



NATEF Task List - Medium/Heavy Duty Truck Diesel Engines

Name: _____
Date: _____

For every task in *Diesel Engines* the following safety requirements must be strictly enforced: Comply with personal and environmental safety practices associated with clothing and the use of gloves; respiratory protection; 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.

The first task in Diesel Engines is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

I. DIESEL ENGINES A. General		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-1	1. Inspect fuel, oil, Diesel Exhaust Fluid (DEF) and coolant levels, and condition; determine needed action.													
P-1	2. Identify engine fuel, oil, coolant, air, and other leaks; determine needed action.													
P-3	3. Listen for engine noises; determine needed action.													
P-2	4. Observe engine exhaust smoke color and quantity; determine needed action.													
P-1	5. Check engine no cranking, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed action.													
P-1	6. Identify engine surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown problems; determine needed action.													
P-2	7. Identify engine vibration problems.													
P-1	8. Check and record electronic diagnostic codes.													



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B. Cylinder Head and Valve Train		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-2	1. Inspect cylinder head for cracks/damage; check mating surfaces for warpage; check condition of passages; inspect core/expansion and gallery plugs; determine needed action.													
P-3	2. Disassemble head and inspect valves, guides, seats, springs, retainers, rotators, locks, and seals; determine needed action.													
P-3	3. Measure valve head height relative to deck and valve face-to-seat contact; determine needed action.													
P-3	4. Inspect injector sleeves and seals; measure injector tip or nozzle protrusion; determine needed action.													
P-1	5. Inspect valve train components; determine needed action.													
P-3	6. Reassemble cylinder head.													
P-3	7. Inspect, measure, and replace/reinstall overhead camshaft; measure/adjust end play and backlash.													
P-1	8. Inspect electronic wiring harness and brackets for wear, bending, cracks, and looseness; determine needed action.													
P-2	9. Adjust valve bridges (crossheads); adjust valve clearances and injector settings.													



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C. Engine Block		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-1	1. Perform crankcase pressure test; determine needed action.													
P-2	2. Remove, inspect, service, and install pans, covers, gaskets, seals, wear rings, and crankcase ventilation components.													
P-2	3. Disassemble, clean, and inspect engine block for cracks/damage; measure mating surfaces for warpage; check condition of passages, core/expansion and gallery plugs; inspect threaded holes, studs, dowel pins, and bolts for serviceability; determine needed action.													
P-2	4. Inspect cylinder sleeve counter bore and lower bore; check bore distortion; determine needed action.													
P-2	5. Clean, inspect, and measure cylinder walls or liners for wear and damage; determine needed action.													
P-2	6. Replace/reinstall cylinder liners and seals; check and adjust liner height (protrusion).													
P-3	7. Inspect in-block camshaft bearings for wear and damage; determine needed action.													
P-3	8. Inspect, measure, and replace/reinstall in-block camshaft; measure/adjust end play.													
P-2	9. Clean and inspect crankshaft for surface cracks and journal damage; check condition of oil passages; check passage plugs; measure journal diameter; determine needed action.													



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C. Engine Block (continued)		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-2	10. Inspect main bearings for wear patterns and damage; replace as needed; check bearing clearances; check and correct crankshaft end play.													
P-2	11. Inspect, install, and time gear train; measure gear backlash; determine needed action.													
P-3	12. Inspect connecting rod and bearings for wear patterns; measure pistons, pins, retainers, and bushings; perform needed action.													
P-3	13. Determine piston-to-cylinder wall clearance; check ring-to-groove fit and end gap; install rings on pistons.													
P-2	14. Assemble pistons and connecting rods; install in block; install rod bearings and check clearances.													
P-2	15. Check condition of piston cooling jets (nozzles); determine needed action.													
P-3	16. Inspect crankshaft vibration damper; determine needed action.													
P-3	17. Install and align flywheel housing; inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.													
P-2	18. Inspect flywheel/flexplate (including ring gear) and mounting surfaces for cracks and wear; measure runout; determine needed action.													



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D. Lubrication Systems		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-1	1. Test engine oil pressure and check operation of pressure sensor, gauge, and/or sending unit; test engine oil temperature and check operation of temperature sensor; determine needed action.													
P-1	2. Check engine oil level, condition, and consumption; determine needed action.													
P-3	3. Inspect and measure oil pump, drives, inlet pipes, and pick-up screens; check drive gear clearances; determine needed action.													
P-3	4. Inspect oil pressure regulator valve(s), by-pass and pressure relief valve(s), oil thermostat, and filters; determine needed action.													
P-3	5. Inspect, clean, and test oil cooler and components; determine needed action.													
P-2	6. Inspect turbocharger lubrication systems; determine needed action.													
P-1	7. Determine proper lubricant and perform oil and filter change.													
E. Cooling System		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-1	1. Check engine coolant type, level, condition, and consumption; test coolant for freeze protection and additive package concentration; determine needed action.													



