

DIESEL ENGINE REPAIR TECHNOLOGY 1, 2, 3, 4
ACTIVITY COURSE CODES: 6310, 6311, 6312, 6313

PROGRAM DESCRIPTION: The Diesel Engine Repair Technology program is designed to prepare students to perform entry-level maintenance and repair tasks under the supervision of an experienced technician. Upon successful completion of the program, students will have the opportunity to obtain the ASE Inspection, Maintenance and Minor Repair and Diesel Engine entry-level certifications, as well as other industry certifications.

OBJECTIVE: Given the necessary equipment, materials, and instruction, students, on completion of the prescribed course of study, will be able to successfully accomplish the following core competencies.

COURSE CREDIT: 540 hours minimum for
IMMR accredited program;
740 hours for TST program;
1040 hours for MTST program

RESOURCES: [S.C. Instructional Materials](#), beginning
on pg. 98, also see Materials and
Resources

COMPUTER ACCESS: 1 computer per student

MAXIMUM ENROLLMENT: 16 – 20 per instructor

A. SHOP AND PERSONAL SAFETY

Proficient MD/HD diesel professionals know the academic subject matter, including safety as required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Identify general shop safety rules and procedures. P-1-3
2. Utilize safe procedures for handling of tools and equipment. P-1-3
3. Identify and use proper placement of floor jacks and jack stands. P-1-3
4. Identify and use proper procedures for safe lift operation. P-1-3
5. Utilize proper ventilation procedures for working within the lab/shop area. P-1-3
6. Identify marked safety areas. P-1-3
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. P-1-3
8. Identify the location and use of eye wash stations. P-1-3
9. Identify the location of the posted evacuation routes. P-1-3
10. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. P-1-3

11. Identify and wear appropriate clothing for lab/shop activities. P-1-3
12. Secure hair and jewelry for lab/shop activities. P-1-3
13. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. P-1-3
14. Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). P-1-3
15. Locate and demonstrate knowledge of material safety data sheets (MSDS). P-1-3
16. Successfully complete a written/online safety exam with a score of 100%. P-1-3
17. Demonstrate awareness of the safety aspect of high pressure systems (e.g., fuel, hydraulics). P-1-3

B. STUDENT ORGANIZATIONS

Proficient MD/HD diesel professionals know the academic subject matter, including professional development, required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

C. TECHNOLOGY KNOWLEDGE

Proficient MD/HD diesel professionals know the academic subject matter, including digital citizenship the ethical use of technology and as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation (e.g., keying speed).
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., cyberbullying, piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work

- environment).
5. Discuss legal issues and the terms of use related to copyright laws, fair use laws, and ethics pertaining to downloading of images, photographs, documents, video, sounds, music, trademarks, Creative Commons, and other elements for personal use.
 6. Describe ethical and legal practices of safeguarding the confidentiality of business-and personal-related information.
 7. Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.
 8. Evaluate various solutions to common hardware and software problems.

D. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS

Proficient MD/HD diesel professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Demonstrate punctuality.
2. Demonstrate self-representation.
3. Demonstrate work ethic.
4. Demonstrate respect.
5. Demonstrate time management.
6. Demonstrate integrity.
7. Demonstrate leadership.
8. Demonstrate teamwork and collaboration.
9. Demonstrate conflict resolution.
10. Demonstrate perseverance.
11. Demonstrate commitment.
12. Demonstrate a healthy view of competition.
13. Demonstrate a global perspective.
14. Demonstrate health and fitness.
15. Demonstrate self-direction.
16. Demonstrate lifelong learning.

E. PROFESSIONAL KNOWLEDGE

Proficient MD/HD diesel professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Demonstrate effective speaking and listening skills.
2. Demonstrate effective reading and writing skills.
3. Demonstrate mathematical reasoning.
4. Demonstrate job-specific mathematics skills.
5. Demonstrate critical-thinking and problem-solving skills.

6. Demonstrate creativity and resourcefulness.
7. Demonstrate an understanding of business ethics.
8. Demonstrate confidentiality.
9. Demonstrate an understanding of workplace structures, organizations, systems, and climates.
10. Demonstrate diversity awareness.
11. Demonstrate job acquisition and advancement skills.
12. Demonstrate task management skills.
13. Demonstrate customer-service skills.

DIESEL TECHNOLOGY LEVEL 1

F. GENERAL DIESEL ENGINE REPAIR

Proficient MD/HD diesel professionals demonstrate general diesel engine repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Inspect level and condition of fuel, oil, diesel exhaust fluid (DEF), and coolant. P-1
3. Inspect engine assembly for fuel, oil, coolant, air, and other leaks; determine needed action. P-1
4. Check (diagnose) engine operation (starting and running) including: noise vibration, smoke, etc. Determine needed action. P-2
5. Use appropriate electronic service tool(s) and procedures to check, record and clear diagnostic codes; check and record trip/operational data; reset maintenance monitor (if applicable); interpret digital multimeter (DMM) readings. P-1
6. Identify system components, configurations, and types of the following: cylinder head(s), valve train, engine block, engine lubrication, engine cooling, air induction, exhaust, fuel, and engine braking. P-1
7. *Check engine no-crank, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed action. P-2 (TST)
8. *Check engine surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and/or shut down problems; determine needed action. P-2 (TST)

