

**CORRELATION
FLORIDA DEPARTMENT OF EDUCATION
COURSE DESCRIPTION**

SUBJECT: Industrial Education
COURSE NAME: Automotive Service Technology 3
SUBMISSION TITLE: Automotive Excellence Volume 2 © 2007
PUBLISHER: Glencoe/McGraw-Hill
GRADE(S): 9-12

COURSE CODE NUMBER:

OUTCOME NUMBER	BENCHMARK NUMBER	INTENDED OUTCOME/BENCHMARK DESCRIPTION	PAGE(S) OR LOCATION(S) WHERE TAUGHT IN MAJOR TOOL
32.0		DEMONSTRATE PROFICIENCY IN GENERAL ENGINE DIAGNOSIS --The student will be able to:	
32.01		Identify and interpret engine concern; determine necessary action. LA.A.142, LA.A.143, LA.A.244	P-1 SE2: ER155-159
32.02		Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins. LA.A.142, LA.A.143, LA.A.244	P-1 SE2: HB48, ER155
32.03		Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals). LA.A.142, LA.A.143, LA.A.244	P-1 SE2: HB48
32.04		Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. LA.A.142, LA.A.143, LA.A.244	P-2 SE2: ER162-163
32.05		Diagnose engine noises and vibrations; determine necessary action. LA.A.42, LA.A.143, LA.A.244	P-3 SE2: ER166-169
32.06		Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine necessary action. LA.A.142, LA.A.143, LA.A.244	P-3 SE2: ER156-161
32.07		Perform engine vacuum tests; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-1 SE2: ER159-161
32.08		Perform cylinder power balance tests; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.A.343	P-1 SE2: ER161
32.09		Perform cylinder compression tests; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.A.343	P-1 SE2: ER156-157

SE2 = Student Edition Vol 2

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32.10		Perform cylinder leakage tests; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-1 SE2: ER158-159
32.11		Remove and reinstall engine in a late model front-wheel drive vehicle (OBDI or newer); reconnect all attaching components and restore the vehicle to running condition. LA.A.142, LA.A.143, LA.A.244	P-1 SE2: ER173-176, ER264-267
32.12		Remove and reinstall engine in a late model rear-wheel drive vehicle (OBDI or newer); reconnect all attaching components and restore the vehicle to running condition. LA.A.142, LA.A.143, LA.A.244	P-3 SE2: ER173-176, ER264-267
33.0		DEMONSTRATE PROFICIENCY IN CYLINDER HEAD AND VALVE TRAIN DIAGNOSIS AND REPAIR --The student will be able to:	
33.01		Remove cylinder head(s); visually inspect cylinder head(s) for cracks; check gasket surface areas for warpage and leakage; check passage condition. LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-2 SE2: ER258-263
33.02		Install cylinder heads and gaskets; tighten according to manufacturer's specifications and procedures. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-1 SE2: ER258-263
33.03		Inspect and test valve springs for squareness, pressure, and free height comparison; replace as needed. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER201-202
33.04		Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks, and valve grooves; determine necessary action. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER227-231

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33.05		Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action. LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-3 SE2: ER201, ER222
33.06		Inspect valves and valve seats; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-3 SE2: ER223-226
33.07		Check valve face-to-seat contact and valve seat concentricity (run out); service seats and valves as needed. SC.H.346, LA.A.142, LA.A.143, LA.A.244	P-3 SE2: ER223-224
33.08		Check valve spring assembled height and valve stem height; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244	P-3 SE2: ER225-226, ER230-231
33.09		Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER203-205
33.10		Inspect hydraulic or mechanical lifters; determine necessary action. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER204
33.11		Adjust valves (mechanical or hydraulic lifters). LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-1 SE2: ER230-231
33.12		Inspect camshaft drives (including gear wear and backlash, sprocket and chain wear;) determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER203-204

