



Company Information

Company Name	3M/Scott Safety	Date Submitted	6/05/2026
Project Title	Design of a Regulator Automated Tube Test (3M_TUBE)	Planned Starting Semester	Fall 2026

Senior Design Project Description

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	3	Electrical	2
Computer	1	Systems	0-1

Company Overview:

3M|Scott Fire and Safety is a premier manufacturer of innovative respiratory and personal protective equipment and safety devices for firefighters, industrial workers, police squads, militaries, homeland security forces and rescue teams around the world. 3M|Scott products protect thousands of individuals each day from environmental hazards including smoke, toxic fumes, combustible gases, falling objects and contaminants. The 3M|Scott product line includes self-contained breathing apparatus' (SCBA), supplied air and air-purifying respirators, thermal imaging cameras and firefighter communication and accountability devices.

Headquartered in Monroe, North Carolina with corporate offices in St. Paul, Minnesota, 3M|Scott Fire and Safety generates >\$500M in revenue and employs about 500 people in Monroe.

Expected Deliverables/Results:

The project will focus on the delivery and presentation of a complete working prototype for automating the testing process of the Regulator flow tube at the 3M|Scott Fire and Safety Monroe, NC manufacturing plant. The team will submit a completed working prototype of an automated load and test unit capable of flow testing a regulator flow tube. The prototype should be capable of picking a tube assembly out of a pallet or nest, loading the tube assembly into fixturing capable of flow testing, completing a flow test, and placing the completed tested part



into an acceptance or rejection bin.

- Two flow tube assemblies will be tested at 130psi and 160psi each. These tubes are the same tube dimensionally with a different orifice size, which will come preinstalled.
- The test values and test pressure will need to be visually displayed.
- The unit will need to be capable of withstanding up to 200 psi of air pressure to test.
- The unit will require a start button, reset button, and e-stop.
- 3M Scott Safety can supply a robot, flow meters, and/or workstation if warranted to integrate into the system.

In addition, students should also determine how to store overall tester information for each pallet/nest to track machine OEE.

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

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

- Robotics knowledge
- Fluid Dynamics
- Thermodynamics
- Physics
- Low Pressure Pneumatics
- Heat Transfer
- Industrial Engineering
- PLC Programming knowledge