

STRANDS AND STANDARDS

ASE DIESEL BRAKES



Course Description

This course is a follow up course to the Diesel IMMR and is in a sequence that prepares individuals to apply technical knowledge and skills to the specialized maintenance and repair of trucks, buses, and other commercial and industrial vehicles. Instruction covers training in the following areas: safety, diesel engine mechanics, drive trains, and electrical/electronic systems. Work ethics and productivity are an integral part of the classroom and lab activities of these courses.

Intended Grade Level	10-12
Units of Credit	1.0
Core Code	
Concurrent Enrollment Core Code	
Prerequisite	Diesel IMMR
Skill Certification Test Number	
Test Weight	
License Area of Concentration	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Diesel Technician
Endorsement 2	
Endorsement 3	

STRAND 1

Student will participate in personal and leadership development activities through SkillsUSA or another appropriate career and technical student organization.

Standard 1

Student will use communication skills to effectively communicate with others.

- Understand when it is appropriate to listen and to speak.
- Understand and follow verbal and written instructions for classroom and laboratory activities.

Standard 2

Student will effectively use teamwork to respectfully work with others.

- Identify and understand different roles in working with a team.

Standard 3

Student will use critical thinking and problem-solving skills.

- Analyze the cause of the problem.
- Develop a solution to address the problem.
- Implement the plan.
- Evaluate the effectiveness of the plan.

Standard 4

Student will be dependable, reliable, steady, trustworthy, and consistent in performance and behavior.

- Set and meet goals on attendance and punctuality.
- Prioritize, plan, and manage work to complete assignments and projects on time.

Standard 5

Student will be accountable for results.

- Use an achievement chart for activities and behaviors in class that encourages a personal evaluation of classroom performance.
- File a regular written report on progress toward completion of assignments and projects.

Standard 6

Be familiar with the legal requirements and expectations of the course.

- Be familiar with the course disclosure statement and all requirements for successful completion of the course.
- Demonstrate workplace ethics, e.g. fair, honest, disciplined.

STRAND 2

Student will participate in work-place readiness activities.

Standard 1

Student will demonstrate employability skills.

- Use a career search network to find career choices.
- Write a resume including a list of demonstrated skills.
- Write a letter of application.

- Complete a job application.
- Participate in an actual or simulated job interview.

Standard 2

Student will participate in a work-based learning experience outside the classroom.

- Student will plan and implement a work-based learning experience aligned with their career goal.

STRAND 3

Students will understand general shop safety.

Standard 1

Learn safe working habits and procedures. Pass a safety test with 100 percent.

Standard 2

Review the different types and hazards of solvents used.

Standard 3

Review the different types, purposes, and hazards of automotive greases, oils, and additives.

Standard 4

Review precautions in the use, handling, and storage of various solvents, cleaners, oils, greases, and additives.

Standard 5

Review the gasses encountered in the diesel field and the hazards they present.

Standard 6

Review the hazards and control of asbestos dust.

Standard 7

Comply with safety rules for working with automotive chemicals (SDS).

Performance Skills

- Pass safety test with 100%

STRAND 4

Students will inspect the Brake Systems and determine needed repair.

Standard 1

Research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins.

Standard 2

Identify brake system components and configurations (including air and hydraulic systems, parking brake, power assist, and vehicle dynamic brake systems).

Standard 3

Identify brake performance problems caused by the mechanical/foundation brake system (air and hydraulic).

Standard 4

Use appropriate electronic service tool(s) and procedures to diagnose problems; check, record, and clear diagnostic codes; interpret digital multimeter (DMM) readings.

Performance Skills

- Research vehicle service information.
- Identify brake system components and configurations.
- Identify brake performance problems.
- Use appropriate electronic service tool(s) and procedures to diagnose problems.

STRAND 5

Students will inspect the Air Brakes: Air Supply and Service Systems and determine needed repair.

Standard 1

Inspect, test, repair, and/or replace 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); determine needed action.

Standard 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.