G. DIESEL ENGINE REPAIR: CYLINDER HEAD AND VALVE TRAIN

Proficient MD/HD diesel professionals demonstrate cylinder head and valve train repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect electronic wiring harness and brackets for wear, bending, cracks, and looseness; determine needed action. P-1
2. *Inspect cylinder head for cracks/damage; check mating surfaces for warpage; check condition of passages; inspect core/expansion and gallery plugs; determine needed action. P-2 (TST)

3. *Inspect injector sleeves and seals; determine needed action. P-3 (TST)
4. *Inspect valve train components; determine needed action. P-1 (TST)
5. *Adjust valve bridges (crossheads); adjust valve clearances and injector settings. P-2 (TST)

H. DIESEL ENGINES: ENGINE BLOCK

Proficient MD/HD diesel professionals demonstrate engine block repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect crankshaft vibration damper; inspect engine mounts. P-1
2. *Remove, inspect, service, and install pans, covers, gaskets, seals, wear rings, and crankcase ventilation components. P-1 (TST)
3. *Perform crankcase pressure test. P-1 (TST)
4. *Install and align flywheel housing; inspect flywheel housing(s) to transmission housing/engine mating surface; measure flywheel housing face and bore runouts; determine needed action. P-2 (TST)
5. *Inspect flywheel/flexplate (including ring gear) and mounting surfaces for cracks and wear; measure runout; determine needed action. P-2 (TST)

I. DIESEL ENGINE REPAIR: LUBRICATION SYSTEMS

Proficient MD/HD diesel professionals demonstrate lubrication systems repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Test engine oil pressure and check operation of pressure sensor, gauge, and/or sending unit; test engine oil temperature and check operation of temperature sensor; determine needed action. P-1
2. Check engine oil level, condition, and consumption; take engine oil sample; determine needed action. P-1
3. Determine proper lubricant; perform oil and filter services. P-1
4. *Inspect, clean, and test oil cooler and components. P-2 (TST)
5. *Inspect turbocharger lubrication systems. P-2 (TST)

J. DIESEL ENGINE REPAIR: COOLING SYSTEMS

Proficient MD/HD diesel professionals demonstrate cooling systems repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check engine coolant type, level, condition, and test coolant for freeze protection and additive package concentration. P-1
2. Verify coolant temperature, check operation of temperature and level sensors, gauge, and/or sending unit. P-1
3. Inspect and reinstall/replace pulleys, tensioners and drive belts; adjust drive belts and check alignment. P-1

4. Recover coolant, flush, and refill with recommended coolant/additive package; bleed cooling systems. P-1
5. Inspect coolant conditioner/filter assembly for leaks; inspect valves, lines, and fittings; replace as needed. P-1
6. Inspect water pump, hoses, and clamps. P-1
7. Inspect, and pressure test cooling systems(s); pressure test cap, tank(s), and recovery systems; inspect radiator and mountings. P-1
8. Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud. P-1
9. Identify engine block heater(s). P-2
10. *Diagnose engine coolant consumption; determine needed action. P-1 (TST)
11. *Inspect thermostat(s), by-passes, housing (s), and seals; replace as needed. P-1 (TST)
12. *Inspect turbocharger cooling systems. P-2 (TST)

K. DIESEL ENGINE REPAIR: AIR INDUCTION AND EXHAUST SYSTEMS

Proficient MD/HD diesel professionals demonstrate air induction and exhaust system repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect turbocharger(s), wastegate(s), and piping systems. P-2
2. Check air induction system including: cooler assembly, piping, hoses, clamps, and mountings; replace air filter as needed; reset restriction indicator (if applicable). P-1
3. Inspect intake manifold, gaskets, and connections. P-1
4. Inspect engine exhaust system, exhaust gas recirculation (EGR) system, and exhaust aftertreatment system for leaks, mounting, proper routing, and damaged or missing components. P-1
5. Inspect crankcase ventilation system; service as needed. P-1
6. *Demonstrate knowledge of exhaust gas recirculation (EGR) system including EGR valve, cooler, piping, filter, electronic sensors, controls, and wiring; determine needed action. P-1 (TST)
7. *Perform air intake system restriction and leakage tests; determine needed action. P-1 (TST)
8. Perform intake manifold pressure (boost) test; determine needed action. P-3
9. *Check exhaust back pressure. P-3 (TST)
10. *Inspect variable ratio geometry turbocharger (VGT), controls, and actuators (pneumatic, hydraulic, and electronic). P-2 (TST)
11. *Demonstrate knowledge of charge air cooler operation and testing. P-1 (TST)
12. *Demonstrate knowledge of exhaust aftertreatment systems, operation, and components. P-1 (TST)
13. *Inspect and/or replace preheater/inlet air heater or glow plug system and controls. P-2 (TST)

L. DIESEL ENGINE REPAIR: FUEL SYSTEMS

Proficient MD/HD diesel professionals demonstrate fuel system repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check fuel level and condition; determine needed action. P-1
2. Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, hoses, lines, and fittings; determine needed action. P-1
3. Inspect low pressure fuel system components (fuel pump, pump drives, screens, fuel/water separators/indicators, hoses, lines, filters, heaters, coolers, ECM cooling plates, check valves, pressure regulator valves, restrictive fittings, and mounting hardware); determine needed action. P-1
4. Replace fuel filter; prime and bleed fuel system. P-1
5. Inspect high pressure fuel system components (fuel pump, pump drives, hoses, injection lines, filters, hold-downs, fittings, seals, and mounting hardware). P-1
6. *Demonstrate knowledge and understanding of the different types of fuel systems. P-1 (TST)
7. *Perform fuel supply and return system tests, determine needed action. P-1 (TST)
8. *Perform cylinder contribution test using electronic service tool(s). P-1 (TST)

