Nevada CTE

Diesel Technology: High School

IDENTIFY AND UTILIZE SAFETY PROCEDURES AND PROPER TOOLS 1.0

PS 1.1 DEMONSTRATE GENERAL LAB SAFETY RULES AND PROCEDURES 1.1

- 1.1.1 Describe general shop safety rules and procedures (i.e., safety test) 1.1.1
- 1.1.2 Utilize safe procedures for handling of tools and equipment 1.1.2
- 1.1.3 Identify and use proper placement of floor jacks and jack stands 1.1.3
- 1.1.4 Identify and use proper lifting procedures and proper use of support equipment (e.g., lifts, hoists, rigging, etc.) 1.1.4
- 1.1.5 Utilize proper ventilation procedures for working within the lab/shop area 1.1.5
- 1.1.6 Identify marked safety areas 1.1.6
- 1.1.7 Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment 1.1.7
- 1.1.8 Identify the location and use of eye wash stations 1.1.8
- 1.1.9 Identify the location of the posted evacuation routes 1.1.9
- 1.1.10 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities (i.e., personal protection equipment – PPE) 1.1.10
- 1.1.11 Identify and wear appropriate clothing for lab/shop activities 1.1.11
- 1.1.12 Secure hair and jewelry for lab/shop activities 1.1.12
- 1.1.13 Research safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits 1.1.13
- 1.1.14 Research safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, fuel injection systems, etc.) 1.1.14
- 1.1.15 Locate and interpret safety data sheets (SDS) 1.1.15
- 1.1.16 Prepare time or job cards, reports or records 1.1.16
- 1.1.17 Perform housekeeping duties 1.1.17
- 1.1.18 Follow verbal instructions to complete work assignments 1.1.18
- 1.1.19 Follow written instructions to complete work assignments 1.1.19

Skip to main content

PS 1.2 IDENTIFY AND UTILIZE PROPER TOOLS 1.2

- 1.2.1 Identify appropriate tools and their usage in diesel service applications 1.2.1
- 1.2.2 Identify standard and metric designation 1.2.2
- 1.2.3 Demonstrate safe handling and use of appropriate tools 1.2.3
- 1.2.4 Demonstrate proper cleaning, storage, and maintenance of tools and equipment 1.2.4
- 1.2.5 Demonstrate proper use of precision measuring tools (i.e., micrometer, dial-indicator, dial-caliper) 1.2.5

PERFORM BASIC VEHICLE SERVICE 2.0

PS 2.1 IDENTIFY AND UTILIZE VEHICLE SERVICE INFORMATION 2.1

- 2.1.1 Locate and utilize paper and/or electronic service information 2.1.1
- 2.1.2 Locate and utilize technical service bulletins (TSBs) 2.1.2
- 2.1.3 Demonstrate knowledge of special service messages, quotes, service campaigns/recalls, vehicle/service warranty applications, and service interval recommendations 2.1.3
- 2.1.4 Locate vehicle identification number (VIN) and production date code 2.1.4
- 2.1.5 Analyze vehicle identification number (VIN) information 2.1.5
- 2.1.6 Research other vehicle information labels (such as tire, emissions, etc.) 2.1.6

PS 2.2 PREPARE A VEHICLE FOR SERVICE 2.2

- 2.2.1 Identify information needed and the service requested on a repair order 2.2.1
- 2.2.2 Identify purpose and demonstrate proper use of fender covers, seat covers, and floor mats 2.2.2
- 2.2.3 Demonstrate use of the three C's (concern, cause, and correction) 2.2.3
- 2.2.4 Review vehicle service history 2.2.4
- 2.2.5 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction 2.2.5

PS 2.3 PREPARE A VEHICLE FOR THE CUSTOMER 2.3

- 2.3.1 Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.) 2.3.1

APPLY CONCEPTS OF DIESEL ENGINE SE

PS 3.1 PERFORM PRELIMINARY ENGINE INSPECTION 3.1

- 3.1.1 Inspect fuel, oil, diesel exhaust fluid (DEF) and coolant levels, and condition; determine needed action 3.1.1

Skip to main content

3.1.2 Identify engine fuel, oil, coolant, air, and other leaks; determine needed action 3.1.2

3.1.3 Observe engine exhaust smoke color and quantity 3.1.3

3.1.4 Check and record electronic diagnostic codes 3.1.4

PS 3.2 PERFORM CYLINDER HEAD AND VALVE TRAIN SERVICE 3.2

3.2.1 Inspect cylinder head for cracks/damage; check mating surfaces for warpage; check condition of passages; inspect core/expansion and gallery plugs; determine needed action 3.2.1

3.2.2 Disassemble head and inspect valves, guides, seats, springs, retainers, rotators, locks, and seals; determine needed action 3.2.2

