

Tri-County Technical College
Industrial Mechanics/HVAC Department - Industrial and Engineering Technology Division
Technical Advanced Placement (TAP) Program

Competency Verification and Teacher Recommendation Form

IMT 131 (Hydraulics and Pneumatics)

SECTION I (To be completed by the student)

Please complete this section of the form and give it to your Industrial Mechanics, Environmental Controls Technology, or Air Conditioning/Heating/Refrigeration teacher.

Your Name (*PLEASE PRINT*): _____ Phone: _____

Address: _____ SSN: _____

City: _____ State: _____ Zip: _____

High School: _____ Grade: _____

SECTION II (To be completed by the teacher)

By placing my initials next to the appropriate competency statement listed on the back of this form, I verify that this student has mastered major competencies of IMT 131 (*Hydraulics and Pneumatics*), as defined in the approved syllabus dated July 27, 2000. I understand that in order to progress in the validation process for Technical Advanced Placement credit, *a minimum of 75 percent of the competencies must be verified*. Having met this requirement, I recommend this student be permitted to continue the validation process by completing the TAP exam, which I understand will be arranged through the Industrial Mechanics Department at Tri-County Technical College.

Teacher Name (*PLEASE PRINT*): _____

Signature: _____

Date: _____

Name of high school course(s) in which this student gained the required competencies for possible TAP advanced standing: _____

Date of course completion or expected completion: _____

Comments (if applicable): _____

Please make a copy of this form for your records and mail the original to Ms. Tonia McClain, Industrial and Engineering Technology Division Secretary, Tri-County Technical College, PO Box 587, Pendleton, SC 29670. (Questions regarding TAP procedures for IMT 131 should be directed to Mr. Franklin Smith, IM/HVAC Department Head, at 646-8361, extension 1413.)

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COMPETENCIES (please initial each one)

- _____ 1. Describe the characteristics of a liquid; determine how static force is transmitted through liquids; define S.S.U.
- _____ 2. Describe the operation at the suction side of a pump; discuss different pressure scales and a different unit of pressure as used on the suction side; discuss true cavitation; contrast entrained and dissolved air in a fluid.
- _____ 3. Determine pressure, force, area, rod speed torque and hydraulic horsepower; discuss cylinder stroke and volume; identify hydraulic motors; define torque; construct a hydraulic system to test the relationship between pressure, area and force.
- _____ 4. Identify and discuss four type of valves (directional control, pressure control, flow control, and check) used to control hydraulics; construct hydraulic circuits using the four valves.
- _____ 5. Name and identify types of accumulators; discuss the functions of accumulators and check valves; describe the operation of hydraulic cylinder; construct a hydraulic circuit using a cylinder and accumulator.
- _____ 6. Identify and describe operation of flow control valves; identify applications of a flow control valve; construct a hydraulic circuit using a flow control valve.
- _____ 7. Identify 4-way, 3-way and 2-way valves; name types of center positions used in directional control valves describe operation and applications of directional control valves.
- _____ 8. Identify two types of pressure control valves; describe operation of simple pressure control valves; construct a hydraulic circuit to test operation of pressure control valve.
- _____ 9. Name and describe the operation of the three types of pumps used in hydraulics; identify positive and non-positive displacement pumps.
- _____ 10. Classify hydraulic motors as uni-directional or bi-directional; identify vane, gear and piston types of hydraulic motors; discuss variable displacement and overcenter types; determine torque rating and operation speed.
- _____ 11. List types of fluids used in hydraulics; discuss fluid additives; describe hydraulic system reservoirs; discuss requirements for oil coolers and filters; discuss bypass valves.
- _____ 12. Calculate pressure, temperature and volume of gases using Boyle=s Law, Charles= Law and General Gas Law; identify parts of positive displacement compressor; contrast flow rate and critical velocity.
- _____ 13. Describe functions of pressure switches, safety relief valves and pressure regulators; describe the operation of directional control valves and flow control valves; identify basic components used in pneumatic systems.
- _____ 14. Identify five basic compressors; calculate displacement; describe single-stage and two-stage compressors; describe methods of unloading compressors; describe the effects of altitude on compressors.
- _____ 15. Discuss elevated temperature of air released from compressors; identify components to remove water and/or oil vapor from air; discuss the difference among refrigerant, absorption and absorption air dryers; explain sizing of receiver for constant and variable demand; compare basic piping systems.
- _____ 16. Describe operation and application of simple check valve; describe types, operations, and sizing of pneumatic motors; discuss use and application of pneumatic cylinders; size pneumatic cylinders.
- _____ 17. Discuss ball, globe, needle and sandwich flow control valves; explain the use of silencers; describe use of quick exhaust valves, including advantages.
- _____ 18. Describe sequence valve; describe venting, non-venting and reverse flow regulators; describe boosters and air-oil tanks.
- _____ 19. Describe the origin of pneumatics system contaminants; describe the rating of air line filters; explain air line lubricators; explain the selection of Filter Regulator Lubricator units.