M. DIESEL ENGINE REPAIR: ENGINE BRAKES

Proficient MD/HD diesel professionals demonstrate engine brakes repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect engine compression and/or exhaust brake housing, valves, seals, lines, and fittings. P-1
2. *Inspect and adjust engine compression and/or exhaust brake systems; determine needed action. P-2 (TST)
3. *Inspect, test, and adjust engine compression and/or exhaust brake control circuits, switches, and solenoids; determine needed action. P-2 (TST)

N. GENERAL ELECTRICAL/ ELECTRONIC SYSTEMS

Proficient MD/HD diesel professionals demonstrate general electrical/electronic systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Research vehicle service information, including vehicle service history, service precautions, and technical service bulletins. P-1
2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). P-1
3. Demonstrate proper use of test equipment when measuring source voltage, voltage drop (including grounds), current flow, continuity, and resistance. P-1
4. Demonstrate knowledge of the causes and effects of shorts, grounds, opens, and

- resistance problems in electrical/electronic circuits. P-1
- 5. Use wiring diagrams to trace electrical/electronic circuits. P-1
- 6. Measure parasitic (key-off) battery drain. P-1
- 7. Demonstrate knowledge of the function, operation, and testing of fusible links, circuit breakers, relays, solenoids, diodes, and fuses. P-1
- 8. Inspect, repair (including solder repair), and/or replace connectors, seals, terminal ends, and wiring; verify proper routing and securement. P-1
- 9. Use appropriate electronic service tool(s) and procedures to check, record, and clear diagnostic codes; interpret digital multimeter (DMM) readings. P-2
- 10. Check for malfunctions caused by faults in the data bus communications network. P-2
- 11. Identify electrical/electronic system components and configuration. P-1
- 12. *Check frequency, pulse width, and waveforms of electrical/electronic signals using appropriate test equipment; interpret readings; determine needed repairs. P-2 (TST)

O. BRAKES: GENERAL REPAIR

Proficient MD/HD diesel professionals demonstrate general brake repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

- 1. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
- 2. Identify brake system components and configurations (including air and hydraulic systems, parking brakes, power assist, and vehicle dynamic brake systems). P-1
- 3. Identify brake performance problems caused by the mechanical/foundation brake system (air and hydraulic). P-1
- 4. *Use appropriate electronic service tool(s) and procedures to diagnose problems; check, record, and clear diagnostic codes; interpret digital multimeter (DMM) readings. P-1 (TST)

LEVEL 2

F. AIR BRAKES: AIR SUPPLY AND SERVICE SYSTEMS

Proficient MD/HD diesel professionals demonstrate air brake air supply and service system repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

- 1. Inspect air supply system components such as compressor, governor, air drier, tanks, and lines; inspect service system components such as lines, fittings, mountings, and valves (hand brake/trailer control, brake relay, quick release, tractor protection, emergency/spring brake control/modulator, pressure relief/safety). P-1
- 2. *Test gauge operation and readings; test low pressure warning alarm operation; perform air-supply system tests such as pressure build-up, governor settings, and leakage; drain air tanks and check for contamination; determine needed action. P-1 (TST)

3. *Demonstrate knowledge and understanding of air supply and service system components and operations. P-1 (TST)
4. *Inspect air compressor drive hear components (gears, belts, tensioners, and/or couplings); determine needed action. P-3 (TST)
5. *Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed. P-1 (TST)
6. *Inspect and test air tank relief (safety) valves, one-way (single) check valves, two-way (double) check valves, manual and automatic drain valves; determine needed action. P-1 (TST)
7. *Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; determine needed action. P-1 (TST)
8. *Inspect and test brake application (foot/treadle) valve, fittings, and mounts; check pedal operation; determine needed action. P-1 (TST)

G. AIR BRAKES: MECHANICAL/FOUNDATION BRAKE SYSTEM

Proficient MD/HD diesel professionals demonstrate mechanical/foundation brake system repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect service brake chambers, diaphragms, clamps, springs, pushrods, clevises, and mounting brackets, determine needed action. P-1
2. Identify slack adjuster types; inspect slack adjusters, determine needed action. P-1
3. Check camshafts (s-cams), tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs, determine needed action. P-1
4. Inspect rotor and mounting surface; measure rotor thickness, thickness variation, and lateral runout; determine needed action. P-1
5. Inspect, clean, and adjust air disc brake caliper assemblies; inspect and measure disc brake pads; inspect mounting hardware; perform needed action. P-1
6. Remove brake drum; clean and inspect brake drum and mounting surface; measure brake drum diameter; measure brake linking thickness; inspect brake lining condition; determine needed action. P-1
7. *Identify concerns related to the mechanical/foundation brake system including poor stopping, brake noise, premature wear, pulling, grabbing, or dragging; determine needed action. P-1 (TST)*

