

# APSM 175A: TABB TECHNICIAN CERTIFICATION

## Foothill College Course Outline of Record

Heading	Value
<b>Units:</b>	2
<b>Hours:</b>	20 lecture, 20 laboratory per quarter (40 total per quarter)
<b>Prerequisite:</b>	Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	None
<b>Grade Type:</b>	Letter Grade (Request for Pass/No Pass)
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- A successful student will be able to calibrate a velocity reset controller for a VAV terminal unit.
- A successful student will be able to perform a duct pitot tube traverse on a HVAC system.
- A successful student will be able to achieve TABB Technician certification.

## Description

Students will demonstrate proper test and balance skills and achieve TABB Technician certification.

## Course Objectives

The student will be able to:

- Describe formulas used in TAB industry
- Describe fundamentals of psychrometrics
- Describe basic HVAC control strategies in HVAC
- Calculate BTU in heat transfer functions
- Determine ratio of tolerance and key outlets in air systems
- Determine pump impeller diameter and flow in hydronic pumps
- Calculate absolute pressure from gauge pressures
- Perform a static profile of an HVAC system
- Calibrate a velocity reset controller for a VAV terminal unit
- Perform a duct pitot tube traverse on a HVAC system
- Proportionally balance a constant volume HVAC air system
- Proportionally balance a constant volume HVAC hydronic system

## Course Content

- Describe formulas used in TAB industry
  - Describe the belt length calculation formula and calculate Bhp and fan static efficiency (Lec and Lab)
  - Determine Ak factor for an air register (Lec and Lab)
- Describe fundamentals of psychrometrics
  - Describe dry bulb, wet bulb, dew point and relative humidity (Lec and Lab)

- Determine psychrometric values on a psychrometric chart (Lec and Lab)
- Describe basic HVAC control strategies in HVAC
  - Discuss the three main components in a control loop (Lec)
  - Discuss electric, pneumatic, hybrid and DDC control systems (Lec)
- Calculate BTU in heat transfer functions
  - Calculate BTU in an air stream and water coil (Lab)
  - Determine heat transfer between air and water (Lab)
- Determine ratio of tolerance and key outlets in air systems
  - Describe the ratio of tolerance when performing TAB (Lec and Lab)
  - Calculate the ratio of tolerance allowed from a given tolerance standard (Lec and Lab)
  - Calculate percentage of design with given airflow readings (Lec and Lab)
  - Determine key outlet from percentage of design (Lec and Lab)
- Determine pump impeller diameter and flow in hydronic pumps
  - Perform a block tight test on a pump to determine TDH (Lec and Lab)
  - Determine pump impeller using TDH and a pump curve (Lec and Lab)
  - Determine flow using TDH and a pump curve (Lec and Lab)
- Calculate absolute pressure from gauge pressures
  - Determine PSIG from a gauge and calculate PSIA (Lab)
- Perform a static profile of an HVAC system
  - Perform a static profile of an air handling unit and its components (Lab)
  - Calibrate a velocity reset controller for a VAV terminal unit
    - Calibrate the maximum and minimum flow set point on a pneumatic reset controller (Lec and Lab)
- Perform a duct pitot tube traverse on a HVAC system
  - Perform a rectangular and round duct pitot traverse to SMACNA standards (Lab)
- Proportionally balance a constant volume HVAC air system
  - Perform a proportion balance on a HVAC air system to SMACNA standards (Lab)
- Proportionally balance a constant volume HVAC hydronic
  - Perform a proportion balance on a HVAC hydronic system to SMACNA standards (Lab)

## Lab Content

- Practice and demonstrate proficiency in skills required for Test Adjust and Balance Bureau Technician certification.

## Special Facilities and/or Equipment

- Laboratory with sheet metal test and balance tools and sample system components
- Personal protective equipment

## Method(s) of Evaluation

- Results of written quizzes and tests
- Responses in class discussions
- Comprehensive written examination to certification level
- Comprehensive practical skills demonstration to certification level

## Method(s) of Instruction

- Lecture
- Discussion
- Demonstration
- Lab assignments followed by discussion

## **Representative Text(s) and Other Materials**

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

## **Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments**

A. Sample reading assignment: From the textbook, review related sections in preparation for the certification exam.

B. Sample writing assignment: Describe the belt length calculation formula.

## **Discipline(s)**

Sheet Metal