Amphenol Advanced Sensors Temperature Response Test Bench

Overview
Amphenol Advanced Sensors proposed that the team design a temperature response bench that they could use to test automotive sensors. The bench had to have a uniform flow rate of 70 m/s and a temperature of 300°C. The team was able to create a design for the test bench and support the design with theoretical analysis and prototype testing.

Objectives
Design a test bench for use in temperature sensor testing that meets the following design requirements:
- Improve method of transitioning the temperature sensor to and from the test chamber.
- Improve control of airflow within the test chamber. A maximum average flow rate of 70 m/s, temperature up to 300°C, and greater flow uniformity is desired.
- Allow for improved system data collection, feedback, and safety according to OSHA standards.
- Allow for operation within an engineering lab with standard utilities including power, water, and air.

Approach
1. Determined clear, quantifiable design requirements
2. Researched comparable systems
3. Developed an initial design to meet requirements
4. Refined design based upon design concerns
5. Researched design concerns
6. Developed a final design
7. Produced a Bill of Materials to determine potential cost above budget
8. Developed a scale model in budget to test key concepts
9. Constructed scale model
10. Tested scale model and applied test results to final design recommendations
11. Completed documentation of results by producing a final report, video, presentation, and poster

Outcomes
- Temperature response bench design was completed and provided to Amphenol Advanced Sensors
- Final design theoretically meets all project objectives based on analysis presented in project reports
- Uniformity of flow was proven using scale model that was constructed and tested by the team