

# SKIVED COLDPLATES

## TECHNICAL BRIEF



Skiving manufacturing technology is a unique metal forming process widely used in copper and aluminium heat sink construction, and most recently adopted for high-performance liquid cooling coldplate construction.

By using a special planer with precise control, thin slices of material are cut and then bent upward to become heat dissipation fins for the coldplate. CoolIT coldplates go one step further by removing a portion of the middle of the fin array to allow for coolant to flow from the center of the coldplate and split down two channels. This patented design results in a class-leading coldplate, with superior heat dissipation as compared to non-skived coldplates.

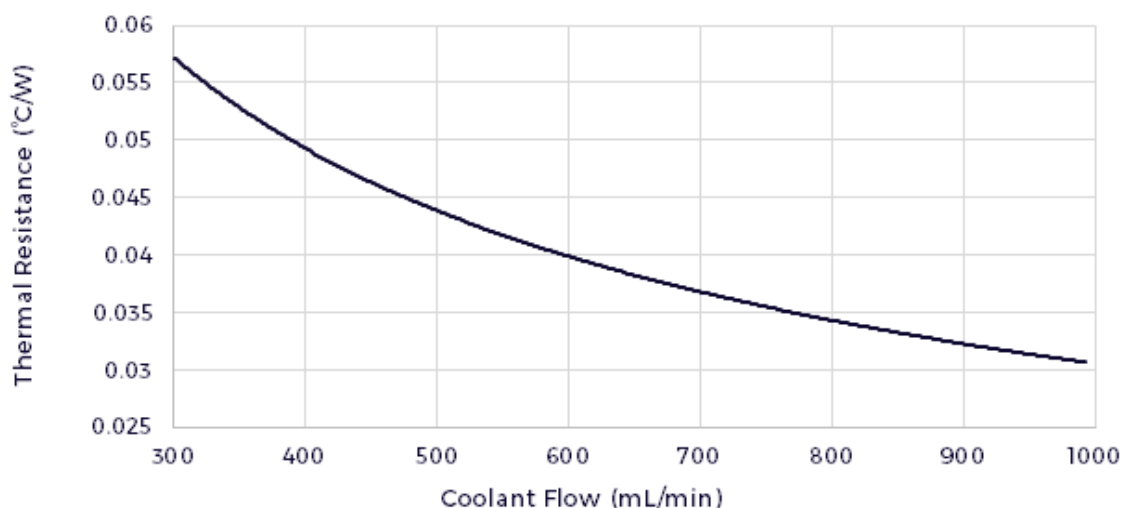
Meeting the industry's fluid requirements and using the highest quality filtered coolants allows skived coldplates, inline quick disconnects and other essential components in the liquid loop to perform at their peak. Improper selection and maintenance of coolant and filtration, with or without skived coldplates, can lead to serious issues in any liquid cooling system.

### UNRIVALED PERFORMANCE TO DENSITY RATIO

Skived coldplates deliver the best performance in the industry because the base and the fins are a common piece of material.

The CoolIT Systems RX3 is an example of a high-performance coldplate. This coldplate is compatible with the 3rd Gen Intel® Xeon® Scalable Processor (Ice Lake). By supporting the necessary flow rate, this coldplate can reach a thermal resistance of 0.03°C/W or lower for high-density processors such as Ice Lake. Additionally, there are some opportunities to further improve the thermal performance of this coldplate depending on the application requirements.

### RX3 Thermal Resistance vs Flow Rate (RQ)



CoolIT coldplates are designed to have an extremely low profile to allow them to fit in 1U applications, yet not compromise performance capabilities. This is an important feature for OEM server designers to ensure they can maintain, or even decrease, server height.

Thermal resistance has been calculated as the difference between the inlet coolant temperature to the coldplate head unit and the case temperature of the CPU over total CPU power. This test setup included Thermal Interface Material (TIM) between the coldplate and CPU.

