

## 2021 ASE Correlation Chart

### Engine Repair (A1)

**MLR-** Maintenance & Light Repair

**AST-** Auto Service Technology

**MAST-** Master Auto Service Technology

	<b>Task</b>	<b>MLR</b>	<b>AST</b>	<b>MAST</b>	<b>Text Page #</b>	<b>Task Page #</b>
<b>A. General</b>						
<b>1.</b>	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	77-83	16, 17, 18, 19, 20
<b>2.</b>	Retrieve and record DTCs, OBD monitor status, and freeze frame data; clear codes and data when directed.	P-1	P-1	P-1	-	-
<b>3.</b>	Verify operation of the instrument panel engine warning indicators.	P-1	P-1	P-1	193; 305-306	45; 101
<b>4.</b>	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed action.	P-1 Inspection only	P-1	P-1	302-303	88, 89, 90
<b>5.</b>	Install engine covers using gaskets, seals, and sealers as required.	P-2	P-1	P-1	476-480	160, 183

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6.	Verify engine mechanical timing.	P-2	P-1	P-1	512-513	137, 166, 184, 185
7.	Inspect, remove and replace engine mounts.	P-2 Inspection only	P-2	P-2	331	106
8.	Identify service precautions related to service of internal combustion engine of a hybrid vehicle.	P-2	P-2	P-2	179; 322-323	-
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	330-332; 525-529	104, 105, 185
<b>B. Cylinder Head and Valve Train</b>						
1.	Identify cylinder head and valve train components and configurations.	P-1	P-1	P-1	352-357	114
2.	Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specification and procedure.		P-1	P-1	332-334; 497; 508-512	107, 165, 169
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	358-362	107, 112
4.	Inspect valve actuating mechanisms for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine needed action.		P-2	P-2	399-403	132, 133, 134
5.	Adjust valves (mechanical or hydraulic lifters).		P-2	P-2	508-509; 514-515	135

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<b>6.</b>	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	396-398; 411-417; 512-513	137, 166
<b>7.</b>	Inspect valve springs for squareness and free height comparison; determine needed action.			P-3	384	124
<b>8.</b>	Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine needed action.			P-3	384-388	125
<b>9.</b>	Inspect valve guides for wear; check valve stem-to-guide clearance; determine needed action.			P-3	362-364	118, 119, 120
<b>10.</b>	Inspect valves and valve seats; determine needed action.			P-3	378-383	126, 127
<b>11.</b>	Check valve spring assembled height and valve stem height; determine needed action.			P-3	384	128
<b>12.</b>	Inspect valve lifters and hydraulic lash adjusters; determine needed action.			P-2	406-409	134
<b>13.</b>	Inspect and/or measure camshaft for runout, journal wear and lobe wear.			P-3	410	138, 139
<b>14.</b>	Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine needed action.			P-3	410	136

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<b>C. Engine Block Assembly</b>						
<b>1.</b>	Identify engine block assembly components and configurations.	P-1	P-1	P-1	437, 442	147, 148
<b>2.</b>	Remove, inspect, and/or replace crankshaft vibration damper (harmonic balancer).		P-2	P-1	335	158
<b>3.</b>	Disassemble engine block; clean and prepare components for inspection and reassembly.			P-2	332-336	108
<b>4.</b>	Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed action.			P-2	346-347; 443-444	112, 148
<b>5.</b>	Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine needed action.			P-2	445	110, 149
<b>6.</b>	Perform deglazing and cleaning of cylinder walls.			P-2	447-448	150
<b>7.</b>	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine needed action.			P-2	470-471	138
<b>8.</b>	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	462-463	154, 155, 156,
<b>9.</b>	Inspect main and connecting rod bearings for damage and wear; determine needed action			P-2	468-470	156

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10.	Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine needed action.			P-2	432-433	157
11.	Inspect and measure piston skirts and ring lands; determine needed action.			P-2	421-422	145
12.	Determine piston-to-bore clearance.			P-2	434; 505-507	152
13.	Inspect, measure, and install piston rings.			P-2	433-435	143, 144
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	461-462	159
15.	Assemble engine block.			P-1	494-508	164-176
<b>D. Lubrication and Cooling Systems</b>						
1.	Identify lubrication and cooling system components and configurations	P-1	P-1	P-1	159-171; 193-201	32, 33, 41
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	186-190	42, 186

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<b>3.</b>	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	171-172	32, 33
<b>4.</b>	Identify causes of engine overheating.	P-2	P-1	P-1	173	40
<b>5.</b>	Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	P-1	P-1	P-1	173-174; 527	35
<b>6.</b>	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	174-175	30
<b>7.</b>	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	168-169	32, 102
<b>8.</b>	Remove, inspect, and replace thermostat and gasket/seal.	P-1	P-1	P-1	162-163	37
<b>9.</b>	Remove and replace radiator.		P-2	P-2	164; 171	38
<b>10.</b>	Inspect and test fan(s), fan clutch (electrical or mechanical), fan shroud, and air dams; determine needed action		P-1	P-1	170	39
<b>11.</b>	Perform oil pressure tests; determine needed action.		P-1	P-1	305-306	45, 101
<b>12.</b>	Inspect auxiliary coolers; determine needed action.		P-2	P-2	200-201	44
<b>13.</b>	Inspect, test, and replace oil temperature and pressure switches and sensors.		P-2	P-1	193	45

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<b>14.</b>	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform needed action.			P-2	193-197	43, 176