Ingersoll Rand - Ares 400+ Cooler Design

Overview
The team designed two heat exchangers that would deliver the required cooling for a newly planned air compressor the sponsor plans to introduce to market.

Objectives
While collaborating with an Ingersoll Rand engineer and students from Shanghai Jiao Tong University (SJTU). Two heat exchanger computer aided design (CAD) models were be developed. The team also performed analytical, computational fluid dynamics (CFD) and finite element analysis (FEA) studies validating the design met sponsor-set performance targets.

Approach
- Obtained sponsor performance targets from partners at SJTU
- Performed patent search on current technology
- Studied existing products
- Conducted analytical analysis aiding in design selection
- Choose final design
- Created CAD models of the two heat exchangers
- Performed FEA insuring models’ structural integrity
- Performed CFD analysis on fluid flow within the two heat exchangers
- Updated sponsor and our partners at SJTU with findings

Outcomes
- The sponsor was provided with CAD model that will aid in future design implementation.
- Model analysis confirmed that target requirements were met with the dimensional restrictions