UNC CHARLOTTE
The WILLIAM STATES LEE COLLEGE *of* ENGINEERING

UNC Charlotte – Lee College of Engineering Senior Design Program

Senior Design Project Description

Company Name	*Electrolux*	**Date Submitted**	*10/30/2019*
Project Title	*Design of Restricted Vent Detection for Residential Dryer* **(ELEC_VENT)**	**Planned Starting Semester**	Spring 2020

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	1
Other ( )			

Company and Project Overview:

Electrolux shapes living for the better by reinventing taste, care and wellbeing experiences, making life more enjoyable and sustainable for millions of people.
As a leading global appliance company, we place the consumer at the heart of everything we do. Through our brands, including Electrolux, AEG, Anova, Frigidaire, Westinghouse and Zanussi, we sell more than 60 million household and professional products in more than 150 markets every year.

Electrolux has been doing business since 1919. The global headquarters is located in Stockholm, Sweden and the North American headquarters is in Charlotte NC. Below is a photo of the front load laundry pair currently sold in the US. The dryer on the right will be the focus of the project.

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Project Context:

2,900 home clothes dryer fires are reported each year and cause an estimated 5 deaths, 100 injuries, and $35 million in property loss. Failure to clean the dryer (34 percent) is the leading cause of home clothes dryer fires (per US Fire Administration). Reducing venting restriction by cleaning the vent and periodic cleaning of the interior of the dryer is critical to avoiding dryer fires.

It is therefore important to help alert the user when the vent or filter becomes restricted. The project goal is to develop a control algorithm within the dryer to determine whether the vent or filter is restricted in order to signal an alarm to the user. Ideally the algorithm can operate using the current dryer construction and sensors but the option to explore new sensors and construction changes could be considered if the cost impact is not significant (>$1.50)

Project Requirements:

The current dryer does not have a method to detect a restricted vent but has the potential by using sensor feedback which includes the inlet temperature, exhaust temperature, and moisture level of the clothing.

The controls solution must be designed to be robust to the many conditions the dryer could operate in such as:

- clothes load size
- fabric type
- vent restriction levels
- installation location
- amount of lint in the filter
- duct type (flexible or rigid)

The solution ideally utilizes the existing dryer construction. New sensors or major changes to the dryer will be considered as long as the cost impact is not too great. A cost increase less than $1.5 would be considered if utilizing the existing dryer construction is not feasible. Prototype costs for additions can be higher, but this would be the goal for the production volumes.

Electrolux will conduct a tear down of the dryer with the team at the beginning of the project to fully educate the team on the construction and current capabilities of the dryer.

A fully functional dryer will be provided. The dryer will be setup to be controlled using DASYLab software which is similar to LabView.

Expected Deliverables/Results:

- Prototype dryer with a controls algorithm to detect a restricted vent using base model EFME627UTT
- Estimated cost increase if current construction needs to be modified
- Test data to support robustness of solution(s)
- Documented test method
- Creation of test fixtures if necessary

Disposition of Deliverables at the End of the Project:

The prototype, test fixtures and all intellectual property will be delivered to Electrolux at the completion of the project.

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

- Thermodynamics
- Fluids
- Programming
- Familiarity with sensors
- Statistical tools (t-test, design of experiments)
- Labview or DASYLab software experience