H. AIR BRAKES: PARKING BRAKE SYSTEM

Proficient MD/HD diesel professionals demonstrate parking brake system repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect and check parking (spring) brake chamber for leaks; determine needed action. P-1
2. Inspect and test parking (spring) brake check valves, lines, hoses, and fittings;

- determine needed action. P-1
- 3. Inspect test parking (spring) brake application and release valve; determine needed action. P-1
- 4. Manually release (cage) and reset (uncage) parking (spring) brakes. P-1
- 5. Identify and test anti-compounding brake function; determine needed action. P-2

I. HYDRAULIC BRAKE SYSTEMS

Proficient MD/HD diesel professionals demonstrate hydraulic brake systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

- 1. Check master cylinder fluid level and condition; determine proper fluid type for application. P-1
- 2. Inspect hydraulic brake system components for leaks and damage. P-1
- 3. Check hydraulic brake system operation including pedal travel, pedal effort, and pedal feet. P-1
- 4. *Identify poor stopping, premature wear, pulling, dragging, imbalance, or poor pedal feel caused by problems in the hydraulic system; determine needed action. P-2 (TST)
- 5. *Test master cylinder for internal/external leaks and damage; replace as needed. P-2 (TST)
- 6. *Test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; determine needed action. P-2 (TST)
- 7. *Test brake pressure differential valve; test warning light circuit switch, bulbs/LEDs, wiring, and connectors; determine needed action. P-2 (TST)
- 8. *Bleed and/or flush hydraulic brake system. P-2 (TST)

J. HYDRAULIC BRAKES: MECHANICAL/FOUNDATION BRAKE SYSTEM

Proficient MD/HD diesel professionals demonstrate hydraulic brakes' mechanical and foundation brake systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

- 1. Inspect rotor and mounting surface; measure rotor thickness, thickness variation, and lateral runout; determine action needed. P-1
- 2. Inspect and clean disc brake caliper assemblies; inspect and measure disc brake pads; inspect mounting hardware; determine needed action. P-1
- 3. Remove brake drum; clean and inspect brake drum and mounting surface; measure brake drum diameter; measure brake lining thickness; inspect brake lining condition; inspect wheel cylinders; determine needed action. P-1

K. HYDRAULIC BRAKES: PARKING BRAKE SYSTEM

Proficient MD/HD diesel professionals demonstrate hydraulic brakes parking

brake system diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check parking brake operation; inspect parking brake application and holding devices; adjust, repair, and/or replace as needed. P-1

L. BRAKES: POWER ASSIST SYSTEMS

Proficient MD/HD diesel professionals demonstrate brake power assist system diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check brake assist/booster system (vacuum or hydraulic) hoses and control valves; check fluid level and condition (if applicable). P-1
2. Check operation of emergency (back-up/reserve) brake assist system. P-1
3. *Identify concerns related to the power assist system (vacuum or hydraulic), including stopping problems caused by the brake assist/booster system; determine needed action. P-2 (TST)
4. *Inspect, test, repair, and/or replace hydraulic brake assist/booster systems, hoses, and control valves. P-1 (TST)

M. VEHICLE DYNAMIC BRAKE SYSTEMS (AIR AND HYDRAULIC): ANTILOCK BRAKE SYSTEM (ABS), AUTOMATIC TRACTION CONTROL (ATC) SYSTEM, AND ELECTRONIC STABILITY CONTROL (ESC) SYSTEM

Proficient MD/HD diesel professionals demonstrate various power brake systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Observe antilock brake system (ABS) warning light operation including trailer and dash mounted trailer ABS warning light. P-1
2. Observe automatic traction control (ATC) and electronic stability control (ESC) warning light operation. P-2
3. *Identify stopping concerns related to the vehicle dynamic brake systems; ABS, ATC, and ESC; determine needed action. P-2 (TST)
4. *Diagnose problems in the vehicle dynamic brake control systems; determine needed action. P-2 (TST)
5. *Check and test operation of vehicle dynamic brake system (air and hydraulic) mechanical and electrical components; determine needed action. P-1 (TST)
6. *Test vehicle/wheel speed sensors and circuits; adjust, repair, and/or replace as needed. P-1 (TST)
7. *Bleed ABS hydraulic circuits. P-2 (TST)
8. *Verify power line carrier (PLC) operation. P-3 (TST)

N. BRAKES: WHEEL BEARINGS

Proficient MD/HD diesel professionals demonstrate brakes-related systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Clean, inspect, lubricate, and/or replace wheel bearings and races/cups; replace seals and wear rings, inspect spindle/tube; inspect and replace retaining hardware; adjust wheel bearings; check hub assembly fluid level and condition; verify end play with dial indicator method. P-1
2. Identify, inspect, and/or replace unitized/preset hub bearing assemblies. P-2

N. SUSPENSION AND STEERING SYSTEMS

Proficient MD/HD diesel professionals demonstrate general suspension and steering systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Disable and enable supplemental restraint system (SRS); verify indicator lamp operation. P-1
3. Identify suspension and steering system components and configuration. P-1
4. *Use appropriate electronic service tools(s) and procedures to diagnose problems; check, record, and clear diagnostic codes; interpret digital multimeter (DMM) readings. P-1 (TST)

