

A/C System and Components—Evaporator Condenser and Related Components

Student/intern information:

Name _____ Date _____ Class _____

Vehicle used for this activity:

Year _____ Make _____ Model _____

Odometer _____ VIN _____

Learning Objective/Task (General Electrical Systems)	2007 NATEF Reference Number	2007 NATEF Priority Level
• Correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses.	6B3-1	P-1
• Inspect A/C system hoses, lines, filters, fittings, and seals; determine needed action.	6B3-2	P-1
• Inspect A/C condenser for proper air flow.	6B3-3	P-1
• Inspect and test A/C system condenser and mountings; determine needed action.	6B3-4	P-2
• Inspect and replace receiver/drier or accumulator/drier.	6B3-5	P-1
• Inspect and test cab/sleeper refrigerant solenoid, expansion valve(s); check placement of thermal bulb (capillary tube); determine needed action.	6B3-6	P-3
• Remove and replace orifice tube.	6B3-7	P-1
• Inspect and test cab/sleeper evaporator core; determine needed action.	6B3-8	P-3
• Inspect, clean, or repair evaporator housing and water drain; inspect and service/replace evaporator air filter.	6B3-9	P-1
• Identify and inspect A/C system service ports (gauge connections); determine needed action.	6B3-10	P-1
• Identify the cause of system failures resulting in refrigerant loss from the A/C system high pressure relief device; determine needed action.	6B3-11	P-2

Time off _____

Time on _____

Total time _____

Recommended Resource Materials

- CDX Automotive program
- CDX eTextbook
- Technical service bulletins, shop manuals, and any other information applicable to the specific vehicle or components
- Class notes

Materials Required

- Vehicles or simulators with HVAC faults
- Vehicle manufacturer's workshop manual including schematic wiring diagrams
- HVAC systems with orifice tubes and expansion valves, refrigerant, lubricant
- Specialist refrigeration tools, thermometers, manifold set, refrigerant recycler, vacuum pump
- HVAC parts and refrigerant
- Manufacturer-specific tools depending on the concern

Some Safety Issues to Consider

- You may be required to handle refrigerant. Use extreme caution: refrigerant is pressurized and very cold. Always wear eye protection and appropriate clothing when working with refrigerant. Never inhale refrigerant.
- Do not release refrigerant to the atmosphere, always use a recycling system to reclaim refrigerant. Check for local environmental laws or regulations in relation to the management of refrigerant gases.
- Activities may require test driving the vehicle on the school grounds or on a hoist, both of which carry severe risks. Attempt this task only with full permission from your supervisor/instructor and follow all the guidelines exactly.
- Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with federal, state, and local regulations.
- Always wear the correct protective eyewear and clothing and use the appropriate safety equipment, as well as fender covers, seat protectors, and floor mat protectors.
- Make sure you understand and observe all legislative and personal safety procedures when carrying out practical assignments. If you are unsure of what these are, ask your supervisor/instructor.

Performance Standard

0—No exposure: No information or practice provided during the program; complete training required

1—Exposure only: General information provided with no practice time; close supervision needed; additional training required

2—Limited practice: Has practiced job during training program; additional training required to develop skill

3—Moderately skilled: Has performed job independently during training program; limited additional training may be required

4—Skilled: Can perform job independently with no additional training

▶ TASK Correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses. **6B3-1**

1. Research how to correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses; use the appropriate service information for the vehicle you are working on and list results below:

a. Evaporator:

b. Condenser:

c. Receiver/drier or accumulator:

Time off _____

Time on _____

Total time _____

d. Hoses:

2. Have your supervisor/instructor verify your research.

Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses.

4. Replace the evaporator, condenser, receiver/drier or accumulator/drier, and hoses, and correct lubricant level. List the actions undertaken below:

5. Check corrective actions with your supervisor/instructor.

Supervisor/instructor's initials: _____

6. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

7. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-1

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Supervisor/instructor signature _____ Date _____

▶ TASK Inspect A/C system hoses, lines, filters, fittings, and seals; determine needed action.

6B3-2

1. Research how to inspect A/C system hoses, lines, filters, fittings, and seals and determine needed action in the appropriate service information for the vehicle you are working on and list them below:

a. Hoses and lines:

b. Filters:

Time off _____

Time on _____

Total time _____

c. Fittings and seals:

2. Have your supervisor/instructor verify your research.

Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to check.

4. Examine the vehicle/simulator and inspect A/C system hoses, lines, filters, fittings, and seals.

5. Determine and list any necessary action(s):

6. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

7. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-2

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Supervisor/instructor signature _____ Date _____

▶ TASK Inspect A/C condenser for proper air flow.

6B3-3

1. Research how to inspect the A/C condenser for proper air flow in the appropriate service information for the vehicle you are working on and list below:

Time off _____

Time on _____

Total time _____

2. Have your supervisor/instructor verify your research.

Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to check.

4. Examine the vehicle/simulator and inspect A/C condenser for proper air flow.

5. Determine and list any necessary action(s):

6. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

7. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-3

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Supervisor/instructor signature _____ Date _____

▶ TASK Inspect and test A/C system condenser and mountings; determine needed action.

6B3-4

1. Research how to inspect and test the A/C system condenser and mountings in the appropriate service information for the vehicle you are working on and list below:

2. Have your supervisor/instructor verify your research.
Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to check.

4. Examine the vehicle/simulator and inspect and test the A/C system condenser and mountings.

5. Compare your results to the manufacturer's specifications. List your observations:

6. Determine and list any necessary action(s):

Time off _____
Time on _____
Total time _____

7. Have your supervisor/instructor verify satisfactory completion of this section of the procedure and if instructed carry out any rectification required.

