Arkansas CTE

Diesel Brakes: Grades 9, 10, 11, 12

Adopted 2015

Demonstrate the employability skills necessary to obtain and maintain employment in the diesel automotive industry.

1.1 Demonstrate personal business etiquette for the automotive industry.

1. Report to class/work daily on time. 1.1.1
2. Dress appropriately and use language and manners suitable for the workplace. 1.1.2
3. Maintain appropriate personal hygiene. 1.1.3
4. Meet and maintain employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 1.1.4
5. Demonstrate honesty, integrity and reliability. 1.1.5

1.2 Demonstrate personal work ethic and habits.

1. Interpret and comply with workplace policies and procedures. 1.2.1
2. Contribute to the success of the team by assisting others and requesting help when needed. 1.2.2
3. Identify and address the needs of all customers, providing helpful, courteous and knowledgeable service and advice as needed. 1.2.3
4. Negotiate solutions to interpersonal and workplace conflicts. 1.2.4
5. Contribute ideas and initiatives for workplace effectiveness. 1.2.5
6. Follow directions for shop protocol taking with personal motivation to accomplish the task at hand. 1.2.6
7. Demonstrate appropriate communication effectively with customers and co-workers. 1.2.7
8. Analyze and resolve problems that arise in completing assigned tasks. 1.2.8
9. Organize and implement a productive plan of work. 1.2.9
10. Use technical principles, problem solving and critical thinking to accomplish assigned tasks. 1.2.10

1.3 Investigate training and entrepreneurial opportunities in the diesel industry.

1. Evaluate the personal characteristics of a successful professional in the industry. 1.3.1

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2. Identify the training opportunities within the architecture and construction industry. 1.3.2
3. Explore extended learning and leadership opportunities in career and technical education student organizations. 1.3.3
4. Examine work-based learning opportunities for students in the industry. 1.3.4
5. Locate in-demand career opportunities within a chosen region of the state. 1.3.5
6. Demonstrate the ability to apply for employment within the industry. 1.3.6

Demonstrate personal and shop safety measures.

2.1 Identify general shop safety rules and procedures.

1. Locate and demonstrate knowledge of material safety data sheets (MSDS). 2.1.1
2. Explain the purposes for marked safety areas. 2.1.2
3. Identify the location and use of eye wash stations. 2.1.3
4. Identify the location of the posted evacuation routes. 2.1.4
5. Identify and wear appropriate clothing for lab/shop activities. 2.1.5
6. Utilize proper ventilation procedures for working within the lab/shop area. 2.1.6
7. Secure hair and jewelry for lab/shop activities. 2.1.7
8. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. 2.1.8
9. Demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment. 2.1.9

2.2 Utilize safe procedures for handling of tools.

1. Demonstrate safe handling and use of automotive tools. 2.2.1
2. Demonstrate proper cleaning, storage, and maintenance of tools and equipment. 2.2.2

2.3 Demonstrate knowledge of the procedures for using safety equipment.

1. Identify and use proper placement of floor jacks and jack stands. 2.3.1
2. Identify and use proper procedures for safe lift operation. 2.3.2
3. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. 2.3.3
4. Demonstrate awareness of the safety aspects of high voltage circuits. 2.3.4
5. Check operation of electric/air horns and reverse warning devices 2.3.5
6. Check condition of spare fuses, safety triangles, fire extinguisher, and all required decals. 2.3.6
7. Inspect seat belts and sleeper restraints. 2.3.7
8. Inspect wiper blades and arms. 2.3.8

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Demonstrate knowledge and application of vehicle maintenance and repair preparation.

3.1 Demonstrate appropriate use of diesel brake systems service tools.

1. Identify tools and their usage in braking systems applications. 3.1.1
2. Identify standard and metric tool designation. 3.1.2
3. Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper). 3.1.3

3.2 Demonstrate the ability to prepare the vehicle for service.

1. Identify information needed and the service requested on a repair order. 3.2.1
2. Demonstrate proper use of fender covers, and mats. 3.2.2
3. Demonstrate awareness of customer expectations for vehicle repair. 3.2.3

3.3 Demonstrate appropriate use of diesel hardware.

1. Check operation of wiper and washer. 3.3.1
2. Inspect windshield glass for cracks or discoloration; check sun visor. 3.3.2
3. Check seat condition, operation, and mounting. 3.3.3
4. Check door glass and window operation. 3.3.4
5. Inspect steps and grab handles. 3.3.5
6. Inspect mirrors, mountings, brackets, and glass. 3.3.6
7. Record all observed physical damage. 3.3.7
8. Lubricate all cab and hood grease fittings. 3.3.8
9. Inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, safety latches, linkages, and cables. 3.3.9
10. Inspect cab mountings, hinges, latches, linkages and ride height; service as needed. 3.3.10

Analyze, inspect, adjust and repair air brake supply and services systems.

