

Through its innovative open-cell metal foams, Metafoam[®] Technologies is revolutionizing pool boiling technologies by significantly increasing the performance of boiling surfaces. As such, Metafoam is facilitating the introduction of a new generation of thermosyphons and other pool boiling solutions.

Metal Foam Boiling Plates

In order to manage increasing heat fluxes, thermal engineers are considering aggressive two-phase liquid cooling solutions. Typically, the main performance objective for pool boiling is to reach a high critical heat flux (CHF) while maintaining a low surface superheat (SSH). CHF is the maximum heat flux that can be handled by a boiling surface before performance drops (similar to dryout for heat pipes). SSH is the difference between surface temperature of the boiling apparatus and the fluid saturation temperature. Metafoam can offer a greatly enhanced solution by optimizing both parameters with its innovative material.



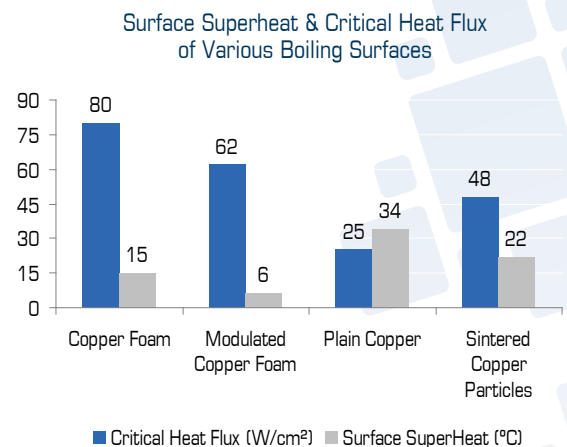
- Because of the unique microstructure of its metal foam yields to a high capillary force, the coolant is quickly pumped toward the heat source for quick and efficient evaporation.
- Modulated design of metal foam coating allows a good separation of vapor and coolant flow which enhances boiling efficiency.
- New patent pending processes to bond metal foams to plates reduce the thermal resistance at the interface.
- Passive pool boiling solutions reduce the costs related to forced convection liquid cooling since they do not require any pump and are quicker to fill during manufacturing.

High Performance Boiling Plates

Preliminary tests conducted at The University of Michigan by Professor Massoud Kaviany, a renowned heat transfer expert, on copper plates coated with copper foam have shown superior results. The tests used n-Pentane as the fluid at a pressure of 1 atm.

Metafoam's initial boiling plate prototypes as tested by Prof. Kaviany reached a CHF of up to 64.2 W/cm². The second generation of prototypes developed and tested by Metafoam has reached up to 80 W/cm² and therefore more than 515 W for a typical 1 in² die.

This is respectively 1.7 and 3.2 times more than sintered copper particles and plain copper surface.



Business Partners Sought

Metafoam's vision is to become the world's leading open-cell metal foam manufacturer for value added and mass market applications. In that regard, Metafoam is looking to enter into partnerships with leading thermal management solution providers to co-develop high performance solutions and/or directly integrate its materials into existing products. Various base materials (Cu, Ni, Fe, and Cu-Ag) can be used and the properties of the foam (porosity, pores size, density) can be adapted to meet specific needs.

Contact our team to learn more about these exciting possibilities.

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