Supervisor/instructor's initials: _____

8. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

9. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-4

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Supervisor/instructor signature _____ Date _____

▶ TASK Inspect and replace receiver/drier or accumulator/drier.

6B3-5

1. Research how to inspect and replace receiver/drier or accumulator/drier in the appropriate service information for the vehicle you are working on and list results below:

Time off _____

Time on _____

Total time _____

2. Have your supervisor/instructor verify your research.

Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to inspect and replace receiver/drier or accumulator/drier.

4. Inspect and replace receiver/drier or accumulator/drier.

5. List the result of your inspection:

6. Determine and list any necessary corrective action(s):

7. Check corrective actions with your supervisor/instructor.

Supervisor/instructor's initials: _____

8. Replace receiver/drier or accumulator/drier.
9. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.
10. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-5

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Supervisor/instructor signature _____ Date _____

▶ TASK Inspect and test cab/sleeper refrigerant solenoid, expansion valve(s); check placement of thermal bulb (capillary tube); determine needed action. **6B3-6**

1. Research how to inspect and test the cab/sleeper refrigerant solenoid, expansion valves; check placement of thermal bulb (capillary tube) in the appropriate service information for the vehicle you are working on and list them below:

a. Inspection and test of refrigerant solenoid:

b. Inspection and test of expansion valves:

c. Check placement of thermal bulb (capillary tube):

2. Have your supervisor/instructor verify your research.
Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to work on.

4. Examine the vehicle/simulator A/C compressor and inspect and test the cab/sleeper refrigerant solenoid, and expansion valve(s); check placement of thermal bulb (capillary tube).

Time off _____

Time on _____

Total time _____

5. List the result of your inspection and test:

6. Determine and list any necessary corrective action(s):

7. Check corrective actions with your supervisor/instructor.

Supervisor/instructor's initials: _____

8. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

9. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-6

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Supervisor/instructor signature _____ Date _____

TASK Remove and replace orifice tube.

6B3-7

1. Locate remove and replace orifice tube in the appropriate service information for the vehicle you are working on.

a. List the steps outlined in the service information to remove the orifice tube:

b. List the steps outlined in the service information to replace the orifice tube:

2. Have your supervisor/instructor verify your research.

Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to remove and replace the orifice tube.

4. Remove and replace the orifice tube as per the service information.

Time off _____

Time on _____

Total time _____

5. Return any tools that you may have used to their proper locations.

6. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-7

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Supervisor/instructor signature _____ Date _____

▶ TASK Inspect and test cab/sleeper evaporator core; determine needed action. **6B3-8**

1. Research how to inspect and test the cab/sleeper evaporator core in the appropriate service information for the vehicle you are working on and list your findings below:

2. Have your supervisor/instructor verify your research.
Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to check.

4. Examine the vehicle/simulator and inspect and test the cab/sleeper evaporator core.

5. Compare your results to the manufacturer's specifications. List your observations:

6. Determine and list any necessary action(s):

7. Have your supervisor/instructor verify satisfactory completion of this section of the procedure and if instructed carry out any rectification required.
Supervisor/instructor's initials: _____

8. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

Time off _____

Time on _____

Total time _____

9. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-8

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Supervisor/instructor signature _____ Date _____

▶ TASK Inspect, clean, or repair evaporator housing and water drain; inspect and service/replace evaporator air filter.

6B3-9

Time off _____

Time on _____

Total time _____

1. Research how to inspect, clean, or repair evaporator housing and water drain; inspect and service/replace evaporator air filter in the appropriate service information for the vehicle you are working on and list results below:

a. Inspect, clean, or repair evaporator housing and water drain:

b. Inspect and service/replace evaporator air filter:

2. Have your supervisor/instructor verify your research.

Supervisor/instructor's initials: _____

3. Ask your supervisor/instructor for a vehicle or simulator to inspect, clean, or repair evaporator housing and water drain; inspect and service/replace evaporator air filter.

4. Inspect, clean, or repair evaporator housing and water drain; inspect and service/replace evaporator air filter; list the actions undertaken below:

5. Check corrective actions with your supervisor/instructor.

Supervisor/instructor's initials: _____

6. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

7. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-9

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Supervisor/instructor signature _____ Date _____

▶ TASK Identify and inspect A/C system service ports (gauge connections); determine needed action.

6B3-10

Time off _____

Time on _____

Total time _____

1. Research how to identify and inspect A/C system service ports (gauge connections) in the appropriate service information for the vehicle you are working on and list findings below:

2. Ask your supervisor/instructor for a vehicle or simulator to identify and inspect A/C system service ports (gauge connections).

3. Examine the vehicle/simulator A/C compressor and identify and inspect A/C system service ports (gauge connections).

4. List the result of your inspection:

5. Determine and list any necessary corrective action(s):

6. Check corrective actions with your supervisor/instructor.
Supervisor/instructor's initials: _____

7. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

8. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-10

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Supervisor/instructor signature _____ Date _____

▶ TASK Identify the cause of system failures resulting in refrigerant loss from the A/C system high pressure relief device; determine needed action.

6B3-11

Time off _____

Time on _____

Total time _____

1. Research how to identify causes of system failures that result in refrigerant loss from the A/C system high pressure relief device. Use the appropriate service information for the vehicle you are working on and list findings below:

2. Have your supervisor/instructor verify your research.
Supervisor/instructor's initials: _____

3. Ask your supervisor for a vehicle to identify the cause of system failures resulting in refrigerant loss from the A/C system high pressure relief device.

4. Test the system to determine the cause of the complaint. List your observations here:

5. Determine any necessary action(s):

6. Return the vehicle to beginning condition and return any tools that you may have used to their proper locations.

7. Discuss the findings with the instructor.

Performance Rating

2007 NATEF Reference Number: 6B3-11

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Supervisor/instructor signature _____ Date _____