

# Diesel Technology: Brakes

## NATEF Crosswalk

The following NATEF tasks (rev. 2007) are covered in this publication. The first column identifies the NATEF task by name and number. The second column identifies the exact location by unit number and assignment sheet or job sheet number in the MAVCC publication.

NATEF Tasks	MAVCC Tasks
III. BRAKES	
A. Air Brakes	
1. Air Supply and Service Systems	
A.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. P-1	Unit 1–A, Assignment Sheet 1 – Diagnose and determine possible causes of general brake problems.  Unit 3–A, Assignment Sheet 1 – Diagnose and determine possible causes of ABS problems.  Unit 3–A, Job Sheet 2 – Troubleshoot antilock brake system problems.
A.1.2. Check air system build-up time; determine needed repairs. P-1	Unit 2–C, Job Sheet 1 – Service the reservoir and check valve function, build-up time, and cut-out pressure.
A.1.3. Drain air reservoir/tanks; check for oil, water, and foreign material; determine needed action. P-1	Unit 2–C, Job Sheet 1 – Service the reservoir and check valve function, build-up time, and cut-out pressure.
A.1.4. Inspect compressor drive gear and coupling; replace as needed. P-1	Unit 2–C, Job Sheet 3 – Inspect, service, and time gear-driven compressor, valves, and associated lines.
A.1.5. Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed. P-1	Unit 2–C, Job Sheet 2 – Inspect and service belt-driven compressor and associated lines.  Unit 2–C, Job Sheet 3 – Inspect, service, and time gear-driven compressor, valves, and associated lines.
A.1.6. Inspect and test air system pressure controls: governor, unloader assembly valves, filters, lines, hoses, and fittings; adjust or replace as needed. P-1	Unit 2–C, Job Sheet 3 – Inspect, service, and time gear-driven compressor, valves, and associated lines.  Unit 2–C, Job Sheet 4 – Inspect and service air dryer system; repair or replace as needed.

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A.1.7. Inspect air system lines, hoses, fittings, and couplings; repair or replace as needed. P-1	<p>Unit 3–C, Job Sheet 1—Inspect and test brake application (foot) valve, fittings, and mounts; adjust or replace as needed.</p> <p>Unit 4–C, Job Sheet 6—Inspect and test tractor protection valve; replace as needed.</p>
A.1.8. 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. P-1	<p>Unit 2–C, Job Sheet 1—Service the reservoir and check valve function, build-up time, and cut-out pressure.</p> <p>Unit 3–C, Job Sheet 1—Inspect and test brake application (foot) valve, fittings, and mounts; adjust or replace as needed.</p>
A.1.9. Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; repair or replace as needed. P-1	Unit 2–C, Job Sheet 4—Inspect and service air dryer system; repair or replace as needed.
A.1.10. Inspect and test brake application (foot) valve, fittings, and mounts; check pedal operation; replace as needed. P-1	Unit 3–C, Job Sheet 1—Inspect and test brake application (foot) valve, fittings, and mounts; adjust or replace as needed.
A.1.11. Inspect and test stop light circuit switches, wiring, and connectors; repair or replace as needed. P-1	Unit 3–C, Job Sheet 2—Inspect and test stop light circuit switches, wiring, and connectors; repair or replace as needed.
A.1.12. Inspect and test hand brake (trailer) control valve, lines, fittings, and mountings; repair or replace as needed. P-1	Unit 4–C, Job Sheet 5—Inspect and test trailer brake control valve (hand valve); replace as needed.
A.1.13. Inspect and test brake relay valves; replace as needed. P-1	Unit 3–C, Job Sheet 3—Inspect and test relay valve; replace as needed.
A.1.14. Inspect and test quick release valves; replace as needed. P-1	<p>Unit 3–C, Job Sheet 4—Inspect and test quick release valve; replace as needed.</p> <p>Unit 4–C, Job Sheet 3—Inspect and test anti-compounding circuit equipped with Quick Release (QR)-1C; replace as needed.</p>
A.1.15. Inspect and test tractor protection valve; replace as needed. P-1	Unit 4–C, Job Sheet 6—Inspect and test tractor protection valve; replace as needed.

