Heavy Duty Equipment Mechanic  
(Class Code 3743)

Competency List

**Mechanical Knowledge**

1. Working knowledge of the basic mechanical principles of the internal combustion engine.

2. Working knowledge of basic electrical principles, systems and components as they relate to vehicle and equipment operation.

3. Working knowledge of the principles, operation and repair of hydraulic, air, and mechanical brake systems and their components.

4. Working knowledge of the principles, operation and repair of gasoline, diesel and alternative fuel systems and components.

5. Working knowledge of the principles, operation and repair of clutch assemblies and components.

6. Working knowledge of the principles, operation characteristics and repair of various types of manual and automatic transmissions and their components.

7. Working knowledge of the principles, operation and repair of drive shafts and final drive assemblies.

8. Working knowledge of the principles, operation and repair of hydraulic systems such as lift gates, cranes, aerial platforms and other specialized equipment.

9. Working knowledge of the operation, servicing and repair of exhaust and emission control systems and components.

10. Working knowledge of the operation, servicing and repair of air conditioning systems, components and controls.

11. Working knowledge of the operation, servicing and repair of cooling and heating systems, components and controls.
12. Working knowledge of the operation, servicing and repair of manual and power steering systems and components.

13. Working knowledge of the principles, operation and repair of suspension systems and components on automotive and heavy-duty equipment.

14. Working knowledge of the overhaul and rebuilding of engines and components on construction, road maintenance, firefighting and other specialized equipment.

15. Working knowledge of tire wearing patterns and inspection for service practices.

16. Working knowledge of wearing characteristics of tracks and their components.

17. Ability to do front and rear end and tandem alignment using alignment rack and gauges.

18. Ability to diagnose needed equipment repairs based on the sound of engine noises.

19. Working knowledge of the functions and operation of charging and starting systems and their components.

20. Ability to perform State licensed brake adjustments.

21. Ability to use basic hand and power tools for vehicle, and equipment repair.

22. Ability to use welding and soldering equipment for equipment modifications and/or repairs.

23. Working knowledge of types of tubing flares, sizes, fittings and hoses.

24. Working knowledge of proper methods used in maintenance of shop tools.

**Knowledge of Tools and Equipment**

Working knowledge of the use of the following tools and equipment for the purpose of diagnosing faulty vehicle and equipment operation and completing needed repairs:

25. Battery load tester

26. Volt-ohm meter (V.O.M.)
27. Cylinder balance tester
28. Chemical and block check tester
29. Cooling system pressure tester
30. Ultra-sonic leak detector
31. Cutting torch
32. Pressure leak detector
33. Dial indicators
34. Timing light
35. Micrometer
36. Hydrometer
37. Manometer
38. Thermometer
39. Pyrometer
40. Air conditioning service gauges
41. Flowmeter
42. Pressure and vacuum gauges
43. Feeler gauges
44. Exhaust gas analyzer
45. Test light
46. Track and grouser gauge
47. Diode tester
48. Battery starter tester
49. Volume container
50. Diagnostic scanner
51. Brake adjusting tools
52. Pressure brake bleeder
53. Soldering gun
54. Transmission and other jacks
55. Pneumatic tools
56. Basic hand tools
57. Specialty tools
58. Hydraulic tools
59. Presses

**Oral/Written Communication**

60. Ability to read and understand written information found in documents such as shop records, departmental policies, rules and regulations, and manufacturers parts and repair manuals.

61. Ability to communicate orally on a one-on-one basis for the purpose of obtaining information and explaining procedures, policies, and methods of performing tasks.

62. Ability to complete written forms such as shop orders, inspection forms, and vehicle and equipment work history records.

**Math/Visual Spatial Skills**

63. Knowledge of basic mathematics including addition, subtraction, multiplication and division of whole numbers, fractions and decimals.

64. Ability to read and understand technical drawings and schematics as used in electrical and hydraulic diagrams and manufacturers manuals and specifications.

65. Ability to draw basic diagrams for the preparation of or modification to systems, and components.
66. General knowledge of the metric and standard system and metric and standard conversion charts.

**Equipment Operation Skills**

67. Ability to operate the various types of equipment to be repaired.

68. Ability to operate a motor vehicle requiring a Class A or B license.

**Misc.**

69. Ability to recognize when equipment manuals should be consulted.

70. Working knowledge of storekeeping procedures as used in maintaining a supply of tools, parts and supplies.

71. Knowledge of CALOSHA rules, State vehicle code, Department of Transportation and general safety standards relating to tools, equipment, storekeeping and shop areas and the movement of vehicles and equipment.

72. Knowledge of City personnel policies, rules and regulations.

73. Ability to schedule and determine work priorities.