

## **Equipment Mechanic Competency List**

1. Knowledge of basic electrical/electronic theory such as resistance, voltage, and amperage in order to diagnose, test, and repair vehicle electrical system and accessories.
2. Knowledge of vehicular cooling and heating systems operation in order to make necessary repairs.
3. Knowledge of air, hydraulic, and electro-mechanical brake system operation in order to troubleshoot and make repairs.
4. Working knowledge of the mechanical principles and components of gasoline/diesel combustion engines to determine necessary repairs.
5. Knowledge of tires and wheels, such as inflation pressure, wheel mounting and balancing (on vehicle, on tire, on wheel), tire pressure monitoring system, tread wear and damage (cuts, blister, tread separation) in order to determine safe limits and proper wear.
6. Knowledge of the functions of automatic transmission components including torque converters, valve bodies, clutches, bands, modulators, governors, mechanical, vacuum and electrical controls, filters, and seals sufficient to adjust, repair, and/or replace them.
7. Knowledge of tires and wheels, such as inflation pressure, wheel mounting and balancing (on vehicle, on tire, on wheel) tread wear and damage, (cuts, blister, tread separation) in order to determine safe limits and proper wear.
8. Knowledge of wheel alignment (caster or camber toe-in) steering components, such as ball joint, center link, drag link, bell crank, shock absorber, steering damper, and tie rod, in order to determine proper alignment, excessive wear, and ensure safe handling of vehicle.
9. Knowledge of vehicle or equipment operation such as drivability, and accessories operation, (PTO, power steering, air conditioning, and winches) in order to determine repairs and proper operation of components.
10. Knowledge of how gas, diesel, liquid petroleum gas (LPG) and methanol fuel systems reacts with combustible engines.
11. Knowledge of drive line principles and components such as constant velocity joints, center support, time/phase of "U" joint, alignment, balance, slip yoke, flanges, and grease fitting in order to determine the proper function of the drive line.
12. Knowledge of exhaust flow and gases such as carbon monoxide, hydrocarbons, oxides of nitrogen, and restriction in muffler, pipes and catalytic converter in order to determine proper and safe operation of the system.
13. Knowledge of the location and appearance of components such as oil pan, transmission pan, and fuel tank sufficiently in order to determine that they are not damaged or broken.

14. Knowledge of heat system transfer such as ratio of water to coolant, water flow, pressure, vacuum, corrosion, and airflow in order to determine coolant system malfunction and to maintain the engine at proper operating temperature.
15. Knowledge of vehicle battery such as type of construction, battery application, maintenance, safe handling, and testing for explosive gases in order to determine proper servicing and usage of the battery.
16. Knowledge of the basic design, construction, and principles of operation of internal combustion engines such as how a gasoline engine operates versus a diesel engine, and how internal parts (i.e., piston, cam shaft, crank shaft, piston rings, and wrist pins) function, in order to overhaul and rebuild engine to manufacturer's specification.
17. Knowledge of the basic principle of operation of the charging system and related components such as how the generator and alternator supplies electrical power to the battery, how the circuit operates, how to test for faults and proper operation, and how the related components function in order to determine that the charging system is supplying the proper amount of voltage and amperage.
18. Skill in repair of electrical system components such as starters, alternators, lighting systems, electrical wiring, relays, regulators, ignition cables, primary ignition system, fuse block, switch and gauges in order to restore operation.
19. Skill in adjusting, repairing, or replacing linkage assemblies (i.e., hydraulic, cable, mechanical and electrical) using basic hand tools, micrometer, multimeter, spanner wrench, transmission stand and floor jack, feeler gauges, and hoist.
20. Skill in adjusting, repairing, and replacing fuel system components such as fuel pumps, filters, tank selector valves (manual/electric) fuel lines, fuel tanks, CAPS, and fuel sensing units in order to ensure proper fuel delivery to metering device (i.e., carburetor or fuel injectors).
21. Skill in diagnosing, repairing, replacing and adjusting final drive components such as ring and pinion, spider gears, axle shaft, bearings, and limited slip carrier in order to provide proper, smooth and quiet operation.
22. Ability to determine damage, or broken or missing components using sight, touch/feel, smell, and hearing.
23. Skill in road testing vehicles such as trucks, buses, automobiles, and small equipment using manuals, troubleshooting guides, sight, smell, touch/feel and hearing in order to isolate any malfunction and to ensure that vehicles are safe and ready for issue.
24. Skill in using test equipment such as manifold gauge, leak detector, temperature gauge, hand and electric vacuum pumps, scan tool, pressure tester, thermometer and multimeter in order to determine necessary repairs.
25. Skill in using drum micrometer, rotor micrometer, air pressure gauge, vacuum gauge, hub puller, and caliper.
26. Skill in using digital volt meter, test light, exhaust analyzer, scan tool, EVAP tester (smoke tester), vacuum gauge, and hand vacuum pump in order to troubleshoot the emission system.

27. Skill in using mechanical test equipment such as compression, vacuum, oil pressure, and fuel pressure gauges, cylinder leak down tester, fuel pump and ignition tester, dynamometer, and manometer.
28. Skill in using air pressure, pressure gauge, basic hand tools, torque wrench, and test light.
29. Skill in using tire machine, floor jack, wrenches, and tire tools (i.e., tire iron, hammer, rubber mallet, lubricant soap, bead expander, valve stem installer, and valve core installer).
30. Skill in using torches and air chisel guns.
31. Skill in using baking soda, battery starter tester, hydrometer, safety glasses, gloves, apron, and battery chargers.
32. Skill in using scope, basic hand tools, hand vacuum pump, exhaust gas analyzer, feeler gauge, brass feeler gauge, vacuum gauge, pressure gauge, dwell/tach meter, and manometer in order to perform tune up procedures.
33. Skill in using gauges, hydrometer, test light, jumper cables, and load tester.
34. Ability to use chain hoist, engine stand, overhead cranes, and specialized tools in order to remove engine from vehicle.
35. Skill in using dial indicator, torque wrench, press, micrometer, feeler gauge, Prussian blue or white leads and tension gauge.
36. Ability to read and understand reports, manuals, technical service bulletins and vehicle history files, in order to determine which repairs have been done, what repairs need to be done, and how to repair the vehicle.
37. Ability to write sufficiently in order to complete standard departmental forms.
38. Ability to write requests or reports such as time/material, repair estimate, repair performed on vehicle and equipment, work performance, and vehicle abuse using results from diagnostic test equipment, work history folder, and actual condition of the equipment or vehicle in order to document the extent of repairs necessary to ensure a safe operating vehicle.
39. Ability to communicate orally on a one-on-one basis for the purpose of obtaining or providing information regarding procedures, policies, and methods of performing tasks.
40. Ability to read and interpret City street maps in order to locate desired destination.
41. Working knowledge of arithmetic including addition, subtraction, multiplication, and division of whole numbers, fractions and decimals.
42. Ability to read and understand technical drawings and schematics as used in wiring diagrams and manufacturers manuals and specifications.
43. Knowledge of the laws governing vehicle emission standards including tolerance, documentation, and certification of test equipment sufficient to meet mandated laws.

44. Ability to read and implement safety procedures such as OSHA regulation and departmental policies in order to ensure a safe and secure work environment.