

Diesel Mechanic (47.0605)

Cross-reference to Show-Me standards (main report)

Measurable Learner Objective and Task Statement	Knowledge (Content)	Performance (Goals)	National Standards (ASE/AED)	
A. Describe and safely interact with all basic diesel mechanic systems, including equipment, materials, tools, and applied academic skills	CA 3, MA 1, SS 7, HP 7	1.4, 1.10, 3.1, 3.5, 4.7	ASE	AED
1. Demonstrate appropriate work place safety practices (e.g., fluid power, electrical, air conditioning and refrigeration, engines, power trains, steering and suspension, brakes, environmental hazards, and welding).			II, III, IV, V, VI, VII, VIII	S 12
2. Adhere to state and federal environmental/regulatory requirements/codes (e.g., use, storage, and disposal of materials and chemicals).			II, III, IV, V, VI, VII, VIII	S 12
3. Identify types, purposes, and the operation of fire extinguishers and suppression resources.			II, III, IV, V, VI, VII, VIII	S 12
4. Inspect work areas for safe work environment.			II, III, IV, V, VI, VII, VIII, IX	S 12
5. Identify and use hand and power tools.				S 1, 2, 3, 4, 5, 6, 7, 8, 9
6. Use reference books, parts books, service manuals and charts.				AD 1, 2 ENG 1.15
7. Perform basic mathematical calculations.				AD 1
8. Identify and select common fasteners/fittings, lines, seals, and gaskets.			II-B.2, II-F.6	ENG 1.4
9. Use precision measurement tools.			II-C.5, .9, .13, .14, .17, .19, .20	ENG 1.11, 12, 12, 14
10. Perform basic computer operation (e.g., keyboarding, software application, and equipment diagnostics).				PT 12
11. Identify mechanical component failures.			III-A.1, B.2, C.1, D.1, IV-A.1.1, A.2.1	PT 12
12. Drill, tap, and remove broken bolts and fittings.				ENG 1.4, 9
B. Perform preventive maintenance	CA 3, MA 1, HP 6, SC 1, SC 2	1.10, 3.1, 3.2, 4.1	ASE	AED
1. Evaluate cooling system (e.g., leaks, fluid level, and freeze temperature of coolant).			II-A.2, II-E.1, .2, .5	ENG 2
2. Check engine lubrication system pressure and level.			II-A.2, II-D.1, .2	ENG 2
3. Check air intake and exhaust system.			II-F.1, .4, .6, .9, VIII-A.3.1, .2, .3, .4, .5	ENG 2

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4. Draw lubrication and/or oil sample.			II-A.2	ENG 2
5. Check linkage adjustments.			III-B.3	
6. Perform visual inspection per pre-trip or daily list.			VIII-A.1.1 thru D.5.9	
7. Inspect, adjust, and maintain fifth wheel.			V-E.1, .2	
8. Inspect steering linkage for wear.			V-A.3.1, .2, .3, .6	
9. Inspect and adjust brakes.			IV-A.2.3, VIII-D.1.15, .16, .17	
10. Perform air brake system test.			IV-A.1.3, .9, .20, .22, .23, VIII-D.1.1, .4, .5	
11. Evaluate oil conditions visually.			VIII-A.1.4, .6	
12. Replace and inspect filters (e.g., water, fuel, engine oil, transmission, and differential).			II-G.1.3, II-E.7, II-D.4	ENG 3
13. Change oils and fluids (e.g., engine oil, transmission oil, differential oil, and steering fluid).			II-D.7, III-B.7, V-A.2.3	ENG2, PT 12
14. Lubricate chassis components.			VIII-D.4.14	
15. Inspect cab components (e.g., instruments, safety equipment and systems, mirrors and mountings, and physical condition)			VIII-B.1.1 thru C.3.3	
C. Maintain and troubleshoot electrical systems	CA 3, SC 1, MA 1, MA 3	1.4, 1.10, 3.1, 3.8, 4.1	ASE	AED
1. Solve problems with basic electricity formulas.			VI-A.3, .4, .5	EL 3
2. Conduct and evaluate common diagnostic tests/results, including DVOM (digital volt ohmmeter) use.			VI-A.2, .3, .4, .5, VI C.1, .2, F.1,	EL 3
3. Interpret diagrams and schematics.			VI-A.1	EL 5
4. Remove and replace components (e.g., battery, starter, and alternator).			VI-B.3, VI-C.5, VI-D.6	EL 1, EL 2
5. Remove and replace associated wiring and/or switches (e.g., solenoids, relay, and contacts).			VI-A.8, C.4, D.7, E.3, VI-G.11	EL 3

