

APPENDIX 3

NATEF TASK LIST

Engine Repair

For every task in Engine Repair, 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.

<i>Task</i>	<i>Textbook Page No.</i>	<i>Worktext Page No.</i>
A. General Engine Diagnosis; Removal and Reinstallation (R & R)		
1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. (P-1)	98	15
2. Identify and interpret engine concern; determine necessary action. (P-1)	338–351	16, 30, 88, 89
3. Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins. (P-1)	98–105	17, 19, 20, 24, 25, 31, 42, 85, 86, 114, 124, 125, 132, 142, 149, 169
4. Locate and interpret vehicle and major component identification numbers. (P-1)	108–112	18, 22, 23, 26, 28, 29
5. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. (P-1)	339–340	90, 91, 92, 93
6. Diagnose engine noises and vibrations; determine necessary action. (P-2)	340–341	94, 95
7. Diagnose the cause of excessive oil consumption, coolant consumption, unusual engine exhaust color and odor; determine necessary action. (P-2)	338–340	96
8. Perform engine vacuum tests; determine necessary action. (P-1)	347–350	97
9. Perform cylinder power balance tests; determine necessary action. (P-2)	343	98, 99
10. Perform cylinder cranking and running compression tests; determine necessary action. (P-1)	342–345	100
11. Perform cylinder leakage tests; determine necessary action. (P-1)	345–346	101, 102
12. Remove and reinstall engine in an OBDII or newer vehicle; reconnect all attaching components and restore the vehicle to running condition. (P-2)	357–358	104, 105, 205
13. Install engine covers using gaskets, seals and sealers as required. (P-1)	588–589	170, 206

<i>Task</i>	<i>Textbook Page No.</i>	<i>Worktext Page No.</i>
14. Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. (P-1)	38–40	4
15. Inspect, remove and replace engine mounts. (P-2)	600	106
B. Cylinder Head and Valve Train Diagnosis and Repair		
1. Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures. (P-1)	358, 381–383	115, 171
2. Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition. (P-1)	383, 366–367	116, 123, 182
3. Inspect valve springs for squareness and free height comparison; determine necessary action. (P-3)	408–410	117
4. Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine necessary action. (P-3)	426–429	126
5. Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action. (P-3)	387–389	118
6. Inspect valves and valve seats; determine necessary action. (P-3)	413–417	127, 128
7. Check valve spring assembled height and valve stem height; determine necessary action. (P-3)	424–425	129
8. Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action. (P-2)	448–451	133, 134
9. Inspect valve lifters; determine necessary action. (P-2)	467–473	135
10. Adjust valves (mechanical or hydraulic lifters). (P-1)	473	136
11. Inspect and replace camshaft and drive belt/chain (includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and variable valve timing components). (P-1)	442–446	137, 172, 207, 208
12. Inspect and/or measure camshaft for runout, journal wear and lobe wear. (P-2)	441–448	138, 139
13. Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine necessary action. (P-2)	447	140
14. Establish camshaft position sensor indexing. (P-1)	583–584	141
C. Engine Block Assembly Diagnosis and Repair		
1. Disassemble engine block; clean and prepare components for inspection and reassembly. (P-1)	358–361	108
2. Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action. (P-2)	366–367	150
3. Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine necessary action. (P-2)	359	151
4. Deglaze and clean cylinder walls. (P-2)	509–511	152
5. Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action. (P-3)	456	153
6. Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine necessary action. (P-1)	531	161, 162, 183

<i>Task</i>	<i>Textbook Page No.</i>	<i>Worktext Page No.</i>
7. Inspect main and connecting rod bearings for damage and wear; determine necessary action. (P-2)	536–538	163, 173, 184
8. Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine necessary action. (P-3)	493	143, 164, 185
9. Inspect and measure piston skirts and ring lands; determine necessary action. (P-2)	490	147
10. Remove and replace piston pin. (P-3)	490, 494	144
11. Determine piston-to-bore clearance. (P-2)	510	154, 174, 186
12. Inspect, measure, and install piston rings. (P-2)	495	145, 146
13. Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance, or silencer); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time. (P-2)	547	166, 187
14. Remove, inspect or replace crankshaft vibration damper (harmonic balancer). (P-2)	530	165, 188
15. Assemble engine block. (P-1)	573–578	189, 190
D. Lubrication and Cooling Systems Diagnosis and Repair		
1. Perform oil pressure tests; determine necessary action. (P-1)	342	103
2. Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action. (P-2)	220	43, 191
3. Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; determine necessary action. (P-1)	191	32, 33
4. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. (P-1)	193, 200	34
5. Inspect and replace engine cooling and heater system hoses. (P-1)	202	35, 192
6. Inspect, test, and replace thermostat and gasket/seal. (P-1)	184	36, 193
7. Test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. (P-1)	187	37
8. Inspect test, remove, and replace water pump. (P-2)	194	38, 194
9. Remove and replace radiator. (P-2)	203	39, 195
10. Inspect, and test fans(s) (electrical or mechanical), fan clutch, fan shroud, and air dams. (P-1)	196–199	40, 196
11. Inspect auxiliary coolers; determine necessary action. (P-3)	226	44
12. Inspect, test, and replace oil temperature and pressure switches and sensors. (P-2)	227	45
13. Perform oil and filter change. (P-1)	214	209
14. Identify causes of engine overheating. (P-1)	199	41