3.2.3 Inspect valve train components; determine needed action 3.2.3

3.2.4 Reassemble cylinder head 3.2.4

3.2.5 Inspect, measure, and replace/reinstall overhead camshaft; measure/adjust end play and backlash 3.2.5

3.2.6 Adjust valve bridges (crossheads); adjust valve clearances and injector settings 3.2.6

PS 3.3 PERFORM ENGINE BLOCK SERVICE AND REPAIR 3.3

3.3.1 Remove, inspect, service, and install pans, covers, gaskets, seals, wear rings, and crankcase ventilation components 3.3.1

3.3.2 Disassemble, clean, and inspect engine block for cracks/damage; measure mating surfaces for warpage; check condition of passages, core/expansion and gallery plugs; inspect threaded holes, studs, dowel pins, and bolts for serviceability; determine needed action 3.3.2

3.3.3 Clean, inspect, and measure cylinder walls or liners for wear and damage; determine needed action 3.3.3

3.3.4 Inspect in-block camshaft bearings for wear and damage; determine needed action 3.3.4

3.3.5 Inspect, measure, and replace/reinstall in-block camshaft; measure/adjust end play 3.3.5

3.3.6 Clean and inspect crankshaft for surface cracks and journal damage; check condition of oil passages; check passage plugs; measure journal diameter; determine needed action 3.3.6

3.3.7 Inspect main bearings for wear and damage; check bearing clearances; check crankshaft end play 3.3.7

3.3.8 Inspect, install, and time gear train; measure gear backlash; determine needed action 3.3.8

3.3.9 Inspect connecting rod and bearings for wear patterns; measure pistons, pins, retainers, and bushings 3.3.9

Skip to main content

3.3.10 Determine piston-to-cylinder wall clearance; check ring-to-groove fit and end gap; install rings on pistons 3.3.10

3.3.11 Assemble pistons and connecting rods; install in block; install rod bearings and check clearances 3.3.11

3.3.12 Check condition of piston cooling jets (nozzles); determine needed action 3.3.12

3.3.13 Inspect crankshaft vibration damper; determine needed action 3.3.13

3.3.14 Inspect flywheel/flexplate (including ring gear) and mounting surfaces for cracks and wear; measure runout; determine needed action 3.3.14

PS 3.4 PERFORM LUBRICATION SYSTEMS SERVICE AND REPAIR 3.4

3.4.1 Check engine oil level, condition, and consumption; determine needed action 3.4.1

3.4.2 Inspect and measure oil pump, drives, inlet pipes, and pick-up screens; check drive gear clearances; determine needed action 3.4.2

3.4.3 Determine proper lubricant and filter requirements 3.4.3

3.4.4 Perform oil and filter change 3.4.4

PS 3.5 PERFORM COOLING SYSTEMS SERVICE AND REPAIR 3.5

3.5.1 Check engine coolant type, level, condition, and consumption; test coolant for freeze protection and additive package concentration; determine needed action 3.5.1

3.5.2 Test coolant temperature and check operation of temperature and level sensors, gauge, and/or sending unit; determine needed action 3.5.2

3.5.3 Inspect and reinstall/replace pulleys, tensioners and drive belts; adjust drive belts and check alignment 3.5.3

3.5.4 Recover coolant, refill with recommended coolant/additive package, and bleed cooling system per manufacturers specification 3.5.4

3.5.5 Inspect coolant conditioner/filter assembly for leaks; inspect valves, lines, and fittings; replace as needed 3.5.5

3.5.6 Inspect water pump and coolant hoses; replace as needed 3.5.6

3.5.7 Inspect, clean, and pressure test radiator. Pressure test cap, tank(s), and recovery systems; determine needed action 3.5.7

3.5.8 Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed 3.5.8

PS 3.6 INSPECT AIR INDUCTION AND EXHAUST SYSTEMS 3.6

3.6.1 Check air induction system: piping, hoses, clamps, and mounts; service or replace air filter as needed 3.6.1

3.6.2 Inspect intake manifold, gaskets, and connections; determine needed action 3.6.2

3.6.3 Inspect charge air cooler assemblies; determine needed action 3.6.3

Skip to main content

3.6.4 Inspect exhaust manifold, piping, mufflers, and mounting hardware; determine needed action 3.6.4

PS 3.7 PERFORM FUEL SUPPLY SYSTEMS SERVICE 3.7

3.7.1 Check fuel level, and condition; determine needed action 3.7.1

3.7.2 Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, supply and return lines and fittings; determine needed action 3.7.2