O. SUSPENSION AND STEERING SYSTEMS: STEERING COLUMN

Proficient MD/HD diesel professionals demonstrate suspension and steering column systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check steering wheel for free play, binding, and proper centering; inspect and service steering shaft U-joint(s), bearings, bushings, and seals; phase steering shaft. P-1
2. Check operation of tilt and telescoping steering column. P-1
3. Check cab mounting. P-2
4. *Remove the steering wheel (includes steering wheels equipped with electrical/electronic controls and components); install and center the steering wheel. P-1 (TST)
5. *Inspect, test, replace, and calibrate steering angle sensor. P-2 (TST)

P. SUSPENSION AND STEERING SYSTEMS: STEERING PUMP AND GEAR UNITS

Proficient MD/HD diesel professionals demonstrate suspension and steering pump and gear unit systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check power steering pump and gear operation, mountings, lines, and hoses; check fluid level and condition; service filter; inspect system for leaks. P-1
2. Flush and refill power steering system; purge air from system. P-1
3. Inspect and/or replace power steering system cooler, lines, hoses, clamps, mountings, and fittings. P-2
4. *Identify causes of power steering system noise, binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems. P-1 (TST)
5. *Inspect, service, and/or replace power steering reservoir, seals, and gaskets. P-2 (TST)
6. *Inspect and/or replace power steering gear(s) (single and/or dual) and mountings. P-2 (TST)

Q. SUSPENSION AND STEERING: STEERING LINKAGE

Proficient MD/HD diesel professionals demonstrate suspension and steering linkage diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect tie rod ends, ball joints, kingpins, pitman arms, idler arms, and other steering linkage components; lubricate as needed. P-1

R. SUSPENSION AND STEERING: SUSPENSION SYSTEMS

Proficient MD/HD diesel professionals demonstrate suspension systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect shock absorbers, bushings, brackets, and mounts. Determine needed action. P-1
2. Inspect leaf springs, center bolts, clips, pins, bushings, shackles, U-bolts, insulators, brackets, and mounts; determine needed action. P-1
3. Inspect axle and axle aligning devices such as: radius rods, track bars, stabilizers bars, and torque arms, inspect related bushings, mounts, and shims. P-1
4. Inspect tandem suspension equalizer components. P-3
5. Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings, check and record ride height. P-1

6. Inspect air springs, mounting plats, springs suspension arms, and bushings. P-1
7. *Inspect, test, repair, and/or replace air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; check and record ride height. P-1 (TST)
8. *Inspect and service kingpins, steering knuckle bushings, locks, bearing, seals, and covers. P-1 (TST)
9. *Measure, record, and adjust ride height; determine needed action. P-1 (TST)
10. *Identify rough ride problems. P-3 (TST)

S. SUSPENSION AND STEERING: WHEEL ALIGNMENT

Proficient MD/HD diesel professionals demonstrate knowledge of alignment angles as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Demonstrate understanding of alignment angles. P-1
2. *Identify causes of vehicle wandering, pulling, shimmy, hard steering, and off-center steering wheel problems P-1(TST)
3. *Check and record camber. P-2 (TST)
4. *Check and record caster. P-2 (TST)
5. *Check, record, and adjust toe settings. P-2 (TST)
6. *Check rear axle(s) alignment (thrustline/centerline) and tracking. P-2 (TST)
7. *Identify turning/Ackerman angle (toe-out-on-turns) problems. P-3 (TST)
8. *Check front axle alignment (centerline). P-2 (TST)

T. SUSPENSION AND STEERING: WHEELS AND TIRES

Proficient MD/HD diesel professionals demonstrate suspension systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect tire condition; identify tire wear patterns; measure tread depth; verify tire matching (diameter and tread); inspect valve stem and cap; set tire pressure. P-1
2. Identify wheel/tire vibration, shimmy, pounding, and hop (tramp) problems. P-2
3. Check wheel mounting hardware; check wheel condition; remove and install wheel/tire assemblies (steering and drive axle); torque fasteners to manufacturer's specification using torque wrench. P-1
4. *Inspect tire and wheel for proper application (size, load range, position, and design); determine needed action. P-2 (TST)

U. SUSPENSION AND STEERING: FRAME AND COUPLING DEVICES

Proficient MD/HD diesel professionals demonstrate suspension systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect, service, and/or adjust fifth wheel, pivot pins, bushings, locking mechanisms, mounting hardware, air lines, and fittings. P-1
2. Inspect frame and frame members for cracks, breaks, corrosion, distortion, elongated holes, looseness, and damage. P-1
3. *Inspect and install frame hangers, brackets, and cross members; determine needed action. P-3 (TST)
4. *Inspect, repair, or replace pintle hooks and draw bars (if applicable). P-2 (TST)
5. *Inspect, service, and/or adjust sliding fifth wheel, tracks, stops, locking system, cylinders, springs, lines, hoses, and controls. P-2 (TST)

LEVEL 3

F. DRIVE TRAIN: GENERAL REPAIR

Proficient MD/HD diesel professionals demonstrate general drive train repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. *Identify drive train components, transmission type, and configuration. P-1 (TST)
3. *Use appropriate electronic service tool(s) and procedures to diagnose problems, check, record, and clear diagnostic codes, interpret digital multimeter (DMM) readings. P-1 (TST)

