



## 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.**

<b>A. General: Engine Diagnosis; Removal and Reinstallation (R &amp; R)</b>	<b>Priority</b>	<b>Completed</b>
1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1	
2. Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins.	P-1	
3. Verify operation of the instrument panel engine warning indicators.	P-1	
4. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	P-1	
5. Install engine covers using gaskets, seals, and sealers as required.	P-1	
6. Remove and replace timing belt; verify correct camshaft timing.	P-1	
7. 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	
8. Inspect, remove and replace engine mounts.	P-2	
9. Identify hybrid vehicle internal combustion engine service precautions.	P-3	
<b>B. Cylinder Head and Valve Train Diagnosis and Repair</b>		
1. Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures.	P-1	



2. Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.	P-1	
3. Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action.	P-2	
4. Adjust valves (mechanical or hydraulic lifters).	P-1	
5. 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 valve timing components; verify correct camshaft timing.	P-1	
6. Establish camshaft position sensor indexing.	P-1	
7. Inspect valve springs for squareness and free height comparison; determine necessary action.	P-3	
8. Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine necessary action.	P-3	
9. Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action.	P-3	
10. Inspect valves and valve seats; determine necessary action.	P-3	
11. Check valve spring assembled height and valve stem height; determine necessary action.	P-3	
12. Inspect valve lifters; determine necessary action.	P-2	
13. Inspect and/or measure camshaft for runout, journal wear and lobe wear.	P-2	
14. Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine necessary action.	P-3	
<b>C. Lubrication and Cooling Systems Diagnosis and Repair</b>		
1. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and galley plugs; determine necessary action.	P-1	
2. Identify causes of engine overheating.	P-1	
3. Inspect, replace, and adjust drive belts, tensioners, and	P-1	



pulleys; check pulley and belt alignment.		
4. Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.	P-1	
5. Inspect, remove, and replace water pump.	P-2	
6. Remove and replace radiator.	P-2	
7. Remove, inspect, and replace thermostat and gasket/seal.	P-1	
8. Inspect and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.	P-1	
9. Perform oil pressure tests; determine necessary action.	P-1	
10. Perform engine oil and filter change.	P-1	
11. Inspect auxiliary coolers; determine necessary action.	P-3	
12. Inspect, test, and replace oil temperature and pressure switches and sensors.	P-2	
13. Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action.	P-2	