3.7.3 Inspect primary fuel delivery system; determine needed action 3.7.3

PERFORM PREVENTATIVE MAINTENANCE INSPECTIONS 4.0

PS 4.1 ASSESS ENGINE SYSTEMS FOR SERVICE 4.1

4.1.1 Check engine starting/operation, record idle and governed rpm 4.1.1

4.1.2 Inspect belts, tensioners, and pulleys; check and adjust belt tension; check belt alignment 4.1.2

4.1.3 Check engine oil level and condition; check dipstick seal 4.1.3

4.1.4 Inspect engine mounts for looseness and deterioration 4.1.4

4.1.5 Check engine for oil, coolant, air, fuel, and exhaust leaks (engine off and running) 4.1.5

4.1.6 Check engine compartment wiring harnesses, connectors, and seals for damage and proper routing 4.1.6

PS 4.2 INVESTIGATE FUEL SYSTEMS FOR SERVICE 4.2

4.2.1 Check fuel tanks, mountings, lines, caps, and vents 4.2.1

4.2.2 Drain water from fuel system 4.2.2

4.2.3 Service water separator/fuel heater; replace fuel filter(s); prime and bleed fuel system 4.2.3

PS 4.3 ASSESS AIR INDUCTION AND EXHAUST SYSTEMS FOR SERVICE 4.3

4.3.1 Check exhaust system mountings for looseness and damage 4.3.1

4.3.2 Check engine exhaust system for leaks, proper routing, and damaged or missing components to include exhaust gas recirculation (EGR) system and after treatment devices, if equipped 4.3.2

4.3.3 Check air induction system: piping, charge air cooler, hoses, clamps, and mountings; check for air restrictions and leaks 4.3.3

4.3.4 Inspect turbocharger for leaks; check mountings and connections 4.3.4

4.3.5 Service or replace air filter as needed; check and reset air filter restriction indicator 4.3.5

4.3.6 Inspect crankcase ventilation system 4.3.6

4.3.7 Inspect diesel exhaust fluid (DEF) system, to include tanks, lines, gauge, pump, and filter 4.3.7

Skip to main content

4.4 INVESTIGATE COOLING SYSTEMS FOR SERVICE 4.4

- 4.4.1 Check operation of fan clutch 4.4.1
- 4.4.2 Inspect radiator (including air flow restriction, leaks, and damage) and mountings 4.4.2
- 4.4.3 Inspect fan assembly and shroud 4.4.3
- 4.4.4 Pressure test cooling system and radiator cap 4.4.4
- 4.4.5 Inspect coolant hoses and clamps 4.4.5
- 4.4.6 Inspect coolant recovery system 4.4.6
- 4.4.7 Check coolant for contamination, additive package concentration, aeration, and protection level (freeze point) 4.4.7
- 4.4.8 Service coolant filter 4.4.8
- 4.4.9 Inspect water pump 4.4.9

PS 4.5 ANALYZE LUBRICATION SYSTEMS FOR SERVICE 4.5

- 4.5.1 Change engine oil and filters; visually check oil for coolant or fuel contamination; inspect and clean magnetic drain plugs 4.5.1

PS 4.6 INVESTIGATE CAB AND HOOD INSTRUMENTS AND CONTROLS FOR SERVICEABILITY 4.6

- 4.6.1 Inspect key condition and operation of ignition switch 4.6.1
- 4.6.2 Check warning indicators 4.6.2
- 4.6.3 Check instruments; record oil pressure and system voltage 4.6.3
- 4.6.4 Check heating ventilation and air conditioning (HVAC) controls 4.6.4
- 4.6.5 Check operation of all accessories 4.6.5
- 4.6.6 Using electronic service tool(s) or on-board diagnostic system; retrieve engine monitoring information; check and record diagnostic codes and trip/operational data (including engine, transmission, anti-lock brake system (ABS), and other systems) 4.6.6

PS 4.7 ASSESS CAB AND HOOD SAFETY EQUIPMENT FOR SERVICE 4.7

- 4.7.1 Check operation of electric/air horns and reverse warning devices 4.7.1
- 4.7.2 Check condition of spare fuses, safety triangles, fire extinguisher, and all required decals 4.7.2
- 4.7.3 Inspect seat belts and sleeper restraints 4.7.3
- 4.7.4 Inspect wiper blades and arms 4.7.4

PS 4.8 INSPECT CAB AND HOOD HARDWARE/ACCESSORIES FOR SERVICE 4.8

- 4.8.1 Check operation of wiper and washer 4.8.1
- 4.8.2 Inspect windshield glass for cracks or discoloration; check sun visor 4.8.2
- 4.8.3 Check seat condition, operation, and mounting 4.8.3
- 4.8.4 Check door glass and window operation 4.8.4

Skip to main content

- 4.8.5 Inspect steps and grab handles 4.8.5
- 4.8.6 Inspect mirrors, mountings, brackets, and glass 4.8.6
- 4.8.7 Record all observed physical damage 4.8.7
- 4.8.8 Lubricate all cab and hood grease fittings 4.8.8
- 4.8.9 Inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, safety latches, linkages, and cables 4.8.9

PS 4.9 EXAMINE HEATING, VENTILATION AND AIR CONDITIONING (HVAC) SYSTEMS FOR SERVICE 4.9

- 4.9.1 Inspect A/C condenser and lines for condition and visible leaks; check mountings 4.9.1
- 4.9.2 Inspect A/C compressor and lines for condition and visible leaks; check mountings 4.9.2
- 4.9.3 Check A/C system condition and operation; check A/C monitoring system, if applicable 4.9.3
- 4.9.4 Check HVAC air inlet filters and ducts; service as needed 4.9.4