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A.1.16. Inspect and test emergency (spring) brake control/modulator valve(s); replace as needed. P-1	Unit 4–C, Job Sheet 7— Check operation of parking brake; remove, inspect, and replace parking brake (spring brake) chamber as needed.  Unit 4–C, Job Sheet 2— Inspect and test inversion valve; replace as needed.
A.1.17. Inspect and test low pressure warning devices, wiring, and connectors; repair or replace as needed. P-1	Unit 2–C, Job Sheet 1— Service the reservoir and check valve function, build-up time, and cut-out pressure.
A.1.18. Inspect and test air pressure gauges, lines, and fittings; repair or replace as needed. P-1	Unit 3–C, Job Sheet 1— Inspect and test brake application (foot) valve, fittings, and mounts; adjust or replace as needed.
<b>2. Mechanical/Foundation</b>	
A.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. P-1	Unit 1–A, Assignment Sheet 1— Diagnose and determine possible causes of general brake problems.
A.2.2. Inspect and test service brake chambers, diaphragm, clamp, spring, pushrod, clevis, and mounting brackets; repair or replace as needed. P-1	Unit 1–C, Job Sheet 2— Inspect, test, service, and replace service brake chamber.
A.2.3. Inspect and service slack adjusters; perform needed action. P-1	Unit 1–C, Job Sheet 1— Inspect, service, and adjust slack adjuster on front axle.
A.2.4. Inspect camshafts, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; replace as needed. P-1	Unit 1–C, Job Sheet 3— Remove, inspect, and replace brake shoes, drum, and hardware for s-cam drum foundation brakes.  Unit 1–C, Job Sheet 4— Inspect and test trailer air supply valve; replace as needed.
A.2.5. Inspect, clean, and adjust air disc brake caliper assemblies; determine needed repairs. P-1	Unit 1–C, Job Sheet 5— Inspect, clean, and measure brake calipers, pads, and rotors; replace pads if needed.

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NATEF Tasks	MAVCC Tasks
A.2.6. Inspect and measure brake shoes or pads; perform needed action. P-1	<p>Unit 1–C, Job Sheet 3—Remove, inspect, and replace brake shoes, drum, and hardware for s-cam drum foundation brakes.</p> <p>Unit 1–C, Job Sheet 4—Remove, inspect, and replace brake shoes, drum, and hardware for wedge-type drum foundation brakes.</p> <p>Unit 1–C, Job Sheet 5—Inspect, clean, and measure brake calipers, pads, and rotors; replace pads if needed.</p>
A.2.7. Inspect and measure brake drums or rotors; perform needed action. P-1	<p>Unit 1–C, Job Sheet 3—Remove, inspect, and replace brake shoes, drum, and hardware for s-cam drum foundation brakes.</p> <p>Unit 1–C, Job Sheet 4—Remove, inspect, and replace brake shoes, drum, and hardware for wedge-type drum foundation brakes.</p>
<b>3. Parking Brakes</b>	
A.3.1. Inspect and test parking (spring) brake chamber diaphragm and seals; replace parking (spring) brake chamber; dispose of removed chambers in accordance with local regulations. P-1	Unit 4–C, Job Sheet 7—Check operation of parking brake; remove, inspect, and replace parking brake (spring brake) chamber as needed.
A.3.2. Inspect and test parking (spring) brake check valves, lines, hoses, and fittings; replace as needed. P-1	Unit 4–C, Job Sheet 7—Check operation of parking brake; remove, inspect, and replace parking brake (spring brake) chamber as needed.
A.3.3. Inspect and test parking (spring) brake application and release valve; replace as needed. P-1	Unit 4–C, Job Sheet 7—Check operation of parking brake; remove, inspect, and replace parking brake (spring brake) chamber as needed.
A.3.4. Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with manufacturer’s recommendations. P-1	Unit 4–C, Job Sheet 7—Check operation of parking brake; remove, inspect, and replace parking brake (spring brake) chamber as needed.

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<b>B. Hydraulic Brakes</b>	
<b>1. Hydraulic System</b>	
B.1.1. Identify poor stopping, premature wear, pulling, dragging, balance, or pedal feel problems caused by the hydraulic system; determine needed action. P-2	Unit 1–A, Assignment Sheet 1 – Diagnose and determine possible causes of general brake problems.  Unit 3–B, Job Sheet 1 – Test hydraulic system and inspect for leaks; determine needed repairs.
B.1.2. Check brake pedal pushrod length; adjust as needed. P-3	Unit 3–B, Job Sheet 4 – Remove, inspect, and repair or replace the master cylinder.
B.1.3. Inspect and test master cylinder for internal/external leaks and damage; replace as needed. P-2	Unit 3–B, Job Sheet 4 – Remove, inspect, and repair or replace the master cylinder.
B.1.4. Inspect hydraulic system brake lines, flexible hoses, and fittings for leaks and damage; replace as needed. P-2	Unit 3–B, Job Sheet 1 – Test hydraulic system and inspect for leaks; determine needed repairs.  Unit 3–B, Job Sheet 4 – Remove, inspect, and repair or replace the master cylinder.
B.1.5. Inspect and test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; replace as needed. P-3	Unit 3–B, Job Sheet 3 – Remove, inspect, and repair or replace the hydraulic brake valve.
B.1.6. Inspect and test brake pressure differential valve and warning light circuit switch, bulbs, wiring, and connectors; repair or replace as needed. P-2	Unit 4–B, Job Sheet 3 – Check operation of brake failure lights and braking warning devices; repair or replace as needed.
B.1.7. Inspect disc brake caliper assemblies; replace as needed. P-2	Unit 2–B, Job Sheet 1 – Remove, clean, and inspect a caliper and pad assembly.  Unit 2–B, Job Sheet 3 – Reinstall caliper and pad assembly and check brake operation.
B.1.8. Inspect/test brake fluid; bleed and/or flush system; determine proper fluid type. P-1	Unit 3–B, Job Sheet 2 – Bleed and/or flush the hydraulic brake system.