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6. Use troubleshooting charts.				EL 1,2,3,4,5
7. Service batteries.			VI-B.3	EL 2
D. Maintain and troubleshoot electronics	CA 3, SC 1, MA 1, MA 3	1.4, 1.10, 3.1	ASE	AED
1. Comprehend basic electronic theory and component operation (e.g., diodes, transistors, and receivers).			VI-A.1, .9	EL 5
2. Identify and apply service information resources (e.g., diagnostic procedures, flow charts and wiring diagrams).			VI-A.1, F.1	EL 1-5
3. Demonstrate basic use of a diagnostic reader.			VI-F.1	EL 5
4. Perform diagnostic tests of electronic circuit components (e.g., sensors, senders, switches, diodes, and resistors).			II-G.3.2, IV-B.4.5, VI-A.1, D.1, E.1, G.1, .3	EL 5
5. Identify circuit problems (e.g., shorted circuit, ground, and open circuit).			VI-A.6	EL 5
6. Maintain wiring connectors.			VI-B.6, D.7, E.6, G.2	EL 3
7. Analyze electronic codes and data streams.			VI-A.2, F.1	EL 5
8. Analyze electronically automated systems (e.g., transmissions and clutches, antilock HEUI injectors, ABS brakes, ATC traction control, and comfort and convenience).			II-3.2, III-B.23, 24, 25, IV-B.4.2, .5, VI-F.1, VII-D.1	EL 5
9. Operate a wiring harness diagnostic break out box.			VI-A.2	EL 1-3
E. Perform basic welding skills (optional)	CA 3, SC 1	1.10, 3.2, 3.3	ASE	AED
1. Demonstrate procedures for broken fastener removal.				S 7
2. Use cutting torch.				S 7
3. Weld with arc and mig welders.				S 7
4. Braze light-gauge materials and fittings.				S 7

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5. Weld with gas welder.				S 7
F. Maintain basic fluid power systems	CA 1, CA 3, MA 2, SC 2	1.4, 3.1	ASE	AED
1. Identify basic hydraulic and pneumatic principles and components.				HYD 4,5,6,7,8
2. Interpret fluid power diagrams, schematics, and ISO symbols.				HYD 9
3. Test pressures and flow rates using appropriate tooling (e.g., flow meter).			IV-B.5, .6	HYD 10
4. Check and adjust nitrogen charge in accumulators.				HYD 8
G. Maintain heating and air conditioning systems	CA 3, SC 1, SC 2, MA 1, MA 2, HP 6	1.8, 1.10, 3.1, 3.2	ASE	AED
1. Explain basic heater and AC theory and operation.			VII-A.1 thru .4, B.1, .2, .6, C.1	
2. Remove and replace heater and air conditioning components.			VII-A.7, B.1, .3, .4, .6, .7, B.2.1, .3, .9, D.1.1	
3. Acquire appropriate license for mobile refrigerant handling.			VII-E.1, .2 .3 .4, .5	
4. Evacuate, reclaim, and charge system per specifications.			VII-B1.8, VII-E.2, .3	
5. Test and adjust climate control temperature sensor systems.			VII-D.1.1	
6. Perform common diagnostic tests of heater and air conditioning systems.			VII-B.1	
H. Maintain steering and suspension-related components	CA 3, MA 1, HP 6, SC 1	1.8, 1.10, 3.1, 3.2, 4.1	ASE	AED
1. Diagnose vehicle steering complaints and tire wear patterns.			V-A.1.1, 2.1, C.1, D.1, .2	
2. Check and adjust simple wheel alignment (e.g., caster, camber, toe, and king pin angle).			V-C.2, .3, .4	
3. Inspect and service steering- and suspension-related components.			V-B.7, .11,C.2, .3, .4, .5, .6, .7,	
4. Remove and replace king pin.			V-B.2	
5. Remove and replace steering and suspension components.			V-A.2, .3, V-B	