PS 4.10 ASSESS BATTERY AND STARTING SYSTEMS 4.10

- 4.10.1 Inspect battery box(es), cover(s), and mountings 4.10.1
- 4.10.2 Inspect battery hold-downs, connections, cables, and cable routing; service as needed 4.10.2
- 4.10.3 Check/record battery state-of-charge (open circuit voltage) and condition 4.10.3
- 4.10.4 Perform battery test (load and/or capacitance) 4.10.4
- 4.10.5 Inspect starter, mounting, and connections 4.10.5
- 4.10.6 Engage starter; check for unusual noises, starter drag, and starting difficulty 4.10.6

PS 4.11 ASSESS CHARGING SYSTEMS 4.11

- 4.11.1 Inspect alternator, mountings, cable, wiring, and wiring routing; determine needed action 4.11.1
- 4.11.2 Perform alternator output tests 4.11.2

PS 4.12 INVESTIGATE LIGHTING SYSTEMS FOR SERVICE 4.12

- 4.12.1 Check operation of interior lights 4.12.1
- 4.12.2 Check all exterior lights, lenses, reflectors, and conspicuity tape; check headlight alignment 4.12.2
- 4.12.3 Inspect and test tractor-to-trailer multi-wire connector(s), cable(s), and holder(s) 4.12.3

Skip to main content

4.13 EXAMINE AIR BRAKES FOR SERVICE 4.13

4.13.1 Check operation of parking brake 4.13.1

4.13.2 Record air governor cut-in and cut-out setting (psi) 4.13.2

4.13.3 Check operation of air reservoir/tank drain valves 4.13.3

4.13.4 Check air system for leaks (brakes released) 4.13.4

4.13.5 Check air system for leaks (brakes applied) 4.13.5

4.13.6 Test one-way and double-check valves 4.13.6

4.13.7 Check low air pressure warning devices 4.13.7

4.13.8 Check tractor protection valve 4.13.8

4.13.9 Test air pressure build-up time 4.13.9

4.13.10 Inspect coupling air lines, holders, and gladhands 4.13.10

4.13.11 Check brake chambers and air lines for secure mounting and damage 4.13.11

4.13.12 Check operation of air drier 4.13.12

4.13.13 Inspect and record brake shoe/pad condition, thickness, and contamination 4.13.13

4.13.14 Inspect and record condition of brake drums/rotors 4.13.14

4.13.15 Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing 4.13.15

4.13.16 Check operation and adjustment of brake automatic slack adjusters (ASA); check and record push rod stroke 4.13.16

4.13.17 Lubricate all brake component grease fittings 4.13.17

4.13.18 Check condition and operation of hand brake (trailer) control valve, if applicable 4.13.18

4.13.19 Drain air tanks and check for contamination 4.13.19

4.13.20 Check condition of pressure relief (safety) valves 4.13.20

PS 4.14 INVESTIGATE HYDRAULIC BRAKES FOR SERVICE 4.14

4.14.1 Check master cylinder fluid level and condition 4.14.1

4.14.2 Inspect brake lines, fittings, flexible hoses, and valves for leaks and damage 4.14.2

4.14.3 Check parking brake operation; inspect parking brake application and holding devices; adjust as needed 4.14.3

4.14.4 Check operation of hydraulic system: pedal travel, pedal effort, pedal feel 4.14.4

4.14.5 Inspect calipers/wheel cylinders for leakage, binding and damage 4.14.5

Skip to main content

4.14.6 Inspect brake assist system (booster), hoses and control valves; check reservoir fluid level and condition 4.14.6

4.14.7 Inspect and record brake pad/lining condition, thickness, and contamination 4.14.7

4.14.8 Inspect and record condition of brake rotors/drums 4.14.8

4.14.9 Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing 4.14.9

PS 4.15 ANALYZE DRIVE TRAIN FOR SERVICE 4.15

4.15.1 Check clutch linkage/cable and levers for looseness or binding, lubricate release/throwout bearing as required 4.15.1

4.15.2 Check hydraulic clutch slave and master cylinders, lines, fittings, hoses, and fluid level 4.15.2

4.15.3 Check transmission case, seals, filter, hoses, lines and cooler for cracks and leaks 4.15.3

4.15.4 Inspect transmission breather 4.15.4

4.15.5 Inspect transmission mounts 4.15.5

4.15.6 Check transmission oil level, type, and condition; add proper type of lubricant as needed 4.15.6

4.15.7 Inspect U-joints, yokes, driveshafts, boots/seals, center bearings, and mounting hardware for looseness, damage, and proper phasing 4.15.7

