

UNC Charlotte – Lee College of Engineering Senior Design Program

Senior Design Project Description

Company Name	<i>Ingersoll Rand</i>	Date Submitted	<i>06/11/2019</i>
Project Title	<i>Small Reciprocating Compressor Efficiency Improvement</i> IR COMP	Planned Starting Semester	<i>Fall 2019</i>

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	5	Electrical	
Computer		Systems	
Other ()			

Company and Project Overview:

At Ingersoll Rand, we're committed to meeting the world's growing critical need for clean and comfortable air, safe and fresh food, energy efficiency and sustainable business practices. We're passionate about building a better future - a world of sustainable progress and enduring results. To deliver on the needs of our customers and the communities where we operate, and to achieve premier performance, we will:

Build a Winning Culture

Build a winning culture by living our values, creating a progressive, diverse and inclusive environment, enabling innovation and creativity, and the development of customer solutions that engage all employees in Ingersoll Rand's mission.

Grow Strategically

Grow strategically through technology and innovation, sales excellence and product management by delivering sustainable solutions and services addressing unmet needs for comfort and efficiency across the globe.

Deploy Operational Excellence

Deploy operational excellence to add value as defined by our customers through a relentless emphasis on continuous improvement.



Reciprocating Air Compressors

Ingersoll Rand has designed reciprocating single stage air compressor & two stage air compressors to last a lifetime. Applications include painting in auto body shop, sanding, making snow at ski hills, pneumatic nail guns, pneumatic drills, hammers, powering various air tools.



Project Requirements:

- The goal of this project is to improve efficiency (kW/CFM) of our small reciprocating compressor without increase in cost, by adapting latest technology used in automobile engines.



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- Ingersoll Rand currently has T30 compressors from the range 5 -30hp. The efficiency improvement has been limited over the past 20 years as it effects cost competitiveness.
- Improve efficiency of the bare compressor without adding cost.

Proposed Scope of Work

1. Complete design concept of changes that can improve efficiency in a T30 small reciprocating compressor.
2. Prototype design and test
 - a. Ingersoll Rand can provide a 5HP or 7.5HP single phase or three phase 230V compressor.
 - b. Ingersoll Rand can provide compressor and lab services in Davidson.
 - c. Can incorporate widely used standard automobile components – like valves, piston rings, pistons, etc so that cost remains same or less.

Expected Deliverables/Results:

1. Project Schedule
2. Bi-Weekly report out with design concepts
3. Final design concept and alternate concepts
4. Working prototype
5. Final Design Report – (Description, Diagrams, Calculations)
6. Display Poster for Project Team

Disposition of Deliverables at the End of the Project:

All material, hardware and documentation must be returned back to Ingersoll Rand

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- A diverse team is preferred.