

2021 ASE Correlation Chart

Engine Repair (A1)

MLR- Maintenance & Light Repair

AST- Auto Service Technology

MAST- Master Auto Service Technology

	Task	MLR	AST	MAST	Text Page #	Task Page #
A. General						
1.	Research vehicle service information, including fluid type, vehicle service history, service precautions, technical service bulletins and recalls, including vehicles equipped with advanced driver assistance systems (ADAS).	P-1	P-1	P-1	128-132	25-28; 30; 43; 44; 46; 59; 93; 100; 104; 184; 185
2.	Retrieve and record DTCs, OBD monitor status, and freeze frame data; clear codes and data when directed.	P-1	P-1	P-1	1033-1041	273; 274; 275; 277
3.	Verify operation of the instrument panel engine warning indicators.	P-1	P-1	P-1	198-199	50; 57
4.	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed action.	P-1 Inspection only	P-1	P-1	257-258	40, 67
5.	Install engine covers using gaskets, seals, and sealers as required.	P-2	P-1	P-1	440-441	115
6.	Verify engine mechanical timing.	P-2	P-1	P-1	436-437	99

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7.	Inspect, remove and replace engine mounts.	P-2 Inspection only	P-2	P-2	276	31
8.	Identify service precautions related to service of internal combustion engine of a hybrid vehicle.	P-2	P-2	P-2	277	42; 285
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	284- 285; 450	78; 117
B. Cylinder Head and Valve Train						
1.	Identify cylinder head and valve train components and configurations.	P-1	P-1	P-1	303- 308; 340- 351	87
2.	Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specification and procedure.		P-1	P-1	308- 310	79; 84
3.	Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.		P-2	P-1	298- 301	83; 85; 88
4.	Inspect valve actuating mechanisms for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine needed action.		P-2	P-2	298- 300; 346- 352	94
5.	Adjust valves (mechanical or hydraulic lifters).		P-2	P-2	278- 281	77; 96

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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	P-1	342-355 837-838; 851	76 99
7.	Inspect valve springs for squareness and free height comparison; determine needed action.			P-3	322-333	89
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	333-335	90
9.	Inspect valve guides for wear; check valve stem-to-guide clearance; determine needed action.			P-3	312-316	86
10.	Inspect valves and valve seats; determine needed action.			P-3	320-332	91
11.	Check valve spring assembled height and valve stem height; determine needed action.			P-3	332	92
12.	Inspect valve lifters and hydraulic lash adjusters; determine needed action.			P-2	349-352	95
13.	Inspect and/or measure camshaft for runout, journal wear and lobe wear.			P-3	355	97; 113
14.	Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine needed action.			P-3	342; 429	98

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C. Engine Block Assembly						
1.	Identify engine block assembly components and configurations.	P-1	P-1	P-1	158-168	43; 44; 45
2.	Remove, inspect, and/or replace crankshaft vibration damper (harmonic balancer).		P-2	P-1	288; 400	114
3.	Disassemble engine block; clean and prepare components for inspection and reassembly.			P-2	286-290; 294-299	80
4.	Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed action.			P-2	296-299	83; 105
5.	Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine needed action.			P-2	386-389	81; 106
6.	Perform deglazing and cleaning of cylinder walls.			P-2	388-390	107
7.	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine needed action.			P-2	425	98; 108
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	384-385; 402-404	111
9.	Inspect main and connecting rod bearings for damage and wear; determine needed action			P-2	408-409	112

	Task	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	425-426	101
11.	Inspect and measure piston skirts and ring lands; determine needed action.			P-2	376-377	102
12.	Determine piston-to-bore clearance.			P-2	388-391; 429-431	109
13.	Inspect, measure, and install piston rings.			P-2	431	103
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	401-404	113
15.	Assemble engine block.			P-1	420-432	116
D. Lubrication and Cooling Systems						
1.	Identify lubrication and cooling system components and configurations	P-1	P-1	P-1	195-234	50
2.	Perform engine oil and filter change; use proper fluid type per manufacturer specification; reset maintenance reminder as required.	P-1	P-1	P-1	144-145; 220-224	35; 58

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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 Inspection only	P-1	P-1	200-202; 206-209	36; 49; 51
4.	Identify causes of engine overheating.	P-2	P-1	P-1	208	52; 57
5.	Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	P-1	P-1	P-1	208-209	37; 53
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	P-1	P-1	209-211	47, 48
7.	Identify types of water pumps (belt driven, chain driven, and electric). Inspect, remove, and replace water pumps.	P-3 Identify pump types only	P-2	P-2	203-204	75
8.	Remove, inspect, and replace thermostat and gasket/seal.	P-1	P-1	P-1	196-199	54; 203
9.	Remove and replace radiator.		P-2	P-2	206-210	55
10.	Inspect and test fan(s), fan clutch (electrical or mechanical), fan shroud, and air dams; determine needed action		P-1	P-1	205-206	56; 204
11.	Perform oil pressure tests; determine needed action.		P-1	P-1	260-261	74
12.	Inspect auxiliary coolers; determine needed action.		P-2	P-2	1693-1694	61
13.	Inspect, test, and replace oil temperature and pressure switches and sensors.		P-2	P-1	221	62
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14.	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform needed action.			P-2	227-232	60