The purpose of this project was to build a machine to form plastic hoses which would make Transfer Flow Inc.’s product less costly to manufacture, could be used in more applications, and would provide a better product to their customers.

The parameters for the Plastic Hose Forming System are:

- Safe
- Efficient
- Cost effective
- Versatile
- Easy setup/maintenance
- Take up small space

The objectives of the project included:

- Verify a thermoforming process
- Form hose into unique geometries
- Partial automation by a computer
- Be cost effective

The plastic hose forming system consists of a heating loop, a cooling loop, a work table, and a fixturing system. The first step in forming hoses is orienting the fixturing system. An operator will use an example shape to properly locate the fixtures. Once the fixtures are in place the operator will connect an unformed hose inline with the system. Hot propylene glycol is then cycled through the system until the hose becomes malleable. The hose is then placed into the configured fixture pattern, and then purged of the hot glycol with compressed air. Cold propylene glycol is then cycled through the system until the hose becomes rigid, and is then purged once again. Any remaining air pressure is released from the hose and the forming cycle is complete.

The computer controls all the major processes in the operation of the plastic hose forming system. This includes the solenoid valves, ac motors, and the heating element. The computer receives inputs from the thermocouples, level sensors, and pressure transducer. The control system allows for communication with the plastic hose forming system through software designed in Labview®. This software allows for an interactive display of the operations, control of the part parameters, as well as, provides a fail safe protocol that will help protect the operator.

A Differential Scanning Calorimetry Machine was used to find the phase change temperatures of the three types hoses considered for forming. The data was used to estimate the required temperature to form that type of hose.