

ASE Education Foundation

Engine Repair (A1)

2025 Correlation Chart

MLR- Maintenance & Light Repair

AST- Auto Service Technology (Includes MLR)

MAST- Master Auto Service Technology (Includes MLR and AST)

	Task	Priority	MLR	AST	MAST	Text Page #	Task Page #
	A. General						
1.	Research vehicle service information such as fluid type, internal combustion engine operation, vehicle service history, service precautions, technical service bulletins, and recalls including xEVs and vehicles equipped with advanced driver assistance systems (ADAS).	P-1	✓	✓	✓	9-16	
2.	Retrieve and record DTCs, OBD monitor status, and freeze frame data; clear codes and data when directed.	P-1	✓	✓	✓	240-260	
3.	Verify operation of the instrument panel engine warning indicators.	P-1	✓	✓	✓	162-184	
4.	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed action.	P-1	✓ Inspect only	✓	✓	286-288	
5.	Install engine covers using gaskets, seals, and sealers as required.	P-1	✓	✓	✓	465-469	
6.	Verify engine mechanical timing.	P-1	✓* (P-2)	✓	✓	308	

*Demonstrate understanding of the procedure.

	Task	Priority	MLR	AST	MAST	Text Page #	Task Page #
7.	Inspect, remove, and replace engine mounts	P-2	✓ Inspect only	✓	✓	325; 516	
8.	Identify service precautions related to service of internal combustion engine of a hybrid electric vehicle.	P-2	✓	✓	✓	1-6; 17-27; 308-309	
9.	Remove and reinstall engine on a newer vehicle equipped with OBD; reconnect all attaching components and restore the vehicle to running condition.	P-3			✓	316- 318;514- 517	
B. Cylinder Head and Valve Train							
1.	Identify cylinder head and valve train components and configurations	P1	✓	✓	✓	338-343	
2.	Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures.	P-1		✓	✓	316-320; 497-501	
3.	Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.	P-1		✓ (P-2)	✓	332-333; 345-346	
4.	Inspect valve actuating mechanisms for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine needed action.	P-2		✓	✓	377-392	
5.	Adjust valves (mechanical or hydraulic lifters).	P-2		✓	✓	310-313	

	Task	Priority	MLR	AST	MAST	Text Page #	Task Page #
6.	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		✓	✓	308; 380-383; 398-406	
7.	Inspect valve springs for squareness and free height comparison; determine needed action.	P-3			✓	357-359; 368-369	
8.	Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine needed action.	P-3			✓	369-371	
9.	Inspect valve guides for wear; check valve stem-to-guide clearance; determine needed action.	P-3			✓	347-349	
10.	Inspect valves and valve seats; determine needed action.	P-3			✓	353-357	
11.	Check valve spring assembled height and valve stem height; determine needed action.	P-3			✓	368-369	
12.	Inspect valve lifters and hydraulic lash adjusters; determine needed action.	P-2			✓	388-392	
13.	Inspect and/or measure camshaft for runout, journal wear and lobe wear.	P-3			✓	396	
14.	Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine needed action.	P-3			✓	396	

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	C. Engine Block Assembly						
1.	Identify engine block assembly components and configurations	P-1	✓	✓	✓	88-89; 426-433	
2.	Remove, inspect, and/or replace crankshaft vibration damper (harmonic balancer).	P-1		✓ (P-2)	✓	321; 444-450	
3.	Disassemble engine block; clean and prepare components for inspection and reassembly.	P-2			✓	318-323	
4.	Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed action.	P-2			✓	332-333	
5.	Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine needed action.	P-2			✓	434-437	
6.	Perform deglazing and cleaning of cylinder walls.	P-2			✓	434-436	
7.	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine needed action.	P-2			✓	454-457; 459-460	
8.	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 needed action.	P-2			✓	452-454	
9.	Inspect main and connecting rod bearings for damage and wear; determine needed action.	P-2			✓	454-457	

	Task	Priority	MLR	AST	MAST	Text Page #	Task Page #
10.	Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine needed action.	P-2			✓	418-422	
11.	Inspect and measure piston skirts and ring lands; determine needed action.	P-2			✓	410-417	
12.	Determine piston-to-bore clearance.	P-2			✓	494-496	
13.	Inspect, measure, and install piston rings.	P-2			✓	494-496	
14.	Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance, and/or silencer); inspect shaft(s) and support bearings for damage and wear; determine needed action; reinstall and time.	P-2			✓	450-452	
15.	Assemble engine block.	P-1			✓	483-497	
	D. Lubrication and Cooling Systems						
1.	Identify lubrication and cooling system components and configurations	P-1	✓	✓	✓	85-86	
2.	Perform engine oil and filter change; use proper fluid type per manufacturer specification; reset maintenance reminder as required.	P-1	✓	✓	✓	170-175; 179-181	
3.	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, gallery plugs; determine needed action.	P-1	✓	✓	✓	161-168	
4.	Identify causes of engine overheating.	P-1	✓ (P-2)	✓	✓	163	

	Task	Priority	MLR	AST	MAST	Text Page #	Task Page #
5.	Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	P-1	✓	✓	✓	163-164	
6.	Inspect and test coolant; drain and recover coolant; flush and refill cooling system; use proper fluid per manufacturer specifications; bleed air as required.	P-1	✓	✓	✓	141-146	
7.	Identify different types of water/coolant pumps (belt driven, chain driven, and electric).	P-1	✓	✓	✓	156-157	
8.	Inspect, remove, and replace water pumps.	P-2	✓ (P-3)	✓	✓	156-158	
9.	Remove, inspect, and replace thermostat and gasket/seal.	P-1	✓	✓	✓	149-152	
10.	Remove and replace radiator.	P-2		✓	✓	166	
11.	Inspect and test fan(s), fan clutch (electrical or mechanical), fan shroud, and air dams; determine needed action	P-1		✓	✓	158-160	
12.	Perform oil pressure tests; determine needed action.	P-1		✓	✓	161	
13.	Inspect auxiliary coolers; determine needed action.	P-2		✓	✓	158	
14.	Inspect, test, and replace oil temperature and pressure switches and sensors.	P-1		✓ (P-2)	✓	184	
15.	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform needed action.	P-2			✓	185-188	