Standard 3

Demonstrate knowledge and understanding of air supply and service system components and operations.

Standard 4

Inspect air compressor drive gear components (gears, belts, tensioners, and/or couplings); determine needed action.

Standard 5

Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed.

Standard 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.

Standard 7

Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; determine needed action.

Standard 8

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

Performance Skills

- Inspect, test, repair, and/or replace air supply system.
- Test gauge operation and readings.
- Demonstrate knowledge and understanding of air supply.
- Inspect air compressor drive gear components.
- Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets.
- Inspect and test air tank relief (safety) valves.
- Inspect and clean air drier systems.
- Inspect and test brake application (foot/treadle) valve, fittings, and mounts.

STRAND 6

Students will Inspect the Air Brakes: Mechanical/Foundation Brake System and determine needed repair.

Standard 1

Inspect, test, repair, and/or replace service brake chambers, diaphragms, clamps, springs, pushrods, clevises, and mounting brackets; determine needed action.

Standard 2

Identify slack adjuster type; inspect slack adjusters; perform needed action.

Standard 3

Check camshafts (S-cam), tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; perform needed action.

Standard 4

Inspect rotor and mounting surface; measure rotor thickness, thickness variation, and lateral runout; determine needed action.

Standard 5

Inspect, clean, and adjust air disc brake caliper assemblies; inspect and measure disc brake pads; inspect mounting hardware; perform needed action.

Standard 6

Remove brake drum; clean and inspect brake drum and mounting surface; measure brake drum diameter; measure brake lining thickness; inspect brake lining condition; determine needed action.

Standard 7

Diagnose concerns related to the mechanical/foundation brake system including poor stopping, brake noise, premature wear, pulling, grabbing, or dragging; determine needed action.

Performance Skills

- Inspect, test, repair, and/or replace service brake chambers, diaphragms, clamps, springs, pushrods, clevises, and mounting brackets.
- Inspect slack adjusters.
- Check camshafts (S-cam), tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs.
- Inspect rotor and mounting surface.
- Inspect, clean, and adjust air disc brake caliper assemblies.
- Clean and inspect brake drum and mounting surface.
- Diagnose concerns related to the mechanical/foundation brake system.

STRAND 7

Students will Inspect the Air Brakes: Parking Brake System and determine needed repair.

Standard 1

Inspect, test, and/or replace parking (spring) brake chamber.

Standard 2

Inspect, test, and/or replace parking (spring) brake check valves, lines, hoses, and fittings.

Standard 3

Inspect, test, and/or replace parking (spring) brake application and release valve.

Standard 4

Manually release (cage) and reset (uncage) parking (spring) brakes.

Standard 5

Identify and test anti-compounding brake function; determine needed action.

Performance Skills

- Inspect, test, and/or replace parking (spring) brake chamber.
- Inspect, test, and/or replace parking (spring) brake check valves, lines, hoses, and fittings.
- Inspect, test, and/or replace parking (spring) brake application and release valve.
- Manually release (cage) and reset (uncage) parking (spring) brakes.
- Identify and test anti-compounding brake function.

STRAND 8

Students will Inspect the Hydraulic Brakes: Hydraulic System and determine needed repair.

Standard 1

Check master cylinder fluid level and condition; determine proper fluid type for application.

Standard 2

Inspect hydraulic brake system for leaks and damage; test, repair, and/or replace hydraulic brake system components.

Standard 3

Check hydraulic brake system operation including pedal travel, pedal effort, and pedal feel; determine needed action.

Standard 4

Diagnose poor stopping, premature wear, pulling, dragging, imbalance, or poor pedal feel caused by problems in the hydraulic system; determine needed action.

Standard 5

Test master cylinder for internal/external leaks and damage; replace as needed.

Standard 6

Test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; determine needed action.

Standard 7

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

Standard 8

Bleed and/or flush hydraulic brake system.