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NATEF Tasks	MAVCC Tasks
<b>2. Mechanical/Foundation</b>	
B.2.1. Identify poor stopping, brake noise, premature wear, pulling, grabbing, dragging, or pedal feel problems caused by mechanical components; determine needed action. P-2	Unit 1–A, Assignment Sheet 1—Diagnose and determine possible causes of general brake problems.
B.2.2. Inspect and measure rotors; perform needed action. P-2	Unit 1–B, Job Sheet 1—Remove, clean, inspect, and measure a brake drum.
B.2.3. Inspect and measure disc brake pads; inspect mounting hardware; perform needed action. P-2	Unit 1–B, Job Sheet 2—Remove, inspect, and replace brake shoes and related hardware.
B.2.4. Check parking brake operation; inspect parking brake application and holding devices; adjust and replace as needed. P-2	Unit 4–C, Job Sheet 7—Check operation of parking brake; remove, inspect, and replace parking brake (spring brake) chamber as needed.
<b>3. Power Assist Units</b>	
B.3.1. Identify stopping problems caused by the brake assist (booster) system; determine needed action. P-2	Unit 1–A, Assignment Sheet 1—Diagnose and determine possible causes of general brake problems.  Unit 4–B, Job Sheet 1—Inspect and test the power assist system and emergency back-up system; determine needed repairs.
B.3.2. Inspect, test, repair, or replace hydraulic brake assist (booster) hoses, and control valves; determine proper fluid type. P-2	Unit 4–B, Job Sheet 1—Inspect and test the power assist system and emergency back-up system; determine needed repairs.
B.3.3. Check emergency (back-up, reserve) brake assist system. P-2	Unit 4–B, Job Sheet 1—Inspect and test the power assist system and emergency back-up system; determine needed repairs.
<b>C. Air and Hydraulic Antilock Brake Systems (ABS) and Automatic Traction Control (ATC)</b>	
C.1. Observe antilock brake system (ABS) warning light operation (includes dash mounted trailer ABS warning light); determine needed action. P-1	Unit 3–A, Job Sheet 1—Inspect, test, and service an antilock brake system.  Unit 3–A, Job Sheet 2—Troubleshoot anti-lock brake system problems.

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<b>NATEF Tasks</b>	<b>MAVCC Tasks</b>
C.2 Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or specified test equipment (scan tool, PC computer); determine needed action. P-1	<p>Unit 3–A, Assignment Sheet 1 – Diagnose and determine possible causes of ABS problems.</p> <p>Unit 3–A, Job Sheet 1 – Inspect, test, and service an antilock brake system.</p> <p>Unit 3–A, Job Sheet 2 – Troubleshoot anti-lock brake system problems.</p>
C.3. Identify poor stopping and wheel lock-up problems caused by failure of the antilock brake system (ABS); determine needed action. P-1	<p>Unit 3–A, Assignment Sheet 1 – Diagnose and determine possible causes of ABS problems.</p> <p>Unit 3–A, Job Sheet 2 – Troubleshoot anti-lock brake system problems.</p>
C.4. Test and check operation of antilock brake system (ABS) air, hydraulic, electrical, and mechanical components; perform needed action. P-1	Unit 3–A, Job Sheet 1 – Inspect, test, and service an antilock brake system.
C.5. Test antilock brake system (ABS) wheel speed sensors and circuits; adjust or replace as needed. P-1	Unit 3–A, Job Sheet 1 – Inspect, test, and service an antilock brake system.
C.6. Bleed the ABS hydraulic circuits following manufacturers’ procedures. P-2	Unit 3–A, Job Sheet 1 – Inspect, test, and service an antilock brake system.
C.7. Observe automatic traction control (ATC) warning light operation; determine needed action. P-3	
C.8. Diagnose automatic traction control (ATC) electronic control(s) and components using self-diagnosis and/or specified test equipment (scan tool, PC computer); determine needed action. P-3	
<b>D. Wheel Bearings</b>	
D.1. Clean, inspect, lubricate and replace wheel bearings and races/cups; replace seals and wear rings; inspect spindle/tube; inspect and replace retaining hardware; adjust wheel bearings. P-1	<p>Unit 2–A, Assignment Sheet 1 – Evaluate worn and damaged wheel bearings and seals.</p> <p>Unit 2–A, Assignment Sheet 2 – Select appropriate replacement wheel bearings and seals.</p> <p>Unit 2–A, Job Sheet 1 – Remove, inspect, clean, replace, and adjust wheel bearings and seals.</p>

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<b>NATEF Tasks</b>	<b>MAVCC Tasks</b>
D.2. Inspect or replace extended service wheel bearing assemblies. P-3	Unit 2–A, Assignment Sheet 1 – Evaluate worn and damaged wheel bearings and seals.  Unit 2–A, Assignment Sheet 2 – Select appropriate replacement wheel bearings and seals.  Unit 2–A, Job Sheet 1 – Remove, inspect, clean, replace, and adjust wheel bearings and seals.