

Battelle Number(s):

15779-E

Patent(s) Issued

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Available Technologies

Enhanced Two-Phase Flow and Heat Transfer in Evaporation

SUMMARY

Innovative and effective ways are needed to improve energy efficiency of cooling systems; improving heat exchangers used for collecting and rejecting heat is an effective way to accomplish such. Researchers at Pacific Northwest National Laboratory have developed a technology that can significantly improve the heat transfer in evaporators, resulting in significant utility cost savings and smaller, less expensive equipment.



Heat exchangers require a temperature difference to cause heat to transfer from a hot fluid to a cold fluid. A better heat exchanger can operate with a smaller temperature difference or can be smaller and therefore less expensive. Furthermore, the vapor generated in evaporators is superheated above the boiling temperature to ensure no liquid leaves the evaporator. Smaller temperature differences in the evaporator and less superheating of the vapor lead to higher energy efficiency in cooling systems, which is accomplished with the “Enhanced Two-Phase Flow and Heat Transfer in Evaporation” technology. Unique structures are used in the evaporating channels that provide separate flow paths for the liquid and vapor while enhancing the boiling process, resulting in improved heat transfer and more stable operation.

The invention is a family of structures, designs, and methods that can be incorporated into devices such as heat exchangers, making them smaller, lighter in weight, and/or capable of enhanced performance as compared to other existing devices. The technology is capable of modification in various respects without departing from the core of the invention.

Partners are sought to further develop the promising technology into a commercial prototype for field deployment.

ADVANTAGES

- * Improves efficiency of refrigeration and other thermodynamic cycles
- * Smaller hardware volume
- * Improves boiling heat transfer
- * Reduces pressure fluctuations for more stable operation

Patents & Intellectual Property

- » Patent Application #: U.S. 2009/0321053
- » Patent Application #: U.S. 6666909
- » Patent #: U.S. 6,875,247

Technology Portfolio(s)

- » Energy Efficiency
- » Microtechnology
- » Microsystems

Potential Industry Applications

- » Aerospace & Defense
- » Automotive & Transportation
- » Computers & Electronics
- » Consumer Products
- » Energy & Utilities

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