4.15.8 Inspect axle housing(s) for cracks and leaks 4.15.8

4.15.9 Inspect axle breather(s) 4.15.9

4.15.10 Lubricate all drive train grease fittings 4.15.10

4.15.11 Check drive axle(s) oil level, type, and condition; add proper type of lubricant as needed 4.15.11

4.15.12 Check transmission wiring, connectors, seals, and harnesses for damage and proper routing 4.15.12

4.15.13 Check pedal height and travel, inspect clutch safety switch 4.15.13

4.15.14 Measure driveline angles; determine necessary action 4.15.14

PS 4.16 INVESTIGATE SUSPENSION AND STEERING SYSTEMS FOR SERVICE 4.16

4.16.1 Check steering wheel operation for free play and binding 4.16.1

4.16.2 Check power steering pump, mounting, and hoses for leaks, condition, and routing; check fluid level 4.16.2

4.16.3 Inspect steering gear for leaks and secure mounting. 4.16.3

4.16.4 Inspect steering shaft U-joints, pinch bolts, splines, pitman arm-to-steering sector shaft, tie rod ends, and linkages 4.16.4

4.16.5 Check kingpins for wear 4.16.5

4.16.6 Check wheel bearings for looseness and noise 4.16.6

Skip to main content

4.16.7 Check oil level and condition in all non-drive hubs; check for leaks. 4.16.7

4.16.8 Inspect springs, pins, hangers, shackles, spring U-bolts, and insulators 4.16.8

4.16.9 Inspect shock absorbers for leaks and secure mounting 4.16.9

4.16.10 Inspect air suspension springs, mounts, hoses, valves, linkage, and fittings for leaks and damage 4.16.10

4.16.11 Check and record suspension ride height 4.16.11

4.16.12 Lubricate all suspension and steering grease fittings 4.16.12

4.16.13 Check axle locating components (radius, torque, and/or track rods) 4.16.13

PS 4.17 ASSESS TIRES AND WHEELS FOR SERVICE 4.17

4.17.1 Inspect tires for wear patterns and proper mounting 4.17.1

4.17.2 Inspect tires for cuts, cracks, bulges, and sidewall damage 4.17.2

4.17.3 Inspect valve caps and stems; determine needed action 4.17.3

4.17.4 Measure and record tread depth; probe for imbedded debris 4.17.4

4.17.5 Check and record air pressure; adjust air pressure in accordance with manufacturers' specifications 4.17.5

4.17.6 Check wheel mounting hardware; determine needed action 4.17.6

4.17.7 Inspect wheels for cracks, damage and proper hand hold alignment 4.17.7

4.17.8 Check tire matching (diameter and tread) on single and dual tire applications 4.17.8

PS 4.18 ANALYZE FRAME AND FIFTH WHEEL FOR SERVICE 4.18

1.18.1 Inspect fifth wheel mounting, bolts, air lines, and locks 4.18.1

4.18.2 Test operation of fifth wheel locking device; adjust if necessary 4.18.2

4.18.3 Check quarter fenders, mud flaps, and brackets 4.18.3

4.18.4 Check pintle hook assembly and mounting, if applicable 4.18.4

4.18.5 Lubricate all fifth wheel grease fittings and plate, of applicable 4.18.5

4.18.6 Inspect frame and frame members for cracks and damage 4.18.6

ANALYZE HYDRAULIC SYSTEMS 5.0

PS 5.1 INVESTIGATE GENERAL SYSTEM OPERATION 5.1

5.1.1 Identify system type (closed and open) and verify proper operation 5.1.1

5.1.2 Read and interpret system diagrams and schematics 5.1.2

PS 5.2 ASSESS HYDRAULIC PUMPS 5.2

5.2.1 Identify system fluid type 5.2.1

Skip to main content

5.2.2 Identify causes of pump failure, unusual pump noises, temperature, flow, and leakage problems 5.2.2

5.2.3 Determine pump type, rotation, and drive system 5.2.3

PS 5.3 PERFORM FILTRATION/RESERVOIRS (TANKS) SERVICE 5.3

5.3.1 Identify type of filtration system; verify filter application and flow direction 5.3.1

5.3.2 Service filters and breathers 5.3.2

5.3.3 Identify causes of system contamination; determine needed action 5.3.3

5.3.4 Check reservoir fluid level and condition; determine needed action 5.3.4

5.3.5 Inspect reservoir, sight glass, vents, caps, mounts, valves, screens, supply and return lines 5.3.5

PS 5.4 EXAMINE HOSES, FITTINGS, AND CONNECTIONS 5.4

5.4.1 Diagnose causes of component leakage, damage, and restriction; determine needed action 5.4.1

5.4.2 Inspect hoses and connections (length, size, routing, bend radii, and protection); repair or replace as needed 5.4.2

5.4.3 Inspect and replace fitting seals and sealants 5.4.3

PS 5.5 EVALUATE ACTUATORS FOR SERVICE 5.5

5.5.1 Identify actuator type (single/double acting, multi-stage/telescopic, and motors) 5.5.1

5.5.2 Identify the cause of seal failure; determine needed repairs 5.5.2

5.5.3 Identify the cause of incorrect actuator movement and leakage (internal and external); determine needed repairs 5.5.3