4.1 Demonstrate the ability to test and repair air brake supply and service systems.

1. Determine poor braking problems caused by supply and service system malfunctions. 4.1.1
2. Check air system build-up time and determine the appropriate needed action. 4.1.2
3. Drain air reservoir/tanks; check for oil, water, and foreign material; determine needed action. 4.1.3
4. Inspect air compressor drive gear, belts and coupling; adjust or replace as needed. 4.1.4
5. Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed. 4.1.5
6. Inspect and test air system pressure controls: governor, unloader assembly valves, filters, lines, hoses, and fittings; adjust or replace as needed. 4.1.6

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7. Inspect air system lines, hoses, fittings, and couplings; repair or replace as needed 4.1.7
8. Inspect and test air tank relief (safety) valves, one-way (single) check valves, two-way (double) check valves, manual and automatic drain valves; replace as needed. 4.1.8
9. Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; repair or replace as needed. 4.1.9
10. Inspect and test brake application (foot/treadle) valve, fittings, and mounts; check pedal operation; replace as needed. 4.1.10
11. Inspect and test stop light circuit switches, wiring, and connectors; repair or replace as needed. 4.1.11
12. Inspect and test hand brake (trailer) control valve, lines, fittings, and mountings; repair or replace as needed. 4.1.12
13. Inspect and test brake relay valves; replace as needed. 4.1.13
14. Inspect and test quick release valves; replace as needed. 4.1.14
15. Inspect and test tractor protection valve; replace as needed. 4.1.15
16. Inspect and test emergency (spring) brake control/modulator valve(s); replace as needed. 4.1.16
17. Inspect and test low pressure warning devices, wiring, and connectors; repair or replace as needed. 4.1.17
18. Inspect and test air pressure gauges, lines, and fittings; replace as needed. 4.1.18

4.2 Analyze the cause for poor mechanical foundation brakes and determine the needed action.

1. Test the braking system for malfunctioning components. 4.2.1
2. Inspect and test service brake chambers, diaphragm, clamp, spring, pushrod, clevis, and mounting brackets; repair or replace as needed. 4.2.2
3. Identify type, inspect and service slack adjusters; perform needed action. 4.2.3
4. Inspect camshafts, tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; replace as needed. 4.2.4
5. Inspect, clean, and adjust air disc brake caliper assemblies; determine needed repairs. 4.2.5
6. Inspect and measure brake shoes or pads; perform needed action. 4.2.6
7. Inspect and measure brake drums or rotors; perform needed action. 4.2.7

4.3 Demonstrate appropriate knowledge to inspect, test and repair parking brakes.

1. Inspect, test and replace parking (spring) brake chamber diaphragm and seals. 4.3.1

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2. Inspect and test parking (spring) brake check valves, lines, hoses, and fittings; replace as needed. 4.3.2

3. Inspect and test parking (spring) brake application and release valve; replace as needed. 4.3.3
4. Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with the manufacturer's recommendations. 4.3.4
5. Identify and test the anti-compounding brake function. 4.3.5
6. Dispose of removed chambers in accordance with local regulations. 4.3.6

Analyze, inspect, adjust and repair hydraulic brakes

5.1 Inspect and repair the hydraulic braking system.

1. Identify poor stopping problems caused by the hydraulic system and determine the needed action. 5.1.1
2. Inspect and test master cylinder for internal/external leaks and damage and replace as needed. 5.1.2
3. Inspect hydraulic system brake lines, flexible hoses, and fittings for leaks and damage and replace as needed. 5.1.3
4. Inspect and test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; replace as needed. 5.1.4
5. Inspect and test brake pressure differential valve and warning light circuit switch, bulbs/LEDs, wiring, and connectors; repair or replace as needed 5.1.5
6. Inspect disc brake caliper assemblies; replace as needed. 5.1.6
7. Inspect/test brake fluid; bleed and/or flush system; determine proper fluid type. 5.1.7

5.2 Inspect and repair mechanical foundation brake systems.

1. Identify poor stopping problems caused by mechanical components and determine needed action. 5.2.1
2. Inspect and measure rotors and perform needed action. 5.2.2
3. Inspect and measure disc brake pads. 5.2.3
4. Inspect mounting hardware and perform needed action. 5.2.4
5. Inspect parking brake operation and the holding devices; adjust and replace as needed. 5.2.5

5.3 Inspect and repair power assist units.

1. Identify stopping problems caused by the brake assist (booster) system and determine needed action. 5.3.1
2. Inspect, test, repair, or replace hydraulic brake assist (booster), hoses, and control valves. 5.3.2
3. Determine the proper fluid type and amount. 5.3.3
4. Check emergency (back-up, reserve) brake assist system. 5.3.4

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Inspect and diagnose air and hydraulic antilock brake systems (ABS), automatic traction control (ATC), and wheel bearings.

6.1 Diagnose and repair air and hydraulic antilock brake systems(ABS).

1. Observe antilock brake system (ABS) warning light operation (includes trailer and dash mounted trailer ABS warning light); determine needed action. 6.1.1
2. Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or electronic service tool(s); determine needed action. 6.1.2
3. Identify poor stopping and wheel lock-up problems caused by failure of the antilock brake system (ABS); determine needed action. 6.1.3
4. Test and check operation of antilock brake system (ABS) air, hydraulic, electrical, and mechanical components; perform needed action. 6.1.4
5. Test antilock brake system (ABS) wheel speed sensors and circuits; adjust or replace as needed. 6.1.5
6. Bleed the ABS hydraulic circuits. 6.1.6

6.2 Diagnose and repair the automatic traction control (ATC) system.

1. Observe automatic traction control (ATC) warning light operation and determine the needed action. 6.2.1
2. Diagnose the automatic traction control (ATC) electronic control(s) and components using self-diagnosis and/or specified test equipment (scan tool, PC computer) and determine the needed action. 6.2.2
3. Verify power line carrier (PLC) operations. 6.2.3

6.3 Inspect and repair the wheel bearings.

1. Inspect, clean, lubricate, adjust and/or replace wheel bearings and races/cups. 6.3.1
2. Inspect and replace the seals and wear rings. 6.3.2
3. Inspect the spindle and tube. 6.3.3
4. Inspect and replace the retaining hardware. 6.3.4
5. Identify, inspect or replace unitized/preset hub bearing assemblies. 6.3.5
6. Inspect tires for wear patterns, cuts. Cracks, bulging, pressure, and proper mounting. 6.2.6