

## PROJECT INFORMATION

**Project Title:** Centrifugal Fan Test Stand

**Expected Duration:** August 2002 to December 2002 (Fall 2002 semester)

**Course Name and Number:** EGR4390-Engineering Design II (senior design)

**Anticipated Number of Students Working on Project:** Ten engineers and six technicians

**Anticipated Number of Future Students to Use the Project:** Thirty per year

### **Project Description:**

Baylor University (Baylor) and the Texas State Technical College at Waco (TSTC) have formed a partnership involving joint design projects and shared laboratory space. The goal of this proposed joint design project is to produce an affordable centrifugal fan test stand to be installed in the shared laboratory space for use by future Baylor engineering students and future TSTC technology students in their study of the performance of fans of the type typically used in HVAC applications. The proposed apparatus consists of an air duct with a motorized damper and flow meter connected to a centrifugal fan installed with any one of three interchangeable centrifugal fan impellers of the forward curved, backward curved and radial blade designs. The fan is driven by a variable speed electric motor under computer control, with metered and recorded electrical power consumption. Airflow measurements are taken and processed to provide the performance and efficiency curves for a given impeller design that will then be compared to the manufacturer's data. The validity of the fan laws for estimating off-curve performance will also be studied. Hardware design shall include the necessary support structures, electrical service, and instrumentation and controls required to carry out fan testing experiments. Software design shall include the computer-assisted control and analysis tools necessary to support meaningful HVAC fan testing experiments. Project deliverables shall include the test apparatus specification, a compliance test report, and a user's manual containing laboratory procedures and sample experiments. Proposed project schedule:

Week 1	Statement of Need
Week 2	Project Definition
Week 3	Concepts Evaluation
Week 4	Conceptual Design Report
Week 5	Subsystems Review
Week 6	Preliminary Design Review
Week 7	Construction Documents
Week 8	Final Design Presentation
Week 9	Construction
Week 10	Subsystems Tests
Week 11	System Integration

Week 12	Compliance Test
Week 13	Report of results
Week 14	Final Design Review
Week 15	Project Overview

A final written report will be submitted to *ASHRAE* at the conclusion of the project.

**Amount of Funds Requested:** \$5000.00

**Anticipated Use of Funds:** The *ASHRAE Undergraduate Senior Project Grant* funds will be used in a joint Baylor/TSTC design project to purchase hardware to build a centrifugal fan test stand to be installed in a shared laboratory for use by both future Baylor engineering students and future TSTC engineering technology students.