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| 3. | Rotate tires according to manufacturer's recommendations. | P-1 |
| 4. | Measure wheel, tire, axle flange, and hub runout; determine necessary action. | P-2 |
| 5. | Diagnose tire pull problems; determine necessary action. | P-2 |
| 6. | Dismount, inspect, and remount tire on wheel; Balance wheel and tire assembly (static and dynamic). | P-1 |
| 7. | Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. | P-2 |
| 8. | Reinstall wheel; torque lug nuts. | P-1 |
| 9. | Inspect tire and wheel assembly for air loss; perform necessary action. | P-1 |
| 10. | Repair tire using internal patch. | P-1 |
| 11. | Inspect, diagnose, and calibrate tire pressure monitoring system. | P-2 |

BRAKES

For every task in Brakes, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

V. BRAKES

A. General Brake Systems Diagnosis

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| 1. | Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. | P-1 |
| 2. | Identify and interpret brake system concern; determine necessary action. | P-1 |
| 3. | Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins. | P-1 |

4. Locate and interpret vehicle and major component identification numbers. P-1

B. Hydraulic System Diagnosis and Repair

1. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law). P-1
2. Measure brake pedal height, travel, and free play (as applicable); determine necessary action. P-1
3. Check master cylinder for internal/external leaks and proper operation; determine necessary action. P-1
4. Remove, bench bleed, and reinstall master cylinder. P-1
5. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action. P-2
6. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action. P-1
7. Replace brake lines, hoses, fittings, and supports. P-2
8. Fabricate brake lines using proper material and flaring procedures (double flare and ISO types). P-2
9. Select, handle, store, and fill brake fluids to proper level. P-1
10. Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves. P-3
11. Inspect, test, and/or replace components of brake warning light system. P-3
12. Bleed and/or flush brake system. P-1
13. Test brake fluid for contamination. P-1

V. BRAKES

C. Drum Brake Diagnosis and Repair

1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action. P-1
2. Remove, clean, inspect, and measure brake drums; determine necessary P-1

action.

3. Refinish brake drum; measure final drum diameter. P-1
4. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. P-1
5. Inspect and install wheel cylinders. P-2
6. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings. P-2
7. Install wheel, torque lug nuts, and make final checks and adjustments. P-1

V. BRAKES

D. Disc Brake Diagnosis and Repair

1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action. P-1
2. Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action. P-1
3. Clean and inspect caliper mounting and slides/pins for operation, wear, and damage; determine necessary action. P-1
4. Remove, inspect and replace pads and retaining hardware; determine necessary action. P-1
5. Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts. P-3
6. Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks. P-1
7. Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action P-1
8. Remove and reinstall rotor. P-1
9. Refinish rotor on vehicle; measure final rotor thickness. P-1
10. Refinish rotor off vehicle; measure final rotor thickness. P-1

- 11. Retract caliper piston on an integrated parking brake system. P-3
- 12. Install wheel, torque lug nuts, and make final checks and adjustments. P-1
- 13. Check brake pad wear indicator system operation; determine necessary action. P-2

V. BRAKES

E. Power Assist Units Diagnosis and Repair

- 1. Test pedal free travel; check power assist operation. P-2
- 2. Check vacuum supply to vacuum-type power booster. P-1
- 3. Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action. P-1
- 4. Inspect and test hydraulically assisted power brake system for leaks and proper operation; determine necessary action. P-3
- 5. Measure and adjust master cylinder pushrod length. P-3

V. BRAKES

**F. Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.)
Diagnosis and Repair**

- 1. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action. P-1
- 2. Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings. P-1
- 3. Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. P-2
- 4. Check parking brake and indicator light system operation; determine necessary action. P-1
- 5. Check operation of brake stop light system; determine necessary action. P-1
- 6. Replace wheel bearing and race. P-2
- 7. Inspect and replace wheel studs. P-1
- 8. Remove and reinstall sealed wheel bearing assembly. P-1

V. BRAKES

G. Electronic Brake, Traction and Stability Control Systems Diagnosis and Repair

1. Identify and inspect electronic brake control system components; determine necessary action. P-1
2. Diagnose poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with the electronic brake control system ; determine necessary action. P-2
3. Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action. P-1
4. Depressurize high-pressure components of the electronic brake control system. P-3
5. Bleed the electronic brake control system hydraulic circuits. P-1
6. Remove and install electronic brake control system electrical/electronic and hydraulic components. P-3
7. Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data). P-1
8. Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.). P-3
9. Identify traction control/vehicle stability control system components. P-3
10. Describe the operation of a regenerative braking system. P-3