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3D Printable Heat Exchanger

IP Status: Pending US Patent; **Application #:** 15/910,459

Compatible with Selective Laser Melt Metal Additive Manufacturing

A 3D printable heat exchanger compatible with selective laser melt metal additive manufacturing has been developed for hydraulic oil cooling applications. The plate-fin tube bank has special features, including non-circular, internally finned tubes, and external angled fins to allow flexibility in the printing process. The design allows additive manufacture commercial-scale heat exchangers with intricate features.

Shaped Tubes, Fins and Internal Features

Metal additive manufacturing is a relatively new manufacturing technique and its application to large working heat exchangers is still being explored. This new design is the first to address the problem inherent to additive manufacture of finned tube banks with internal features to enhance heat transfer to oil. With increased interest in 3D printing (additive manufacturing), a need exists for 3D printable fin-tube heat exchanger designs, and this new design is compatible with metal additive manufacturing (3D printing) for several components: internal flow disruptor features in shaped tubes, tubes with plain fins, and tubes with internal features.

BENEFITS AND FEATURES:

- Compatible with additive manufacturing
- Anticipated performance comparable to traditionally fabricated designs for similar end uses
- Uses no more metal than conventionally produced heat exchangers

APPLICATIONS:

- Heat exchangers
- HVAC
- Heat exchanger applications involving liquid to air heat transfer (e.g., oil coolers and engine radiators additively manufactured using metals)

Phase of Development - Prototype development. Prototypes of tubes, tubes with external fins, and tubes with fins and internal disruptors have been successfully manufactured and tested in a commercial facility.

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