G. DRIVE TRAIN: CLUTCH REPAIR

Proficient MD/HD diesel professionals demonstrate drive train clutch repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check and adjust clutch brake, linkage, cables, levers, brackets, bushings, pivots, springs, and clutch safety switch (includes push-type and pull-type); check pedal height and travel; determine needed action. P-1
2. Inspect clutch master cylinder fluid level; check clutch master cylinder, slave cylinder, lines, and hoses for leaks and damage; determine needed action. P-1
3. *Inspect, adjust, repair, and/or replace hydraulic clutch slave and master cylinders, lines, and hoses; bleed system. P-2 (TST)
4. *Inspect, adjust, lubricate, or replace release (throw-out) bearing, sleeve, bushings, springs, housing, levers, release fork, fork pads, rollers, shafts, and seals. P-1 (TST)
5. *Inspect, adjust, and/or replace single-disc clutch pressure plate and clutch disc. P-1 (TST)
6. *Inspect, adjust, and/or replace two-plate clutch pressure plate, clutch discs, intermediate plate, and drive pins/lugs. P-1 (TST)
7. *Inspect and/or replace clutch brake assembly; inspect input shaft and bearing retainer; determine needed action. P-1 (TST)

8. *Inspect, adjust, and/or replace self-adjusting/continuous-adjusting clutch mechanisms. P-1 (TST)
9. *Inspect and/or replace pilot bearing. P-1 (TST)

P. DRIVE TRAIN: TRANSMISSION REPAIR

Proficient MD/HD diesel professionals demonstrate drive train transmission repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect transmission shifter and linkage; inspect transmission mounts, insulators, and mounting bolts. P-1
2. Inspect transmission for leakage; determine needed action. P-1
3. Replace transmission cover plates, gaskets, seals, and cap bolts; inspect seal surfaces and vents; determine needed action. P-1
4. Check transmission fluid level and condition; determine needed action. P-1
5. Inspect transmission breather; inspect transmission oil filters, coolers and related components; determine needed action. P-2
6. Inspect speedometer components. P-2
7. Inspect and test function of REVERSE light, neutral start, and warning device circuits. P-1
8. Inspect and adjust power take-off (PTO) assemblies, controls, and shafts. P-3
9. *Inspect, adjust, and replace transmission covers, rails, forks, levers, bushings, sleeves, detents, interlocks, springs, and lock bolts/safety wires. P-2 (TST)
10. *Identify causes of transmission noise, shifting concerns, lockup, jumping out-of-gear, overheating, and vibration problems. P-1 (TST)
11. *Inspect, test, repair, and/or replace air shift controls, lines, hoses, valves, regulators, filters, and cylinder assemblies. P-2(TST)
12. *Remove and reinstall transmission. P-2 (TST)
13. *Inspect input shaft, gear, spacers, bearings, retainers, and slingers. P-3 (TST)
14. *Inspect and test transmission temperature gauge, wiring harnesses, and sensor/sending unit. P-2 (TST)
15. *Inspect operation of automatic transmission, components, and controls; diagnose automatic transmission system problems; determine needed action. P-2 (TST)
16. *Inspect operation of automated mechanical transmission, components, and controls; diagnose automated mechanical transmission system problems; determine needed action. P-2 (TST)

Q. DRIVE TRAIN: DRIVESHAFT AND UNIVERSAL JOINTS

Proficient MD/HD diesel professionals demonstrate driveshaft and universal joints repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect, service, and/or replace driveshafts, slip joints, yokes, drive flanges, support

- bearings, universal joints, boots, seals, and retaining/mounting hardware; check phasing of all shafts. P-1
- 2. *Identify causes of driveshaft and universal joint noise and vibration problems; determine needed action. P-1 (TST)
- 3. *Inspect driveshaft center support bearings and mounts; determine needed action. P-1 (TST)
- 4. *Measure driveline angles; determine needed action. P-2 (TST)

R. DRIVE TRAIN: DRIVE AXLES

Proficient MD/HD diesel professionals demonstrate drive axles repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

- 1. Check for fluid leaks; inspect drive axle housing assembly, cover plates, gaskets, seals, vent/breather, and magnetic plugs. P-1
- 2. Check drive axle fluid level and condition; check drive axle filter; determine needed action. P-1
- 3. Inspect air-operated power divider (inter-axle differential) assembly including: diaphragms, seals, springs, yokes, pins, lines, hoses, fittings, and controls. P-2
- 4. Inspect drive axle shafts; determine needed action. P-2
- 5. Remove and replace wheel assembly; check rear wheel seal and axle flange for leaks; determine needed action. P-1
- 6. *Inspect, repair, and replace drive axle lubrication system pump, troughs, collectors, slingers, tubes, and filters. P-3 (TST)
- 7. *Identify causes of drive axles(s) drive unit noise and overheating problems. P-2 (TST)
- 8. *Inspect and test drive axle temperature gauge, wiring harnesses, and sending unit/sensor; determine needed action. P-2 (TST)
- 9. *Remove and replace differential carrier assembly. P-2 (TST)
- 10. *Identify causes of drive axle wheel bearing noise and check for damage; perform needed action. P-1 (TST)

R. GENERAL HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

Proficient MD/HD diesel professionals demonstrate general heating, ventilation, and air conditioning diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

- 1. Research vehicle service information, including refrigerant/oil type, vehicle service history, service precautions, and technical service bulletins. P-1
- 2. Identify heating, ventilation and air conditioning (HVAC) components and configuration. P-1
- 3. Use appropriate electronic service tools(s) and procedures to check, record, and clear diagnostic codes; interpret digital multimeter (DMM) readings. P-1

