

UNC Charlotte – Lee College of Engineering Senior Design Program

Senior Design Project Description

Company Name	<i>Electrolux</i>	Date Submitted	<i>11/15/2019</i>
Project Title	<i>Design of an Electronic Gas Valve (ELEC_GAS)</i>	Planned Starting Semester	<i>Spring 2020</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	2	Electrical	1
Computer	1	Systems	
Other ()			

Company and Project Overview:

Electrolux is based in Sweden and has been a long-standing world leader in appliance manufacturing. Founded 100 years ago (1919), Electrolux started with small appliances like the vacuum cleaner, and has since moved into the major appliances space, with Washers, Dryers, Refrigerators, etc.. Electrolux is most commonly known, in this area, under the brand Frigidaire.

For the past year, Electrolux has been working on a project to upgrade the standard burners on a range using new 3D printing techniques and advanced computer simulation of fuel and air mixing. The goal is to create a cost effective design that will maximize the mixing of the burners and give us a nice blue flame (where the most heat per unit gas is created). One thing that has been a pain for this project has been the lack of a good electronic valve, so that is where this project comes in.

The project proposed this year is an Electronic Gas Valve, for a standard gas range. There are many gas valve designs on the market, but they tend to have problems with non-linear power output for a linear signal input. We want a group to design a new valve that will be electronically controlled, and have a smooth power transition across multiple inputs.

Also, safety regulations require that any design must automatically shut off in the event of a power failure.

Project Requirements:



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The scope of the project will be to research, design, and build an electronically controllable gas valve. The primary objective of this valve is to have at least 5 power settings, which will correlate to 5 levels of gas flow. The 5 levels of flow should create a smooth linear transition in output power (with minimal hysteresis).

The valve must also close in the result of power failure to the control system.

Prototypes may use any gas for demonstration, but the final design should be fabricated of materials suitable for creating a live flame.

Expected Deliverables/Results:

- The Electronic Valve itself
- A basic control interface with at least 5 settings
- Drawings, documentation, coding, bill of material, etc.

Disposition of Deliverables at the End of the Project:

Unless otherwise specified during the project, Electrolux will take ownership of the Valve and all related materials after the Fall Design Expo.

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

- Basic knowledge of fluid dynamics
- Familiarity with a microcontroller, and programming expertise
- Understanding of non-linear control systems
- Safety with pressurized gases
- Safety dealing with open flames
- Basic user interface design