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6. Inspect, remove, and replace mounted tires.			V-D.1, .2	
I. Maintain brake systems	CA 3, SC 1, SC 2, HP 6	1.8, 1.10, 3.1, 3.2, 4.1	ASE	AED
1. Repair cam, wedge, and disc brakes.			IV-A.2, .3, .4, .5, .6	
2. Bleed brake system.			IV-B.9	
3. Service hydraulic brake system using schematics.			IV-B1.1-1.7, 1.9-1.11, 2.2, 2.4, 2.5	
4. Inspect brake drum and/or rotors using safety specifications.			IV-B.1.1 thru 1.8	
5. Remove and replace spring brake chambers and diaphragms.			IV-A.2.8, B.2.2	
6. Service air brake system using schematics.			IV-A.2.2	
7. Diagnose, remove, and replace brake power-assist components.			IV-A1.1 thru 1.23	
8. Inspect, test, and service anti-lock brake systems.			IV-B.3.1, .2, .3	
9. Inspect, test, and service auxiliary brake system (e.g., electric, park, or mechanical).			IV-B.4.4	
J. Maintain power train components (on-highway)	CA 3, MA 1, HP 6, SC 1	1.8, 1.10, 3.1, 3.2, 3.7, 4.1	ASE	AED
1. Inspect, remove, and replace clutch assembly and flywheel.			III-A.4, .5, .6, .8, .9, .10, .11, .12	PT 1,2
2. Inspect and adjust clutch free play and linkage.			III-A.2	PT 2
3. Remove and replace manual and automatic transmission.			III-B.9	
4. Diagnose and repair manual and automatic transmission.			III-B.1, .2	PT 4,5,6
5. Replace and adjust wheel bearings.			III-D.21, .22, 23	PT 10
6. Service hubs.			IV-A.2.8	PT 10
7. Remove and replace drive line.			III-C.1, .2, .3, .4	PT 8
8. Check alignment of drive line (e.g., slopes, angles, and phasings).			III-C.4	PT 8

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9. Diagnose, remove and replace differential/power dividers.			III-D.17, .18	PT 9,10
10. Inspect, test, and service electronic power train control systems.			III-D.16	PT 6
K. Maintain power train components (heavy equipment)	CA 3, MA 1, HP 6, SC 1	1.8, 1.10, 3.1, 3.2, 3.7, 4.1	ASE	AED
1. Remove and install transmission.			III-B.9	
2. Diagnose and repair power shift transmission.				PT 5
3. Diagnose and repair steering clutches and brakes.				PT 2
4. Disassemble and assemble steering clutches and brakes.				PT 2
5. Disassemble and assemble final drive.				PT 10
6. Perform undercarriage component repair and alignment.				
7. Replace and adjust wheel bearings.			III-D.21, .22, 23	PT 10
8. Remove and install differential.			III-D.17, .18	PT 9
9. Disassemble and assemble differential.			III-D.17, .18	PT 9
10. Perform power train diagnostics.			III-A.1, B.1, .2, C.1, D.1	PT 12
11. Describe operation of torque converters and divider components.				PT 3,11
12. Describe operation of hydrostatic drive systems.				PT 7
13. Diagnose and repair torque converters and dividers.				PT 3,11
14. Describe operation of differential steering.				
15. Troubleshoot power train electronics.				PT 12
L. Maintain diesel engine components	CA 3, MA 2, SC 1	1.10, 3.1, 3.2, 3.3	ASE	AED
1. Comprehend basic diesel engine theory and configuration.			II-A.2, .9, .10, .11	ENG 2

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2. Clean and qualify components.			II-B.1, C.2, .8, G.1.3	ENG 1
3. Rebuild or replace accessories.				ENG 2
4. Install exterior components.			II-C.1	ENG 2
5. Identify and qualify reusable parts.			II-B.1, C.2, .8, G.1.3	ENG 2
6. Analyze engine performance (e.g., electronically, and dyno).			II-A.12	ENG 3
7. Remove and install engine.				ENG 4
M. Inspect and qualify engine block	CA 3, MA 1, SC 7	1.10, 3.1, 3.2, 3.3	ASE	AED
1. Remove and inspect internal and external engine components.			II-C.2, .4, .8, .17	ENG 2
2. Troubleshoot internal and external engine mechanical problems.			II-C.2, .4, .8, .17	ENG 2
3. Install internal engine components.			II-C.5, C.7, C.9, C.10, C.12, C.13	ENG 2
4. Inspect/qualify engine block.			II-C.2	ENG 2
N. Service and install cylinder heads and valve trains	CA 3, MA 1	1.10, 3.1, 3.2, 3.3	ASE	AED
1. Remove, visually inspect for problems, and reinstall cylinder head.			II-B.1, .3, .8	ENG 2
2. Service/rebuild cylinder heads.			II-B.4, .5, .6, .7, .8, .9, .10, .11, .12	ENG 2
3. Install camshaft and bushings.			II-B.9, C.7, .8, .9	ENG 2
4. Install cylinder head.			II-B.1	ENG 2
O. Maintain air induction and exhaust system	CA 3, MA 1, SC 7	1.10, 3.1, 3.2, 3.3	ASE	AED
1. Test and/or replace air induction components.			II-F.1, .3, .4	ENG 2
2. Test and/or replace exhaust system components.			II-F.1, .3	ENG 2

