

## 2008 NATEF AUTOMOBILE STANDARDS CORRELATIONS

### **ENGINE PERFORMANCE**

**For every task in Engine Performance the following safety requirement must be strictly enforced:** 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 local, state, and federal safety and environmental regulations.

<b>A. General Engine Diagnosis</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. (P-1)	HB-44	Job Sheet EP-1
2. Identify and interpret engine performance concern; determine necessary action. (P-1)	EP-371 through EP-378	Job Sheet EP-6
3. Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins. (P-1)	HB-44, EP-372, SS-548, SS-592	Job Sheet HB-4
4. Locate and interpret vehicle and major component identification numbers.	HB-44, EP-410 through EP-411, SS-528	Job Sheet HB-1, HB-2
5. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. (P-2)	EP-371 through EP-378, EP-380 through EP-381	Diagnostic Sheet EP-4 Job Sheet EP-13
6. Diagnose abnormal engine noise or vibration concerns; determine necessary action. (P-3)	EP-371 through EP-379	Job Sheet EP-7
7. Diagnose abnormal exhaust color, odor, and sound; determine necessary action. (P-2)	EP-357, EP-372	Job Sheet EP-2
8. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action. (P-1)	EP-376 through EP-378	Job Sheet EP-8
9. Perform cylinder power balance test; determine necessary action. (P-2)	ER-375	Diagnostic Sheet EP-3 Job Sheet EP-9
10. Perform cylinder cranking compression tests; determine necessary action. (P-1)	EP-372 through EP-374	Job Sheet EP-10

<b>A. General Engine Diagnosis (<i>continued</i>)</b>	<b>Student Edition</b>	<b>Technical Applications</b>
11. Perform cylinder leakage test; determine necessary action. (P-1)	EP-374 through 375	Job Sheet EP-12
12. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. (P-1)	EP-425, EP-478 through EP-479	Job Sheet EP-6
13. Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action. (P-3)	EP-501	Job Sheet EP-54
14. Verify engine operating temperature; determine necessary action. (P-1)	EP-381	Job Sheet EP-14
15. Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action. (P-1)	EP-381 through EP-383	Job Sheets EP-16, EP-17
16. Verify correct camshaft timing. (P-1)	EP-362 through EP-363	Job Sheet EP-3
<b>B. Computerized Engine Controls Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. (P-1)	EP-408 through EP-411, EP-473 through EP-478, EP-480 through EP-483	Job Sheet EP-42
2. Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data. (P-1)	EP-487 through EP-497, EP-498 through EP-501	Job Sheets EP-42, EP-43, EP-44
3. Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action. (P-1)	EP-475 through EP-480, EP-500 through EP-501	Job Sheet EP-44
4. Check for module communication LAN/CAN/BUS errors using a scan tool. (P-2)	EP-391, EP-412	Job Sheet EP-22

<b>B. Computerized Engine Controls Diagnosis and Repair (continued)</b>	<b>Student Edition</b>	<b>Technical Applications</b>
5. Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.. (P-1)	EP-478 through EP-479	Job Sheet EP-21
6. Access and use service information to perform step-by-step diagnosis. (P-1)	EP-500 through EP-501	Job Sheet EP-44
7. Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action. (P-3)	EP-389 through EP-391	
8. Perform active tests of actuators using scan tool; determine necessary action. (P-1)	EP-405 through EP-406	Job Sheet EP-20
9. Describe the importance of running all OBDII monitors for repair verification. (P-1)	EP-471 through EP-474	Job Sheet EP-42
<b>C. Ignition System Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action. (P-1)	EP-355 through EP-356, EP 417 through EP-433, EP-470 through EP-483	Job Sheets EP-23, EP-24
2. Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action. (P-1)	EP-418 through EP-420, EP-423, EP-425	Diagnostic Sheets EP-6, EP-7, EP-8  Job Sheets EP-25, EP-26, EP-28, EP-29
3. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action. (P-1)	EP-392 through EP-394	Job Sheet EP-3
4. Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary. (P-2)	EP418 through 433, EP-407 through EP-408, EP-462 through EP-467	Job Sheets EP-23, EP-24

