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Design, Modeling, and Additive Manufacturing of Air-Cooled Heat Exchangers
Cross-Flow Air-Cooled Heat Exchanger Design

Traditionally Heat Exchanger

Additively Manufactured Heat Exchanger

Copper Tubes and Aluminum Fins

Macrostructure

Microstructure
Heat Exchanger Modeling

- Utilization of Computational Fluid Dynamics (CFD) and numerical optimization methods to investigate intricate geometries that aim reduce airside convection resistance at minimal hydraulic penalty.
Additive Manufacturing

- Composite polymer printing using Fused Filament Fabrication (FFF)
- Metal printing using Selective Laser Melting (SLM)

Aluminum-Filled-Polycarbonate Tapered-Pin-Fin Heat Exchanger

17-4 Stainless-Steel Airfoil Heat Exchanger