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E. Cooling System (continued)		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-1	2. Test coolant temperature and check operation of temperature and level sensors, gauge, and/or sending unit; determine needed action.													
P-1	3. Inspect and reinstall/replace pulleys, tensioners and drive belts;													
P-2	4. Inspect thermostat(s), by-passes, housing(s), and seals; replace as needed.													
P-1	5. Recover coolant, flush, and refill with recommended coolant/additive package; bleed cooling system.													
P-1	6. Inspect coolant conditioner/filter assembly for leaks; inspect													
P-1	7. Inspect water pump and hoses; replace as needed.													
P-1	8. Inspect, clean, and pressure test radiator. Pressure test cap, tank(s), and recovery systems; determine needed action.													
P-1	9. Inspect thermostatic cooling fan system (hydraulic, pneumatic,													
P-2	10. Inspect turbo charger cooling systems; determine needed action.													



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F. Air Induction and Exhaust Systems		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-1	1. Perform air intake system restriction and leakage tests;													
P-3	2. Perform intake manifold pressure (boost) test; determine needed													
P-3	3. Check exhaust back pressure; determine needed action.													
P-2	4. Inspect turbocharger(s), wastegate, and piping systems; determine needed action.													
P-2	5. Inspect turbocharger(s) (variable ratio/geometry VGT), pneumatic, hydraulic, electronic controls, and actuators.													
P-1	6. Check air induction system: piping , hoses, clamps, and													
P-3	7. Remove and reinstall turbocharger/wastegate assembly.													
P-3	8. Inspect intake manifold, gaskets, and connections; replace as													
P-2	9. Inspect, clean, and test charge air cooler assemblies; replace as needed.													
P-2	10. Inspect exhaust manifold, piping, mufflers, and mounting													
P-2	11. Inspect exhaust after treatment devices; determine necessary action.													



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F. Air Induction and Exhaust Systems (continued)		Week											
		1	2	3	4	5	6	7	8	9	10	11	12
P-2	12. Inspect and test preheater/inlet air heater, or glow plug system and controls; perform needed action.												
P-2	13. Inspect exhaust gas recirculation (EGR) system including EGR												
G. Fuel System 1. Fuel Supply System		Week											
		1	2	3	4	5	6	7	8	9	10	11	12
P-1	1. Check fuel level, and condition; determine needed action.												
P-1	2. Perform fuel supply and return system tests; determine needed action.												
P-1	3. Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, supply and return lines and fittings; determine needed action.												
P-1	4. Inspect, clean, and test fuel transfer (lift) pump, pump drives, screens, fuel/water separators/indicators, filters, heaters, coolers, ECM cooling plates, and mounting hardware; determine needed action.												
P-1	5. Inspect and test pressure regulator systems (check valves, pressure regulator valves, and restrictive fittings); determine needed action.												
P-1	6. Check fuel system for air; determine needed action; prime and												



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G. Fuel System 2. Electronic Fuel Management System		Week												
		1	2	3	4	5	6	7	8	9	10	11	12	
P-1	1. Inspect and test power and ground circuits and connections; measure and interpret voltage, voltage drop, amperage, and resistance readings using a digital multimeter (DMM); determine needed action.													
P-1	2. Interface with vehicle's on-board computer; perform diagnostic procedures using electronic service tool(s) (to include PC based software and/or data scan tools); determine needed action.													
P-1	3. Check and record electronic diagnostic codes and trip/operational data; monitor electronic data; clear codes; determine further diagnosis.													
P-1	4. Locate and use relevant service information (to include diagnostic													
P-1	5. Inspect and replace electrical connector terminals, seals, and locks.													
P-1	6. Inspect and test switches, sensors, controls, actuator													
P-1	7. Using electronic service tool(s) access and interpret customer programmable parameters.													
P-2	8. Perform on-engine inspections, tests and adjustments on electronic unit injectors (EUI); determine needed action.													
P-2	9. Remove and install electronic unit injectors (EUI) and related													



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G. Fuel System 2. Electronic Fuel Management System (continued)		Week											
		1	2	3	4	5	6	7	8	9	10	11	12
P-1	10. Perform cylinder contribution test utilizing electronic service tool(s).												
P-2	11. Perform on-engine inspections and tests on hydraulic electronic unit injectors (HEUI) and system electronic controls; determine needed action.												
P-2	12. Perform on-engine inspections and tests on hydraulic electronic unit injector (HEUI) high pressure oil supply and control systems; determine needed action.												
P-2	13. Perform on-engine inspections and tests on high pressure common rail (HPCR) type injection systems; determine needed action.												
P-2	14. Inspect high pressure injection lines, hold downs, fittings and												
H. Engine Brakes		Week											
		1	2	3	4	5	6	7	8	9	10	11	12
P-2	1. Inspect and adjust engine compression/exhaust brakes; determine needed action.												
P-3	2. Inspect, test, and adjust engine compression/exhaust brake control circuits, switches, and solenoids; determine needed action.												
P-3	3. Inspect engine compression/exhaust brake housing, valves, seals, lines, and fittings; determine necessary action.												