



TECHNOLOGY

Roll-Bonded Heat Exchangers for Low Temperature Lift Energy Conversion

OVERVIEW

Typical energy conversion—from power generation to heat pumping to air conditioning—utilizes a large temperature lift between heat source and heat sink. This is due, in part, to economic reasons. Energy conversion with a low temperature lift (ECLTL) between the heat source and heat sink requires a large heat transfer area and a high volume flow rate of heat source- and sink-fluid, which entails higher start-up and operating costs. However, rising fossil fuel prices and environmental regulation to mitigate climate change will make ECLTL systems powered by renewable energy more attractive due to their free fuel costs. Current ECLTL systems do have several shortcomings. For example, the pressing process for plate type heat exchangers is very expensive and results in minimal plate design flexibility, so that the flow area ratio between the heat transfer fluid and working fluid is not optimized.

Researchers at the University of Maryland have proposed a method that optimizes the area ratio between two heat transferring fluids for ECLTL systems. This method uses roll bonded heat exchange cartridges, which are so flexible that they can be custom designed to optimize the heat transfer area ratio and the flow area ratio between two heat transferring fluids. The heat exchanger surface can also be enhanced with holes or louvers. Furthermore, two heat exchange cartridges can be molded together and the gap between the modules adjusted to extend flow area ratio range. Because of these advantages, total required heat exchanger surface area, volume, and cost are much reduced as compared to conventional heat exchangers.

Advantages:

- Flexibility allows for complex geometries that optimize heat transfer and transfer flow
- Easy to adjust or modify to increase flow area ratio range
- Can be assembled and disassembled for cleaning and inspection
- Taken together, these improvements further reduce operating costs of ECLTL systems

Applications:

- Environmentally-friendly energy conversion—made possible by novel roll bonded heat exchangers for ECLTL systems

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Additional Information

INSTITUTION

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PATENT STATUS

Patent(s) pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Industrial Processing

EXTERNAL RESOURCES

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