Performance Skills

- Check master cylinder fluid level and condition.
- Inspect hydraulic brake system for leaks and damage.
- Check hydraulic brake system operation.
- Diagnose poor stopping, premature wear, pulling, dragging, imbalance, or poor pedal feel.
- Test master cylinder for internal/external leaks and damage.
- Test metering (hold-off), load sensing/proportioning, proportioning, and combination valves.
- Test brake pressure differential valve; test warning light circuit switch, bulbs/LEDs, wiring, and connectors
- Bleed and/or flush hydraulic brake system.

STRAND 9

Students will Inspect the Hydraulic Brakes: Mechanical/Foundation Brake System and determine needed repair.

Standard 1

Clean and inspect rotor and mounting surface; measure rotor thickness, thickness variation, and lateral runout; determine necessary action.

Standard 2

Inspect and clean disc brake caliper assemblies; inspect and measure disc brake pads; inspect mounting hardware; perform needed action.

Standard 3

Remove, clean and inspect brake drums; measure brake drum diameter; measure brake lining thickness; inspect brake lining condition; inspect wheel cylinders; determine serviceability.

Standard 4

Check disc brake caliper assembly mountings and slides; replace as needed.

Performance Skills

- Clean and inspect rotor and mounting surface.
- Inspect and clean disc brake caliper assemblies.
- Remove, clean, and inspect brake drums.
- Check disc brake caliper assembly mountings and slides.

STRAND 10

Students will Inspect the Hydraulic Brakes: Parking Brake System and determine needed repair.

Standard 1

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

Performance Skills

- Check parking brake operation.

STRAND 11

Students will Inspect the Power Assist Systems and determine needed repair.

Standard 1

Check brake assist/booster system (vacuum or hydraulic) hoses and control valves; check fluid level and condition (if applicable).

Standard 2

Check operation of emergency (back-up/reserve) brake assist system.

Standard 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.

Standard 4

Inspect, test, repair, and/or replace hydraulic brake assist/booster systems, hoses, and control valves.

Performance Skills

- Check brake assist/booster system hoses and control valves.
- Check operation of emergency (back-up/reserve) brake assist system.
- Identify concerns related to the power assist system.
- Inspect, test, repair, and/or replace hydraulic brake assist/booster systems, hoses, and control valves.

STRAND 12

Students will Inspect the Vehicle Dynamic Brake Systems (Air and Hydraulic): Antilock Brake System (ABS), Automatic Traction Control (ATC) System, and Electronic Stability Control (ESC) System and determine needed repair.

Standard 1

Observe antilock brake system (ABS) warning light operation including trailer and dash mounted trailer ABS warning light; determine needed action.

Standard 2

Observe automatic traction control (ATC) and electronic stability control (ETC) warning light operation; determine needed action.

Standard 3

Identify stopping concerns related to the vehicle dynamic brake systems: ABS, ATC, and ESC; determine needed action.

Standard 4

Diagnose problems in the vehicle dynamic brake control systems; determine needed action.

Standard 5

Check and test operation of vehicle dynamic brake system (air and hydraulic) mechanical and electrical components; determine needed action

Standard 6

Test vehicle/wheel speed sensors and circuits; adjust, repair, and/or replace as needed.

Standard 7

Bleed ABS hydraulic circuits.

Standard 8

Verify power line carrier (PLC) operation.

Performance Skills

- Observe antilock brake system (ABS) warning light operation.
- Observe automatic traction control (ATC) and electronic stability control (ETC) warning light operation.
- Identify stopping concerns related to the vehicle dynamic brake systems.
- Diagnose problems in the vehicle dynamic brake control systems.
- Check and test operation of vehicle dynamic brake system (air and hydraulic) mechanical and electrical components.
- Test vehicle/wheel speed sensors and circuits.
- Bleed ABS hydraulic circuits.
- Verify power line carrier (PLC) operation.

STRAND 13

Students will Inspect the Wheel Bearings and determine needed repair.

Standard 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.

Standard 2

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

Performance Skills

- Clean, inspect, lubricate, and/or replace wheel bearings and races/cups .
- Identify, inspect, and/or replace unitized/preset hub bearing assemblies.