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3. Clean and inspect turbo chargers and blower super chargers			II-F.2, .6	ENG 2
P. Inspect and qualify lubrication system	CA 3, MA 1, HP 6, SC 2, SC 8	1.8, 1.10, 3.1, 4.1	ASE	AED
1. Repair or replace oil cooler.			II-D.5	ENG 2
2. Diagnose and qualify oil pump.			II-D.3	ENG 2
3. Inspect oil spray jets/piston coolers.			II-C.14	ENG 2
4. Install oil pump.			II-D.3	ENG 2
5. Prime and pressurize lubrication system.			II-D.4	ENG 2
6. Diagnose lubrication system failure.			II-D.1	ENG 2
Q. Maintain diesel engine cooling system	CA 3, SC 2, SC 7, HP 6	1.10, 3.1, 4.1	ASE	AED
1. Demonstrate an understanding of basic coolant system theory and operation.			II-E.1	ENG 2
2. Troubleshoot heating/cooling system problems.			II-E.2, .3, .4	ENG 2
3. Replace heating/cooling system components.			II-E.3, .4, .7, .8, .10	ENG 2
4. Rebuild cooling system components.				ENG 2
5. Flush heating/cooling system.			II-E.6	ENG 2
6. Inspect fan drive assembly and related hardware.			II-E.3, .10	ENG 2
7. Test and adjust coolant and additives.			II-E.5	ENG 2
R. Troubleshoot and repair fuel system—mechanical	CA 3, MA 2, SC 1, SC 2	1.8, 1.10, 3.1, 3.5, 4.1	ASE	AED
1. Test and/or replace injection nozzles and injectors.			II-G2.3	ENG 3
2. Time fuel injection pump.			II-G2.1, 2.2	ENG 3
3. Identify and install fuel line hoses and connections.			II-G2.7	ENG 3

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4. Remove and install injection pump.			II-G2.1, 2.2	ENG 3
5. Prime and pressurize fuel system.			II-G1.5	ENG 3
6. Test fuel system pressure.			II-G1.4	ENG 3
S. Troubleshoot and repair fuel system—electronic	CA 3, MA 2, SC 1, SC 2	1.8, 1.10, 3.1, 3.5, 4.1	ASE	AED
1. Check DTC (diagnostic trouble codes) from on-board computer system utilizing scan tool and technical information; determine needed repairs.			II-G3.2, 3.3, 3.9	ENG 3
2. Inspect, adjust and replace test sensors, controls and actuator components and circuits.			II-G3.4, 3.5, 3.9	ENG 3
3. Connect computer programming equipment to vehicle/engine; access and change customer parameters; determine needed repairs.			II-G3.6, 3.10	ENG 3
4. Remove, inspect, test and reinstall electronic injectors; determine needed repairs.			II-G3.7, 3.8	ENG 3
5. Prime and pressurize fuel system.			II-G1.5	ENG 3
T. Perform a diesel engine tuneup	CA 3, MA 2, SC 7	3.1, 3.2, 3.5, 3.7	ASE	AED
1. Adjust intake and exhaust valves to specifications.			II-B.12	ENG 4
2. Adjust injectors to specifications.			II-G.2.1, .2, .3	ENG 4
3. Adjust governor (as applicable).			II-G.2.6	ENG 4
4. Set control racks.			II-2.1, .2, .3	ENG 4
5. Adjust compression brake.			II-H.1	ENG 4
6. Adjust valve bridge or crosshead.			II-B.7	ENG 4
7. Tuneup an engine (specify type: _____).				ENG 4
U. Demonstrate leadership skills in the classroom, industry, and society	CA 1, CA 4, CA 6, SS 6, HP 2	2.1, 2.3, 2.6, 4.3, 4.4, 4.6, 4.8	ASE	AED
1. Demonstrate an understanding of SkillsUSA, its structure, and activities.				
2. Demonstrate an understanding of one's personal values.				

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3. Perform tasks related to effective personal management skills.				
4. Demonstrate interpersonal skills.				
5. Demonstrate etiquette and courtesy.				
6. Demonstrate effectiveness in oral and written communication.				
7. Develop and maintain code of professional ethics.				
8. Maintain an appropriate professional appearance.				
9. Perform basic tasks related to securing and terminating employment.				
10. Perform basic parliamentary procedures in a group meeting.				
V. Explain and demonstrate skills in a specialization area identified by the instructor			ASE	AED

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