**NATEF Automobile Standards Correlations**

**Engine Performance**

<b>D. Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action. (P-1)	EP-461 through EP-462, EP-470 through EP-483, EL-284	Job Sheet EP-35
2. Check fuel for contaminants and quality; determine necessary action. (P-2)	EP-449	
3. Inspect and test mechanical and electrical fuel pumps and pump control systems for pressure, regulation and volume; perform necessary action. (P-1)	EP-457 through EP-460	Job Sheet EP-36
4. Replace fuel filters. (P-2)	EP-459	Job Sheet EP-37
5. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air. (P-2)	EP-437 through EP-445	Job Sheet EP-34
6. Inspect and test fuel injectors. (P-1)	EP-464 through EP-465	Job Sheet EP-39
7. Check idle speed. (P-1)	EP-440	Job Sheet EP-32
8. Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action. (P-1)	EP-366 through EP-367, EP-397 through EP-398, EP-413, EP-466	Diagnostic Sheet EP-1  Job Sheets EP-4, EP-5
9. Perform exhaust system back-pressure test; determine necessary action. (P-1)	EP-377 through EP-378	Diagnostic Sheet EP-2  Job Sheet EP-11
10. Test the operation of turbocharger/supercharger systems; determine necessary action. (P-3)	EP-441	Diagnostic Sheet EP-9, EP-10  Job Sheets EP-30, EP-31

<b>E. Emissions Control Systems Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Diagnose oil leaks, emissions, and driveability concerns caused by malfunctions in the positive crankcase ventilation (PCV) system; determine necessary action. (P-2)	EP-488 through EP-489	Diagnostic Sheet EP-12
2. Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action. (P-2)	EP-488 through EP-489	Diagnostic Sheet EP-12  Job Sheets EP-45, EP-46
3. Diagnose emissions and driveability problems concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action. (P-1)	EP-489 through EP-491	Job Sheet EP-47
4. Inspect, test, service and replace components of EGR system, including EGR tubing, exhaust passages, vacuum passages, vacuum/pressure controls, filters and hoses; perform necessary action. (P-1)	EP-489 through EP-491	Diagnostic Sheet EP-13  Job Sheets EP-48, EP-50
5. Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action. (P-2)	EP-489 through EP-491	Diagnostic Sheet EP-14  Job Sheet EP-49
6. Diagnose emissions and driveability problems concerns caused by the secondary air injection and catalytic converter systems; determine necessary action. (P-2)	EP-491 through EP-493	Job Sheet EP-52
7. Inspect and test mechanical components of secondary air injection systems; perform necessary action. (P-3)	EP-491 through EP-493	
8. Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action. (P-3)	EP-491 through EP-493	Diagnostic Sheet EP-15  Job Sheet EP-51
9. Inspect and test catalytic converter efficiency. (P-1)	EP-366 through 367, EP-397, EP-477 through EP-478, EP-494 through EP-495	Job Sheet EP-52

**NATEF Automobile Standards Correlations**

**Engine Performance**

<b>E. Emissions Control Systems Diagnosis and Repair (continued)</b>	<b>Student Edition</b>	<b>Technical Applications</b>
10. Diagnose emissions and driveability problems concerns caused by the evaporative emissions control system; determine necessary action. (P-1)	EP-487 through EP-501	Job Sheet EP-43
11. Inspect and test components and hoses of evaporative emissions control system; perform necessary action. (P-1)	EP-480, EP-495 through EP-497, EP-501	Job Sheet EP-53
12. Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action. (P-1)	EP-408 through EP-411, EP-475 through EP-483	Job Sheet EP-43
<b>F. Engine Related Service</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Adjust valves on engines with mechanical or hydraulic lifters. (P-1)	EP-359, EP-362	Job Sheet ER-46
2. Remove and replace timing belt; verify correct camshaft timing. (P-1)	EP-430 through EP-432	Job Sheet ER-52
3. Remove and replace thermostat and gasket/seal. (P-1)	EP-383	Diagnostic Sheet EP-5 Job Sheet EP-15
4. Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action. (P-1)	EP-384	Job Sheet EP-18
5. Perform common fastener and thread repair to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert. (P-1)	HB-81 through HB-83	Job Sheets HB-6, HB-7
6. Perform engine oil and filter changes. (P-1)	EP-384 through EP-385	Job Sheet EP-19
7. Identify hybrid vehicle internal combustion engine service precautions. (P-3)	HB-104	