## RELIABILITY THAT LASTS

With such high fin density, skived coldplates require clean and filtered coolant to operate at their peak performance. To achieve this, CoolIT utilizes Recochem OAT PG25% coolant, which is pre-filtered to 50 microns. To further control the coolant quality on the secondary loop, CoolIT offers a full range of solutions including Rack Manifolds, Passive Coldplate Loops and Coolant Distribution Units.



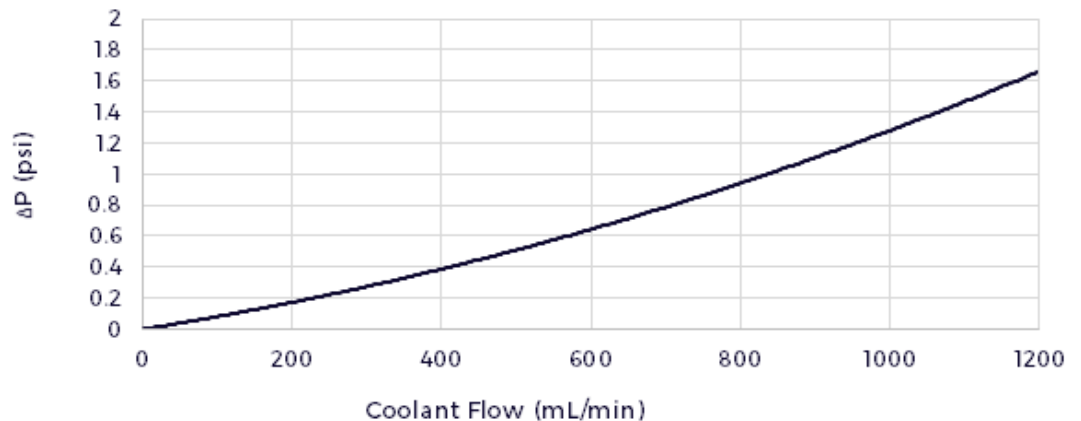
Ensuring the entire secondary liquid loop is designed and produced by CoolIT allows for the highest quality assurance and long-term reliability, while continuing to provide high-performance for HPC. CoolIT CDU's utilize intelligent monitoring and controls to constantly monitor changing coolant conditions and watch for unexpected flow and pressure changes. Planned Preventative Maintenance is simple and requires semi-annual coolant samples to be drawn and sent to CoolIT for analysis.