4. *Identify and interpret heating and air condition problems. P-1 (TST)
5. *Identify refrigerant type; test for contamination; select and connect proper gauge set/test equipment; record temperature and pressure readings. P-1 (TST)
6. *Demonstrate understand of A/C system performance test. P-1 (TST)
7. *Demonstrate understanding of A/C system leak test. P-1 (TST)
8. *Inspect condition of refrigerant oil removed from A/C system; determine needed action. P-1 (TST)
9. *Determine oil and oil capacity for system application and/or component replacement. P-1 (TST)

S. HVAC: REFRIGERATION SYSTEM COMPONENTS

Proficient MD/HD diesel professionals demonstrate refrigeration system components diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect and replace A/C compressor drive belts, pulleys, and tensioners; verify belt alignment. P-1
2. Check A/C system operation including system pressures; visually inspect A/C components for signs of leaks; check A/C monitoring system (if applicable). P-1
3. Inspect A/C condenser for airflow restrictions; determine necessary action. P-1
4. Inspect receiver/drier or accumulator/drier; determine needed action. P-1
5. *Inspect A/C compressor and clutch assembly; check compressor clutch air gap; determine needed action. P-1 (TST)
6. *Inspect AC system hoses, lines, fittings, O-rings, seals, and service valves; determine needed action. P-1 (TST)
7. *Inspect expansion valve or orifice (expansion) tube; determine needed action. P-1 (TST)
8. *Inspect evaporator housing water drain; determine needed action. P-1 (TST)
9. *Understand A/C system conditions that cause the protection devices (pressure, thermal, and/or control module) to interrupt system operation. P-2 (TST)
10. *Understand procedure to remove and reinstall evaporator. P-2 (TST)
11. *Understand procedure to inspect and/or replace condenser. P-2 (TST)

T. HVAC: HEATING, VENTILATION, AND ENGINE COOLING SYSTEMS

Proficient MD/HD diesel professionals demonstrate heating, ventilation, and engine cooling systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect engine cooling and heater systems hoses and pipes; determine necessary action. P-1
2. Inspect HVAC system-heater ducts, doors, hoses, cabin filters, and outlets; determine needed action. P-1
3. Identify the source of A/C system odors; determine needed action. P-2

4. *Identify temperature control problems in the HVAC system; determine needed action. P-2 (TST)
5. *Understand procedure to remove, inspect, reinstall, and/or replace engine coolant and heater system components. P-2 (TST)

U. HVAC: OPERATING SYSTEMS AND RELATED CONTROLS

Proficient MD/HD diesel professionals demonstrate HVAC operating systems and related controls diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Verify HVAC blower motor operation; confirm proper air distribution; confirm proper temperature control; determine needed action. P-1
2. *Inspect and test HVAC system blower motors, resistors, switches, relays, wiring, and protection devices. P-1 (TST)
3. *Demonstrate understanding of A/C compressor clutch control systems. P-2 (TST)
4. *Demonstrate understanding of vacuum, mechanical, and electrical components and controls of the HVAC system. P-2 (TST)

V. HVAC: REFRIGERANT RECOVER, RECYLING, AND HANDLING

Proficient MD/HD diesel professionals demonstrate HVAC refrigerant recovery, recycling, and handling skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. *Understand correct use and maintenance of refrigerant handling equipment. P-1 (TST)
2. *Understand how to identify A/C system refrigerant; test for sealants; recover, evacuate, and charge A/C system; add refrigerant oil as required. P-1 (TST)

LEVEL 4

F. ELECTRICAL/ELECTRONIC SYSTEMS: BATTERY SYSTEM

Proficient MD/HD diesel professionals demonstrate battery system diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Identify battery type and system configuration. P-1
2. Confirm proper battery capacity for application; perform battery state-of-charge test; perform battery capacity test, determine needed action. P-1
3. Inspect battery, battery cables, connectors, battery boxes, mounts, and hold-downs; determine needed action. P-1
4. Charge battery using appropriate method for battery type. P-1
5. Jump-start vehicle using a booster battery and jumper cables or using an appropriate

- auxiliary power supply. P-1
6. *Check how voltage disconnect (LVD) systems; determine needed action. P-2 (TST)
 7. *Inspect, lean, and service battery; replace as needed. P-1 (TST)
 8. *Inspect and clean battery boxes, mounts, and hold-downs; repair or replace as needed. P-1 (TST)
 9. *Test and clean battery cables and connectors; repair or replace as needed. P-1 (TST)
 10. *Identify electrical/ modules, radios, and other accessories that require re-initialization or code entry after reconnecting vehicle battery. P-3 (TST)

G. ELECTRICAL/ELECTRONIC SYSTEMS: STARTING SYSTEM

Proficient MD/HD diesel professionals demonstrate starting system diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Demonstrate understanding of starter system operation. P-1
2. Perform starter circuit cranking voltage and voltage drop tests. Determine needed action. P-1
3. Inspect starter control circuit switches, relays, connectors, terminals, wires, and harnesses (including over-crank protection); determine needed action. P-1
4. *Identify causes of no-crank or slow crank condition; differentiate between electrical and engine mechanical problems; determine needed action. P-1 (TST)
5. *Perform starter current draw tests; determine needed action. P-3 (TST)
6. *Remove and replace starter; inspect flywheel ring gear or flex plate. P-1 (TST)

