

A/C System and Components—Compressor and Clutch

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
<ul style="list-style-type: none"> Identify A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed action. 	6B2-1	P-1
<ul style="list-style-type: none"> Inspect, test, and replace A/C system pressure, thermal, and electronic protection devices. 	6B2-2	P-2
<ul style="list-style-type: none"> Inspect and replace A/C compressor drive belts, pulleys, and tensioners; adjust belt tension and check alignment. 	6B2-3	P-1
<ul style="list-style-type: none"> Inspect, test, service, or replace A/C compressor clutch components or assembly. 	6B2-4	P-2
<ul style="list-style-type: none"> Inspect and correct A/C compressor lubricant level (if applicable). 	6B2-5	P-2
<ul style="list-style-type: none"> Inspect, test, or replace A/C compressor. 	6B2-6	P-2
<ul style="list-style-type: none"> Inspect, repair, or replace A/C compressor mountings and hardware. 	6B2-7	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
- 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 Identify A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed action. **6B2-1**

1. Research what causes protection devices (pressure, thermal, and electronic) to interrupt system operation; use the appropriate service information for the vehicle you are working on and list the causes below:

a. Causes of pressure protections devices interrupting system operation:

b. Causes of thermal protection devices interrupting system operation:

c. Causes of electronic protection devices interrupting system operation:

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

3. Examine the vehicle/simulator and identify A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation.

4. List the problems identified:

Time off _____

Time on _____

Total time _____

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

6. Return the vehicle to its 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: 6B2-1

0

1

2

3

4

Supervisor/instructor signature _____ Date _____

▶ TASK Inspect, test, and replace A/C system pressure, thermal, and electronic protection devices.

6B2-2

1. Research how to inspect, test and replace A/C system pressure, thermal, and electronic protection devices in the appropriate service information for the vehicle you are working on and list them below:

a. Pressure protection:

b. Thermal protection:

c. Electronic protection:

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 test and replace A/C system pressure, thermal, and electronic protection devices.

Time off _____

Time on _____

Total time _____

5. Using the appropriate service information, determine the steps necessary for testing the components:

6. Write a short description of the purpose and operation of the suspected component(s):

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

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: 6B2-2

0

1

2

3

4

Supervisor/instructor signature _____ Date _____

▶ TASK Inspect and replace A/C compressor drive belts, pulleys, and tensioners; adjust belt tension and check alignment.

6B2-3

1. Research how to inspect and replace A/C compressor drive belts, pulleys, and tensioners; adjust belt tension; and check alignment. Use the appropriate service information for the vehicle you are working on.

a. List the steps outlined in the service information:

b. Write down the specified tension of the compressor drive belt:

Time off _____

Time on _____

Total time _____

c. List faults to look for when inspecting drive belts, pulleys and tensioners:

d. Describe how to check correct pulley and belt alignment:

2. Remove vehicle A/C compressor drive belts.

a. Inspect vehicle drive belts, pulleys, tensioners, and mounting brackets for faults.

b. List any faults identified on the vehicle A/C compressor drive belts, pulleys, and tensioners.

c. Refit vehicle A/C compressor drive belts using appropriate service information.

3. Retention A/C compressor drive belts using appropriate service information.

4. Check for correct pulley, tensioner, and A/C compressor drive belt alignment.

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

6. Discuss the findings with your instructor.

Performance Rating

2007 NATEF Reference Number: 6B2-3

0

1

2

3

4

Supervisor/instructor signature _____ Date _____

TASK Inspect, test, service, or replace A/C compressor clutch components or assembly.

6B2-4

1. Research how to inspect, test, service, or replace A/C compressor clutch components or assembly in the appropriate service information for the vehicle you are working on and list them below:

2. Ask your supervisor for a vehicle or simulator to check the A/C compressor clutch or components.

Time off _____

Time on _____

Total time _____

3. Inspect, test, service, or replace the A/C compressor clutch components or assembly. List your observations here:

4. Compare your results to the manufacturer’s specifications. List your observations:

5. Determine any necessary action(s):

6. 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: _____

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: 6B2-4

0

1

2

3

4

Supervisor/instructor signature _____ Date _____

TASK Inspect and correct A/C compressor lubricant level (if applicable).

6B2-5

1. Research how to inspect and correct A/C compressor lubricant levels in the appropriate service information for the vehicle you are working on and list results below:

2. Ask your supervisor/instructor for a vehicle or simulator to check A/C compressor lubricant level.

3. Examine the vehicle/simulator A/C compressor and inspect A/C compressor lubricant level.

Time off _____
Time on _____
Total time _____

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: 6B2-5

0

1

2

3

4

Supervisor/instructor signature _____ Date _____

▶ TASK Inspect, test, or replace A/C compressor.

6B2-6

1. Research how to inspect, test, or replace the A/C compressor in the appropriate service information for the vehicle you are working on and list them below:

a. Inspection of A/C compressor:

b. Testing of A/C compressor:

c. Replacing A/C compressor:

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 work on.

4. Examine the vehicle/simulator A/C compressor and inspect and test the A/C compressor.

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. Replace the A/C compressor as needed.

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: 6B2-6

0

1

2

3

4

Supervisor/instructor signature _____ Date _____

TASK Inspect, repair, or replace A/C compressor mountings and hardware.

6B2-7

1. Research how to inspect, repair, or replace the A/C compressor mounting and hardware in the appropriate service information for the vehicle you are working on and list them below:

a. Inspection of A/C compressor mounting and hardware:

Time off _____

Time on _____

Total time _____

b. Repair of A/C compressor mounting and hardware:

c. Replacement of A/C compressor mounting and hardware:

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, repair, and replace the A/C compressor mounting and hardware.

5. List the result of your inspection and test:

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

7. Replace the A/C compressor mounting and hardware as needed.

8. 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: _____

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: 6B2-7

0

1

2

3

4

Supervisor/instructor signature _____ Date _____