5.5.4 Inspect actuator mounting, frame components, and hardware for looseness, cracks, and damage; determine needed action 5.5.4

5.5.5 Inspect actuators for dents, cracks, damage, and leakage; determine needed action 5.5.5

5.5.6 Purge and/or bleed system in accordance with manufacturers' recommended procedures 5.5.6

ANALYZE BRAKE SYSTEMS 6.0

PS 6.1 ASSESS AIR BRAKES – AIR SUPPLY AND SERVICE SYSTEMS 6.1

6.1.1 Identify poor stopping, air leaks, premature wear, pulling, grabbing, dragging, or balance problems caused by supply and service system malfunctions; determine needed action 6.1.1

6.1.2 Check air system build-up time; determine needed action 6.1.2

6.1.3 Drain air reservoir/tanks; check for oil, water, and foreign material; determine needed action 6.1.3

6.1.4 Inspect air system lines, hoses, fittings, and couplings; repair or replace as needed 6.1.4

Skip to main content

6.1.5 Inspect and test air tank relief (safety) valves, one-way (single) check valves 6.1.5

6.1.6 Inspect and test brake application (foot/treadle) valve, fittings, and mounts; check pedal operation; determine needed action 6.1.6

6.1.7 Inspect and test stop light circuit switches, wiring, and connectors; determine needed action 6.1.7

6.1.8 Inspect and test emergency (spring) brake control valve(s) 6.1.8

6.1.9 Inspect and test low pressure warning devices, wiring, and connectors; determine needed action 6.1.9

6.1.10 Inspect and test air pressure gauges, lines, and fittings; determine needed action 6.1.10

PS 6.2 ASSESS AIR BRAKES – MECHANICAL/FOUNDATION BRAKES 6.2

6.2.1 Identify poor stopping, brake noise, premature wear, pulling, grabbing, or dragging problems caused by the foundation brake, slack adjuster, and brake chamber problems; determine needed action 6.2.1

6.2.2 Inspect service brake chambers, pushrod, clevis, and mounting brackets 6.2.2

6.2.3 Identify type and inspect slack adjusters 6.2.3

6.2.4 Inspect camshafts, tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; determine needed action 6.2.4

6.2.5 Inspect and measure brake shoes or pads; determine needed action 6.2.5

6.2.6 Inspect and measure brake drums or rotors; determine needed action 6.2.6

PS 6.3 ASSESS AIR BRAKES – PARKING BRAKES 6.3

6.3.1 Inspect parking (spring) brake check valves, lines, hoses, and fittings 6.3.1

6.3.2 Inspect and test parking (spring) brake application and release valve 6.3.2

6.3.3 Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with manufacturers' recommendations 6.3.3

PS 6.4 ASSESS HYDRAULIC BRAKES – HYDRAULIC SYSTEM 6.4

6.4.1 Identify poor stopping, premature wear, pulling, dragging, balance, or pedal feel problems caused by the hydraulic system; determine needed action 6.4.1

6.4.2 Inspect and test master cylinder for internal/external leaks and damage; determine needed action 6.4.2

6.4.3 Inspect hydraulic system brake lines, flexible hoses, and fittings for leaks and damage; determine needed action 6.4.3

6.4.4 Inspect and test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; determine needed action 6.4.4

Skip to main content

6.4.5 Inspect and test brake pressure differential valve and warning light circuit switch, bulbs/LEDs, wiring, and connectors; determine needed action 6.4.5

6.4.6 Inspect disc brake caliper assemblies; determine needed action 6.4.6

6.4.7 Inspect/test brake fluid; bleed and/or flush system; determine proper fluid type 6.4.7

PS 6.5 ASSESS HYDRAULIC BRAKES – MECHANICAL/FOUNDATION BRAKES 6.5

6.5.1 Identify poor stopping, brake noise, premature wear, pulling, grabbing, dragging, or pedal feel problems caused by mechanical components; determine needed action 6.5.1

6.5.2 Inspect and measure rotors; determine needed action 6.5.2

6.5.3 Inspect and measure disc brake pads; inspect mounting hardware; determine needed action 6.5.3

6.5.4 Check parking brake operation; inspect parking brake application and holding devices; determine needed action 6.5.4

PS 6.6 ASSESS HYDRAULIC BRAKES – POWER ASSIST UNITS 6.6

6.6.1 Identify stopping problems caused by the brake assist (booster) system; determine needed action 6.6.1

6.6.2 Inspect, test, repair, or replace hydraulic brake assist (booster), hoses, and control valves; determine proper fluid type 6.6.2

6.6.3 Check emergency (back-up, reserve) brake assist system 6.6.3

PS 6.7 DIAGNOSE AIR AND HYDRAULIC ANTI-LOCK BRAKING SYSTEMS (ABS) AND AUTOMATIC TRACTION CONTROL (ATC) SYSTEMS 6.7

6.7.1 Observe anti-lock braking system (ABS) warning light operation (includes trailer and dash mounted trailer ABS warning light); determine needed action 6.7.1

