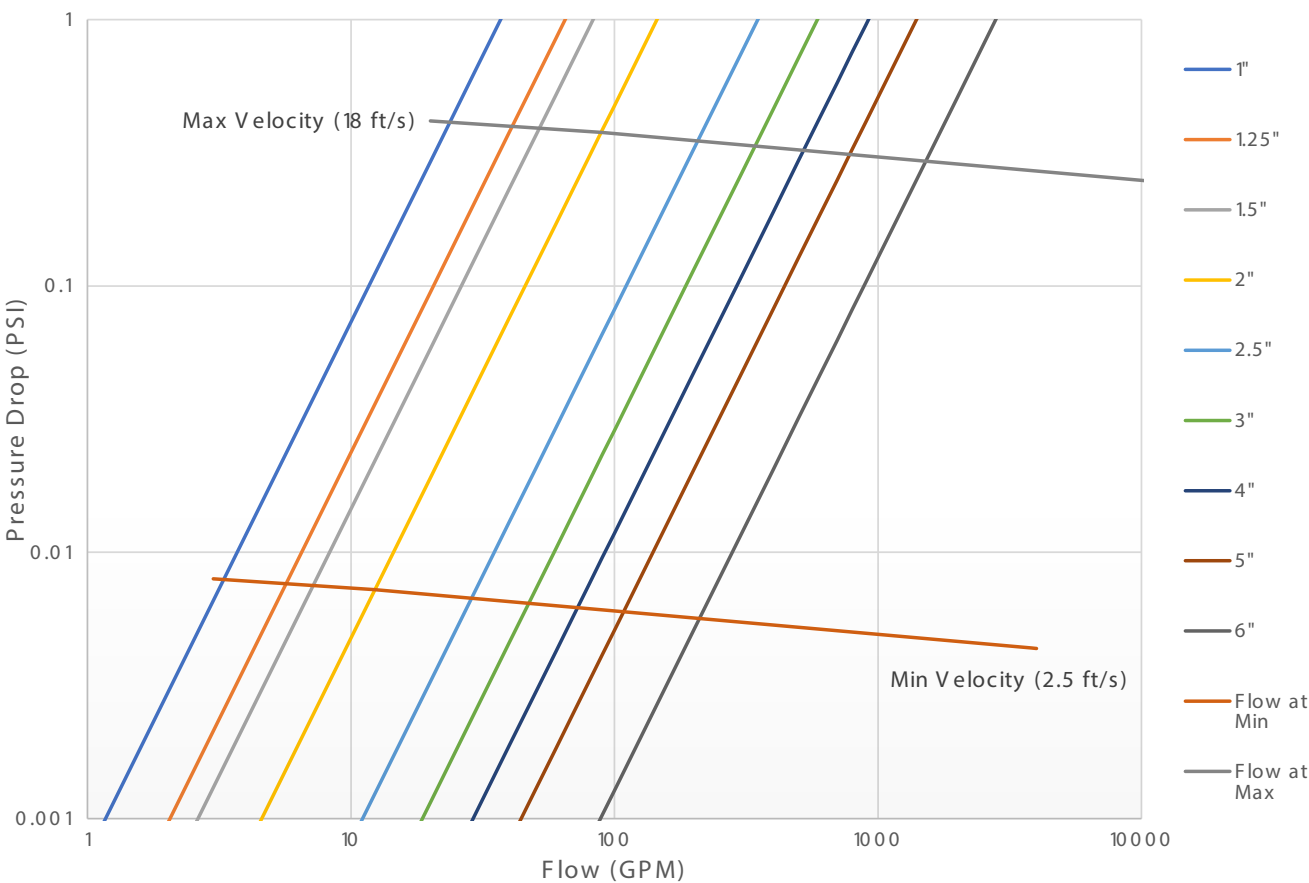
**USV IRX has lower pressure drop under all conditions.*

Operate More Efficiently

The USV IRX Series maintains a larger effective flow area when open, reducing internal restriction and pressure loss.

