TRN 140 Transportation Climate Control

COURSE DESCRIPTION:

Prerequisites: None
Corequisites:

P:d [(TuTj 0r[(P)--1 (re c)2.1 (:P)-v)2 (C 0.00s)1Pere .00t<tTw T*h(re)-1 (re (:P)-ry)2.1 o(r
repair of climate control components and systems, recovery/recycling of refrigerants, and
safety and environmental regulations. Upon completion, students should be able to diagno
and repair vehicle climate control systems. Course Hours Per Week: Class, 1. Lab, 2. Semest
Hours Credit, 2

STUDENT LEARNING OUTCOMES:

Upon successful completion of this course, the student will be able to:
(State-wide outcomes)

a. In a lab setting, demonstrate work place safety per OSH and EPA guidelines that apply to relevant climate control systems found on transportation vehicles and equipment
b. Given a transportation vehicle or related equipment with a fault to the climate control system, diagnose and repair the climate control system using the recommended lab equipment as outlined by the related service information.
c. Using the recommended equipment as outlined by the EPA, identify and perform the proper recovery and recycling procedures for any refrigerant in a transportation veh or related equipment.
d. Describe the operation of the heating, ventilation and air condition systems.
e. Describe the use of climate control testing equipment to aid diagnosis of the systems
f. Describe the use of appropriate service information and capacity charts.
g. Describe the EPA regulations that govern the proper use of refrigerants in a transportation vehicle or related equipment.

(Local outcomes)

h. Explain basic air conditioning, heating and cooling theory and system operation.
i. Identify refrigeration components.
j. Identify refrigeration and cooling system safety precautions.
k. Inspect refrigeration and cooling system components.

p. Discharge and service air conditioning system components.
q.

1) Adding refrigerant as a liquid
2) Charging with vapor
3) Adding refrigerant to accumulator type systems
4) EPA regulations

I. Leak Testing
    1) Halide
    2) Electronic
    3) Soap
    4) Dytel
J. Compressor Reed Valve Replacement
K. Compressor Front Seal Replacement
L. Replace Low Pressure Protection Devices
M. Replace Clutch Components
N. Replace Hoses, Lines, Fittings, and Seals
O. Expansion Valve Screen Replacement
P. VIR Overhaul
Q. Receiver-Drier/Desiccant Replacement
R. Accumulator Replacement
S. Expansion Tube Replacement
T. STV and EPR Valve Replacement
U. Compressor Replacement/Flushing System

IV. Problem/Diagnosis
    A. Engine Overheating
    B. Noisy System Operation
        1) Mounts
        2) Bearings
            (a) pulley
            (b) clutch
        3) Belts
        4) Excessive high or low charge
        5) Moisture in the refrigerant
    C. Insufficient Cooling
    D. Intermittent Cooling
    E. No cooling at all
    F. Windshield Fogging
    G. Abnormal Low-Side Readings
    H. Abnormal High-Side Readings
    I. Frost on Evaporator
    J. Sight Glass
        1) Clear
        2) Bubbles
        3) Oily
        4) Cloudy

K. Electrical Circuit Problems
   1) Blown fuse
   2) Defective wiring
   3) Bad connections
   4) Defective thermostat
   5) Magnetic clutch
L. Effects of moisture in System
M. POA Systems/Pressures
N. EPR Systems/Pressures
O. Air Distribution
   1) Vacuum motors
   2) Manual cables
   3) Blower motor
      (a) Relays
      (b) Fuses
      (c) Resistors
P. Driveability/Compressor Control Check Areas
   1) Constant run relay
   2) Time delay relay
   3) Wide open throttle switch
   4) Low vacuum switch
   5) Power steering pressure swiitc
   6) Power brake time relay
   7) High coolant temperatu5re switch
   8) Electronic control module delay timer
   9) Anti-dieseling relay

V. Heating Systems
   A. Components
      1) Blend doors
      2) Blower motor
      3) Control valves
      4) Plenum chamber
      5) Vacuum reservoir and check valve
      6) Electrical controls
   B. Flow Control Valve Operation
      1) “Bowden” cable operated
      2) Restricted heater
      3) Small hose usually inlet
   C. Thermostat and By-pass
   D. Radiator, Pressure Cap, and Expansion Tank Operation
   E. Service
      1) Electrolysis damage
      2) “Bloc-Chek” test

3) Testing radiator pressure cap
4) Reverse flushing
5) Fluid fan inspection
6) Replace heater coolant valve
7) Replace heater core
8) Replace hoses
9) Replace drive belts
10