6.7.2 Diagnose anti-lock braking system (ABS) electronic control(s) and components; determine needed action 6.7.2

6.7.3 Identify poor stopping and wheel lock-up problems caused by failure of the anti-lock braking system (ABS); determine needed action 6.7.3

6.7.4 Test and check operation of anti-lock braking system (ABS) components; determine needed action 6.7.4

6.7.5 Test anti-lock braking system (ABS) wheel speed sensors and circuits; determine needed action 6.7.5

6.7.6 Bleed the anti-lock braking system ABS hydraulic circuits 6.7.6

PS 6.8 PERFORM WHEEL BEARING SERVICE AND REPAIR 6.8

6.8.1 Inspect and service wheel bearings according to manufactures specifications 6.8.1

Skip to main content

6.8.2 Identify, inspect or replace unitized/preset hub bearing assemblies 6.8.2

PERFORM SUSPENSION AND STEERING SERVICE 7.0

PS 7.1 ASSESS STEERING SYSTEMS - COLUMN 7.1

7.1.1 Identify causes of fixed and driver adjustable steering column and shaft noise, looseness, and binding problems; determine needed action 7.1.1

7.1.2 Inspect steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft; determine needed action 7.1.2

7.1.3 Remove the steering wheel (includes steering wheels equipped with electrical/electronic controls and components); install and center the steering wheel. Inspect, test, replace and calibrate steering angle sensor 7.1.3

7.1.4 Disable and enable supplemental restraint system (SRS) in accordance with manufacturers' procedures 7.1.4

PS 7.2 ASSESS STEERING SYSTEMS - UNITS 7.2

7.2.1 Identify causes of power steering system noise, steering binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed action 7.2.1

7.2.2 Determine recommended type of power steering fluid; check level and condition; determine needed action 7.2.2

7.2.3 Flush and refill power steering system; purge air from system. 7.2.3

PS 7.3 ASSESS STEERING SYSTEMS - LINKAGE 7.3

7.3.1 Inspect steering linkage components 7.3.1

7.3.2 Check and adjust steering (wheel) stops 7.3.2

PS 7.4 INVESTIGATE SUSPENSION SYSTEMS 7.4

7.4.1 Inspect front axles and attaching hardware; determine needed action 7.4.1

7.4.2 Inspect kingpins, steering knuckle bushings, locks, bearings, seals, and covers; determine needed action 7.4.2

7.4.3 Inspect shock absorbers, bushings, brackets, and mounts; determine needed action 7.4.3

7.4.4 Inspect leaf springs, center bolts, clips, pins and bushings, shackles, U-bolts, insulators, brackets, and mounts; determine needed action 7.4.4

7.4.5 Inspect axle aligning devices such as radius rods, track bars, stabilizer bars, torque arms, related bushings, mounts, shims, and cams; determine needed action 7.4.5

7.4.6 Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; determine needed action 7.4.6

Skip to main content

7.4.7 Inspect air springs, mounting plates, springs, suspension arms, and bushings 7.4.7

7.4.8 Measure and adjust ride height; determine needed action 7.4.8

PS 7.5 PERFORM WHEEL ALIGNMENT DIAGNOSIS, ADJUSTMENT, AND REPAIR 7.5

7.5.1 Identify causes of vehicle wandering, pulling, shimmy, hard steering, and off-center steering wheel problems; adjust or repair as needed 7.5.1

7.5.2 Check and adjust camber 7.5.2

7.5.3 Check and adjust caster 7.5.3

7.5.4 Check and adjust toe settings 7.5.4

7.5.5 Check rear axle(s) alignment (thrustline/centerline) and tracking; adjust or repair as needed 7.5.5

7.5.6 Identify turning/Ackerman angle (toe-out-on-turns) problems; determine needed action 7.5.6

7.5.7 Check front axle alignment (centerline); adjust or repair as needed 7.5.7

PS 7.6 EVALUATE WHEELS AND TIRES 7.6

7.6.1 Identify tire wear patterns; check tread depth and pressure determine needed action 7.6.1

7.6.2 Identify wheel/tire vibration, shimmy, pounding, hop (tramp) problems; determine needed action 7.6.2

7.6.3 Remove and install steering and drive axle wheel/tire assemblies; torque mounting hardware to specifications with torque wrench 7.6.3

7.6.4 Inspect tire for proper application, (size, load range, position, and tread design); determine needed action 7.6.4

7.6.5 Inspect wheel/rims for proper application, load range, size, and design; determine needed action 7.6.5

7.6.6 Check operation of tire pressure monitoring system (TPMS); determine needed action 7.6.6

ANALYZE ELECTRIC/ELECTRONIC SYSTEMS 8.0

PS 8.1 PERFORM GENERAL ELECTRICAL SYSTEMS SERVICE 8.1

8.1.1 Read and interpret electrical/electronic circuits using wiring diagrams 8.1.1

8.1.2 Check continuity in electrical/electronic circuits using appropriate test equipment 8.1.2

8.1.3 Check applied voltages, circuit voltages, and voltage drops in electrical/electronic circuits using appropriate test equipment 8.1.3