H. ELECTRICAL/ELECTRONIC SYSTEMS: CHARGING SYSTEM

Proficient MD/HD diesel professionals demonstrate charging system diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Identify and understand operation of the generator (alternator). P-1
2. Check instrument panel mounted voltmeters and/or indicator lamps; determine needed action. P-1
3. Inspect generator (alternator) drive belt condition; check pulleys and tensioners for wear; check fans and mounting brackets; verify proper belt alignment; determine needed action. P-1
4. Inspect cables, wires, and connectors in the charging circuit; determine needed action. P-1
5. Perform charging system voltage and amperage output tests; perform AC ripple test; determine needed action. P-1
6. *Perform charging circuit voltage drop tests; determine needed action. P-1 (TST)
7. *Remove, inspect, and/or replace generator (alternator). P-1 (TST)

I. ELECTRICAL/ELECTRONIC SYSTEMS: LIGHTING SYSTEMS

Proficient MD/HD diesel professionals demonstrate lighting system diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect for brighter-than-normal, intermittent, dim, or no-light operation; determine needed action. P-1
2. Test, replace, and aim headlights. P-1
3. Inspect cables, wires, and connectors in the lighting system. P-1
4. Inspect and diagnose tractor-to-tractor multi-wire connectors, cables, and holders. Determine needed action. P-2
5. *Inspect switches, relays, bulbs/LEDs, wires, terminals, connectors, sockets, and control components/modules of exterior lighting systems; determine needed action. P-2 (TST)
6. *Inspect switches, relays, bulbs/LEDs, wires, terminals, connectors, sockets, and control components/modules of interior lighting systems; determine needed action. P-2 (TST)
7. *Inspect switches, relays, bulbs/LEDs, wires, terminals, connectors, sockets, and control components/modules of auxiliary lighting systems; determine needed action. P-2 (TST)

J. ELECTRICAL/ELECTRONIC SYSTEMS: INSTRUMENT CLUSTER AND DRIVER INFORMATION SYSTEMS

Proficient MD/HD diesel professionals demonstrate instrument cluster and driver information systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check gauge and warning indicator operation. P-1
2. Identify faults in the sensor/sending units, gauges, switches, relays, bulbs/LEDs, wires, terminals, connectors, sockets, printed circuits, and control components/modules of the instrument cluster, driver information system, and warning systems; determine needed action. P-2
3. *Inspect electronic speedometer, odometer, and tachometer systems. P-3 (TST)*
4. *Understand how to recycle, label, and store refrigerant. P-1 (TST)

K. GENERAL CAB

Proficient MD/HD diesel professionals demonstrate general cab diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Research vehicle service information including, vehicle service history, service precautions, and technical service bulletins. P-1
2. Use appropriate electronic service tool(s) and procedures to check, record, and clear diagnostic codes; check and record trip/operational data; reset maintenance monitor (if applicable); interpret digital multimeter (DMM) readings. P-1

L. CAB: INSTRUMENTS AND CONTROLS

Proficient MD/HD diesel professionals demonstrate cab instruments and controls diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Inspect mechanical key condition; check operation of ignition switch; check operation of indicator lights, warning lights and/or alarms; check instructions; record oil pressure and system voltage; check operation of electronic power take-off (PTO) and engine idle speed controls (if applicable). P-1
2. Check operation of all accessories. P-1
3. Understand operation of auxiliary power unit (APU)/electric power unit. (EPU). P-3

M. CAB: SAFETY EQUIPMENT

Proficient MD/HD diesel professionals demonstrate cab safety equipment diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check operation of horns (electric and air); check warning device operation (reverse, air pressure, etc.); check condition of spare fuses, safety triangles, fire extinguisher, and all required decals; inspect seat belts and sleeper restraints; inspect condition of wiper blades and arms. P-1

N. CAB: HARDWARE

Proficient MD/HD diesel professionals demonstrate cab hardware diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Check operation of wipers and washer; inspect windshield glass for cracks or discoloration; check sun visor; check seat condition, operation, and mounting; check door glass and window operation; verify operation of door and cab locks; inspect steps and grab handles; inspect mirrors, mountings, brackets, and glass. P-1
2. Record all physical damage. P-1
3. Lubricate all cab grease fittings; inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, safety latches, linkages, and cables. P-2
4. Inspect cab mountings, hinges, latches, linkages, and ride height. P-1

5. Inspect quarter fender, mud flaps, and brackets. P-1

O. GENERAL HYDRAULICS (OPTIONAL PER ADVISORY BOARD RECOMMENDATION)

Proficient MD/HD diesel professionals demonstrate general hydraulics systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Diesel Engine Repair Technology program of study.

1. Research vehicle service information, including vehicle service history, service precautions, fluid type, and technical service bulletins. P-3
2. Verify placement of equipment/component safety labels and placards; determine needed action. P-3
3. Identify hydraulic system components; locate filtration system components; service filters and breathers. P-3
4. Check fluid level and condition; take a hydraulic fluid sample for analysis. P-3
5. Inspect hoses and connection for leaks, proper routing, and proper protection; determine needed action. P-3

[Course Academic Standards and Indicators](#)

[Materials/Resources/Equipment Listing](#)