## MINIMAL PRESSURE DROP

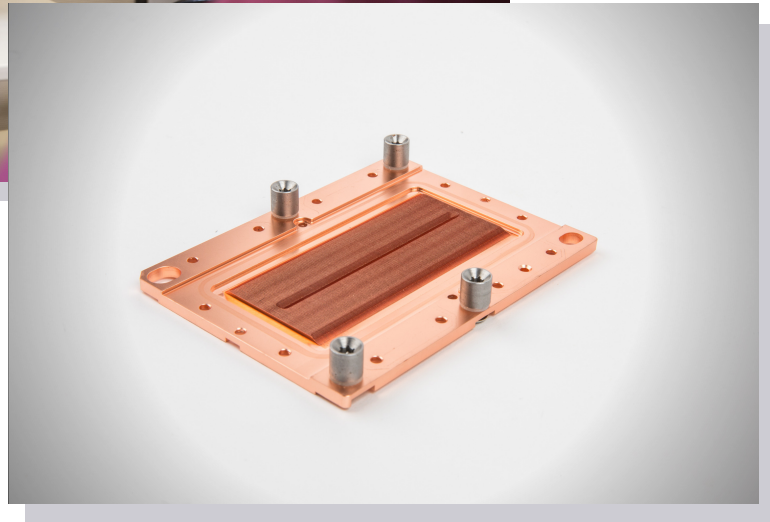
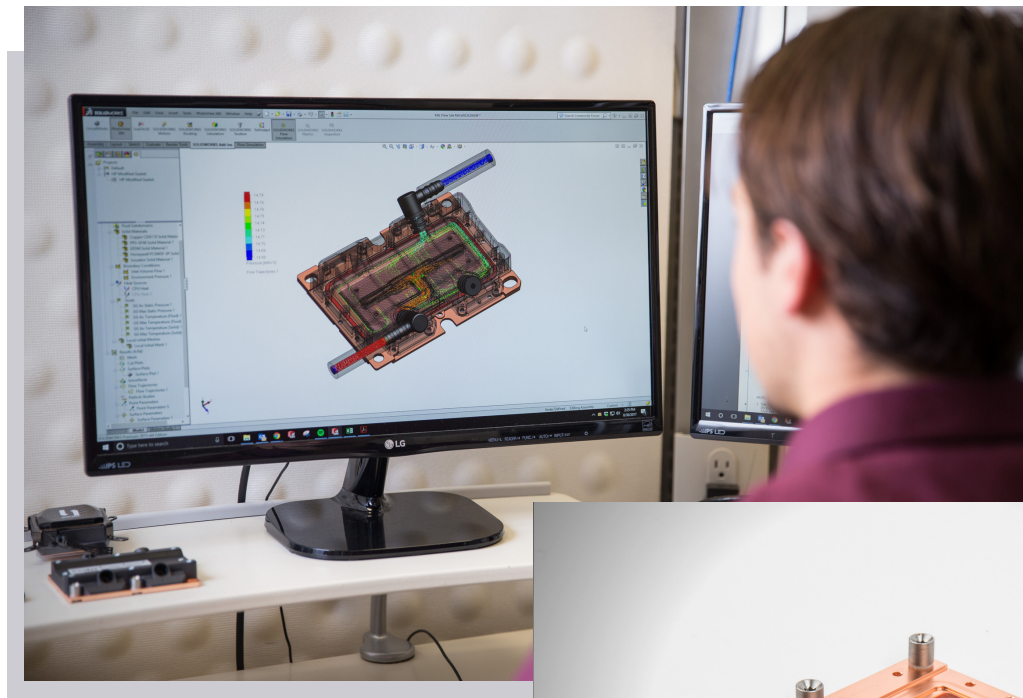
CoolIT's patented split-flow skived coldplates produce a very low-pressure drop per square inch while providing the high performance and reliability expected from DLC solutions.

CoolIT's RX1 coldplate is compatible with Intel® Xeon® Scalable Processors (Skylake) and offers a very low-pressure drop within the system. This helps to maintain a low overall system pressure drop with various coldplate loop configurations. Ultimately, this provides higher coolant flow rates with comparable pumping systems to coldplates with a higher pressure drop.

### RX1 $\Delta P$



CoolIT OAT PG25% Coolant was used in this test setup with an ambient air temperature of 21°C.



## EXPERIENCED COLDPLATE PARTNERS USE SKIVED COLDPLATES

It is commonplace for new coldplate vendors to appear and disappear in a relatively small period, due to lack of experience in the industry and difficulty building trust with OEM server vendors to include their untested designs. This stems from the fact that the coldplate and passive coldplate loop which installs onto the server, now become part of the Server OEMs own solution and must deliver excellent performance while meeting the quality and reliability standards they expect to accompany their own cutting edge technology.

The coldplate is one of the most critical components in the DLC loop and designing or building it incorrectly can have serious consequences to the entire liquid-cooled system. CoolIT has built and shipped over 4 million coldplates to a wide range of customer segments including desktop, HPC, and hyperscale customers.

# Conclusion

COOLIT SKIVED COLDPLATES ARE THE BEST OPTION FOR DLC APPLICATIONS AND ALLOW FOR UNRIVALED THERMAL EFFICIENCY AND PERFORMANCE.

CHOOSING A PROVEN COLDPLATE VENDOR IS A KEY DECISION IN ENSURING A LIQUID-COOLED DATACENTER WILL PERFORM AT ITS BEST AND DELIVER THE MAXIMUM PERFORMANCE THAT LIQUID COOLING IS KNOWN FOR.