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33.13		Inspect and replace timing belt(s), overhead camdrive sprockets and tensioners; check belt tension; adjust as necessary. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-1 SE2: ER257, ER259
33.14		Inspect camshaft for run out; journal wear and lobe wear. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-3 SE2: ER203-204
33.15		Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-3 SE2: ER207
33.16		Establish camshaft(s) timing and cam sensor indexing according to manufacturer's specifications and procedures. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-1 SE2: ER259
34.0		DEMONSTRATE PROFICIENCY IN ENGINE BLOCK DIAGNOSIS AND REPAIR --The student will be able to:	
34.01		Disassemble engine block; clean and prepare components for inspection and reassembly. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.B.441, MA.B.241	P-2 SE2: ER177-187
34.02		Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action. LA.A.142, LA.A.143, LA.A.244	P-2 SE2: ER199-201, ER206-215
34.03		Inspect internal and external threads; restore as needed (includes installing thread inserts). LA.A.142, LA.A.143, LA.A.244	P-1 SE2: HB75, HB85-87

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34.04		Inspect and measure cylinder walls for damage, wear, and ridges; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.B.141, MA.B.441, MA.B.241	P-2 SE2: ER180-182, ER236-240
34.05		Inspect and measure cylinder walls for damage and wear; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244	P-2 SE2: ER180-182, ER236-240
34.06		Deglaze and clean cylinder walls. LA.A.142, LA.A.143, LA.A.244	P-1 SE2: ER236
34.07		Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141, MA.B.441, MA.B.241	P-3 SE2: ER207
34.08		Inspect and measure main and connecting rod bearings for damage, clearance, and end play; determine necessary action (includes the proper selections of bearings). LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141, MA.B.241	P-2 SE2: ER211-213, ER247
34.09		Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; inspect rod alignment and bearing bore condition. LA.A.142, LA.A.143, LA.A.244	P-3 SE2: ER210-213
34.10		Inspect and measure pistons; determine necessary action. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER210-211, ER245-246
34.11		Remove and replace piston pin. LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-3 SE2: ER210-211
34.12		Inspect, measure, and install piston rings. LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-2 SE2: ER210-211, ER246, ER255-256

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34.13		Inspect auxiliary (balance, intermediate, idler, counterbalance or silencer) shaft(s); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time. LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-2 SE2: ER214-215, ER257, ER259
34.14		Inspect, repair or replace crankshaft vibration damper (harmonic balancer). LA.A.142, LA.A.143, LA.A.244	P-3 SE2: ER149
34.15		Assemble the engine using gaskets, seals, and formed-in-place (tube-applied) sealants, thread sealers, etc. according to manufacturer's specifications. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141, MA.B.241	P-2 SE2: ER251-267
34.16		Inspect crankshaft for end play, straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure journal wear; check crankshaft sensor reluctor ring (where applicable); determine necessary action. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER208-210
35.0		DEMONSTRATE PROFICIENCY IN LUBRICATION AND COOLING SYSTEMS DIAGNOSIS AND REPAIRS --The student will be able to:	
35.01		Perform oil pressure tests; determine necessary action. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-1 SE2: ER163-165
35.02		Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.B.441, MA.E.141	P-3 SE2: ER213-214

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35.03		Perform cooling system, cap and recovery tests (pressure, combustion leakage, and temperature); determine necessary action. LA.A.142, LA.A.143, LA.A.241, MA.B.442, MA.E.141	P-1 SE2: ER136-140
35.04		Inspect, replace, and adjust drive belts, tensioners and pulleys. LA.A.142, LA.A.143, LA.A.244, MA.B.442	P-1 SE2: ER133
35.05		Inspect and replace engine cooling and heater system hoses. LA.A.142, LA.A.143, LA.A.244	P-2 SE2: ER132-133
35.06		Inspect, test, and replace thermostat and housing. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER134
35.07		Test coolant; drain and recover, flush, and refill cooling system with recommended coolant and bleed air as required. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-1 SE2: ER138-141
35.08		Inspect, test, remove, and replace water pump. LA.A.142, LA.A.143, LA.A.244	P-2 SE2: ER137
35.09		Remove and replace radiator. LA.A.142, LA.A.143, LA.A.244	P-2 SE2: ER141
35.10		Inspect, and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams. LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER137-138
35.11		Inspect auxiliary oil coolers; perform necessary action. LA.A.142, LA.A.143, LA.A.244	P-3 SE2: ER144
35.12		Inspect, test, and replace oil temperature and pressure switches and sensors. SC.H.346, LA.A.142, LA.A.143, LA.A.244, MA.B.442, MA.E.141	P-2 SE2: ER144
35.13		Perform oil and filter change. SC.H.346, LA.A.142, LA.A.143, LA.A.244	P-1 SE2: ER149-150

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