8.1.4 Check current flow in electrical/electronic circuits and components using appropriate test equipment 8.1.4

Skip to main content

8.1.5 Check resistance in electrical/electronic circuits and components using appropriate test equipment 8.1.5

8.1.6 Locate shorts, grounds, and opens in electrical/electronic circuits 8.1.6

8.1.7 Identify parasitic (key-off) battery drain problems; perform tests; determine needed action 8.1.7

8.1.8 Inspect and test fusible links, circuit breakers, relays, solenoids, and fuses; replace as needed 8.1.8

8.1.9 Check frequency and pulse width signal in electrical/electronic circuits using appropriate test equipment 8.1.9

PS 8.2 PERFORM BATTERY SERVICE 8.2

8.2.1 Identify battery type; perform appropriate battery load test; determine needed action 8.2.1

8.2.2 Determine battery state of charge using an open circuit voltage test 8.2.2

8.2.3 Inspect, clean, and service battery; replace as needed 8.2.3

8.2.4 Inspect and clean battery boxes, mounts, and hold downs; repair or replace as needed 8.2.4

8.2.5 Charge battery using appropriate method for battery type 8.2.5

8.2.6 Inspect, test, and clean battery cables and connectors; repair or replace as needed 8.2.6

8.2.7 Jump start a vehicle using jumper cables and a booster battery or appropriate auxiliary power supply using proper safety procedures 8.2.7

8.2.8 Perform battery capacitance test; determine needed action 8.2.8

PS 8.3 PERFORM STARTING SYSTEM SERVICE 8.3

8.3.1 Perform starter circuit cranking voltage and voltage drop tests; determine needed action 8.3.1

8.3.2 Inspect and test components (key switch, push button and/or magnetic switch) and wires and harnesses in the starter control circuit; replace as needed 8.3.2

8.3.3 Inspect and test, starter relays and solenoids/switches; replace as needed 8.3.3

8.3.4 Remove and replace starter; inspect flywheel ring gear or flex plate 8.3.4

8.3.5 Perform starter current draw test; determine needed action 8.3.5

PS 8.4 PERFORM CHARGING SYSTEM DIAGNOSIS AND REPAIR 8.4

8.4.1 Test instrument panel mounted volt meters and/or indicator lamps; determine needed action 8.4.1

8.4.2 Identify causes of a no charge, low charge, or overcharge problems; determine needed action 8.4.2

8.4.3 Inspect and replace alternator drive belts, pulleys, fans, tensioners, and mounting brackets; adjust drive belts and check alignment 8.4.3

Skip to main content

8.4.4 Perform charging system voltage and amperage output tests; perform AC ripple test; determine needed action 8.4.4

8.4.5 Perform charging circuit voltage drop tests; determine needed action 8.4.5

8.4.6 Remove and replace alternator 8.4.6

8.4.7 Inspect, repair, or replace cables, wires, and connectors in the charging circuit 8.4.7

PS 8.5 PERFORM LIGHTING SYSTEMS DIAGNOSIS AND REPAIR 8.5

8.5.1 Identify causes of brighter than normal, intermittent, dim, or no headlight and daytime running light (DRL) operation 8.5.1

8.5.2 Test, replace, and aim headlights 8.5.2

8.5.3 Test headlight and dimmer circuit switches, relays, wires, terminals, connectors, sockets, and control components/modules; repair or replace as needed 8.5.3

8.5.4 Inspect and test switches, bulbs/LEDs, sockets, connectors, terminals, relays, wires, and control components/modules of parking, clearance, and taillight circuits; repair or replace as needed 8.5.4

8.5.5 Inspect and test tractor-to-trailer multi-wire connector(s); repair or replace as needed 8.5.5

8.5.6 Inspect, test, and adjust stoplight circuit switches, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed 8.5.6

8.5.7 Inspect and test turn signal and hazard circuit flasher(s), switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed 8.5.7

8.5.8 Inspect and test reverse lights and warning device circuit switches, bulbs/LEDs, sockets, horns, buzzers, connectors, terminals, wires and control components/modules; repair or replace as needed 8.5.8

INVESTIGATE TRANSPORTATION SYSTEMS 9.0

PS 9.1 ASSESS TRANSPORTATION SYSTEMS 9.1

9.1.1 Describe the history of the automobile and the effects on society 9.1.1

9.1.2 Research the different career opportunities in the transportation career path 9.1.2

9.1.3 Investigate new and emerging technologies 9.1.3

9.1.4 Analyze workplace situations and use problem-solving techniques to improve the workplace environment 9.1.4