The **USV IRX** Advantage

1. Lower pressure loss at higher flow
2. Full port design with lower turbulence
3. Predictable performance that meets your system’s demands.



What This Means in Practice

Lower pressure drop delivers system-level gains. Pumps can be sized more accurately, energy demand is reduced, and performance remains stable as flow varies. In continuous-duty systems, including data center cooling, these advantages compound over time, improving efficiency and reducing operational risk.

Your System Sets the Requirements. We Build to Match.

The USV IRX Series is designed to be configured around your system, not the other way around.

Select from common sizes, materials, and connections below, or quickly align on exactly what your application requires. This platform is built to adapt, making it easy to integrate the valve into your layout.

USV IRX Series Common Configurations

Pipe Diameter	1"	1.25"	1.5"	2"	2.5"	3"	4"	5"	6"
DIN	25	32	40	50	65	80	100	125	150
Max Pressure	250 PSI								
Body Materials	316 SS, Carbon Steel, Brass, Aluminum								
Seal Materials	EPDM, Viton, NBR, Neoprene, Silicone								
Connections	Tri-Clamp/Sanitary, Flanged, Groove End, MNPT/FNPT, Wafer, ORB, Custom								
Custom Length	Specify exact end-to-end dimension								
Custom Width	Specify exact end-to-end dimension								
Profiles	Optimized profiles for high-density CDU installations								
Certifications	ISO 9001:2015								
Patent	Protected by US Patent No. 12,422,051 and international patent WO2025/128473.								

**Consult USV for additional materials, sizes, and end connections*

Where Standard Ends, Flexibility Begins

The configuration options shown above represent the most common ways the IRX Series is specified and applied. They are provided to illustrate typical starting points, not to restrict what can be built.

The IRX Series is a fully configurable check valve platform. Materials, seals, connections, end-to-end length, overall width, and internal geometry can all be tailored to match your system requirements. The valve is designed to integrate cleanly into virtually any layout, allowing you to specify exactly what your application demands without forcing adapters, workarounds, or layout concessions.



Ready to configure an IRX Check Valve for your system?

Share your flow rate, connections, media, and pressure requirements, and our team will quickly engineer an IRX High-Flow, Low-Pressure-Drop check valve tailored to your application. With rapid prototyping and on-demand production capacity, U.S. Valve is built to support your CDU fluidics program from concept to scale.

A Platform You Can Build On

Engineered scale, proven execution, and long-term partnership.

U.S. Valve is part of IDEX Corporation, a global engineered products company traded on the New York Stock Exchange (IEX) and a member of the S&P 500. That scale and accountability provide the foundation behind how we commit to programs, support customers, and deliver reliably over the long term.



*Trusted Solutions,
Improving Lives™*

IDEX is a \$3.5 billion organization with approximately 9,000 employees and operations in more than 20 countries, serving industries where performance, reliability, and continuity are non-negotiable. Across fluid systems, life sciences, fire and rescue, precision optics, and data center infrastructure, IDEX builds mission-critical products designed to perform consistently in demanding environments.

As demand accelerates for AI infrastructure and data center power and cooling systems, IDEX continues to invest alongside its customers. That investment translates into real capacity, disciplined execution, and the ability to support programs not just at launch, but through expansion, replication, and sustained operation.

Partnered for Engineered Performance at Scale



Fast Delivery

Valves are typically assembled, tested, and released within one to two days of order receipt, helping programs stay on schedule without sacrificing quality or consistency.



Tested Performance

Every valve is one hundred percent tested prior to shipment to verify zero-leak integrity and ensure reliable performance in real operating conditions.



Capacity to Scale

Backed by IDEX's global manufacturing footprint, US Valve programs are supported by expandable capacity across multiple facilities, providing continuity and the ability to scale production as demand grows.



Engineering & Execution

US Valve combines application-level engineering support with fast, autonomous execution, allowing decisions, quoting, and delivery to move quickly as programs evolve.





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CDUVALVES.COM

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