Specifications

Lubricants, Fluids, Sealers and Adhesives

	Specifications
Motorcraft® DOT 4 LV High Performance Motor Vehicle Brake Fluid / PM-20	WSS-M6C65-A2

Torque Specifications

Item	Nm	lb-ft	lb-in
Front caliper bleeder screw-vehicles with 2 piston brake caliper	11	-	97
Front caliper bleeder screw-vehicles with 4 piston brake caliper	8	-	71
Front caliper bleeder screw-vehicles with 6 piston brake caliper	19	-	168
Rear caliper bleeder screw-all except SVT Performance Package	11	-	97
Front and rear caliper bleeder screw-SVT Performance Package	14	-	124
Master cylinder brake tube fittings	27.5	-	20

General Specifications

Item	Specification
Front brake disc minimum thickness-vehicles with 2 piston brake caliper	1.122 in (28.5 mm)
Front brake disc minimum thickness-vehicles with 4 piston brake caliper	1.201 in (30.5 mm)
Front brake disc minimum thickness-vehicles with 6 piston brake caliper	1.244 in (31.6 mm)
Front brake disc minimum thickness-SVT Performance Package	1.339 in (34 mm)
Rear brake disc minimum thickness-solid	0.390 in (9.9 mm)
Rear brake disc minimum thickness-vented	0.925 in (23.5 mm)
Rear brake disc minimum thickness-SVT Performance Package	0.945 in (24 mm)
Brake pad minimum thickness	0.118 in (3 mm)
Brake pad maximum taper wear (in any direction)	0.118 in (3 mm)

Specifications

Lubricants, Fluids, Sealers and Adhesives

	Specifications
Motorcraft® DOT 4 LV High Performance Motor Vehicle Brake Fluid / PM-20	WSS-M6C65-A2

Torque Specifications

Item	Nm	lb-ft	lb-in
Front caliper bleeder screw-vehicles with 2 piston brake caliper	11	-	97
Front caliper bleeder screw-vehicles with 4 piston brake caliper	8	-	71
Front caliper bleeder screw-vehicles with 6 piston brake caliper	19	-	168
Rear caliper bleeder screw-all except SVT Performance Package	11	-	97
Front and rear caliper bleeder screw-SVT Performance Package	14	-	124
Master cylinder brake tube fittings	27.5	-	20

General Specifications

Item	Specification
Front brake disc minimum thickness-vehicles with 2 piston brake caliper	1.122 in (28.5 mm)
Front brake disc minimum thickness-vehicles with 4 piston brake caliper	1.201 in (30.5 mm)
Front brake disc minimum thickness-vehicles with 6 piston brake caliper	1.244 in (31.6 mm)
Front brake disc minimum thickness-SVT Performance Package	1.339 in (34 mm)
Rear brake disc minimum thickness-solid	0.390 in (9.9 mm)
Rear brake disc minimum thickness-vented	0.925 in (23.5 mm)
Rear brake disc minimum thickness-SVT Performance Package	0.945 in (24 mm)
Brake pad minimum thickness	0.118 in (3 mm)
Brake pad maximum taper wear (in any direction)	0.118 in (3 mm)

Brake System

Symptom Chart(s)

Symptom Chart: Brake System

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.
REFER to: Diagnostic Methods (100-00 General Information, Description and Operation).

Condition	Possible Sources	Actions
The red brake warning indicator and the yellow ABS warning indicator are illuminated	Diagnostic Trouble Codes (DTCs) in the ABS	CHECK for ABS diagnostic trouble codes (DTCs). REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
The red brake warning indicator is always/never on	• Brake fluid level switch • Parking brake switch • Wiring, terminals or connectors • IPC • BCM	REFER to: Instrumentation, Message Center and Warning Chimes (413-01 Instrumentation, Message Center and Warning Chimes, Diagnosis and Testing).
Vehicle pulls or drifts during braking	• Brake calipers and/or guide pins • Brake flexible hose • Brake pads • Brake discs	INSPECT the brake system components. INSTALL new components as necessary.
	Tires	REFER to: Wheels and Tires (204-04A Wheels and Tires, Diagnosis and Testing).
	Suspension component(s) and/or wheel alignment	REFER to: Suspension System (204-00 Suspension System - General Information, Diagnosis and Testing).
Brake pedal goes down fast or eases down slowly	Brake fluid leaks and/or air in the system	INSPECT the system for leaks. REPAIR as necessary. BLEED the system. REFER to: Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).
	Brake master cylinder	CARRY OUT the Brake Master Cylinder - Bypass Condition Component Test.
	HCU	REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
	Brake pedal	INSPECT the brake pedal simulator spring, cam and interface-to-booster. INSTALL a new brake pedal and bracket as necessary.

Condition	Possible Sources	Actions
Brakes lock up under light brake pedal force	• Brake pads • Brake flexible hose • Brake disc • Brake calipers and/or guide pins	INSPECT the brake system components. INSTALL new components as necessary.
	ABS	REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
Excessive brake pedal travel (low/spongy pedal)	Brake fluid leaks and/or air in the system	INSPECT the system for leaks. REPAIR as necessary. BLEED the system. REFER to: Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).
	Brake master cylinder	CARRY OUT the Brake Master Cylinder - Bypass Condition Component Test.
	Brake calipers and/or guide pins	INSPECT the brake calipers and guide pins. INSTALL new components as necessary.
	Brake flexible hose	INSPECT the brake flexible hoses during brake application. INSTALL a new brake hose as necessary. REFER to: Front Brake Flexible Hose (206-03 Front Disc Brake, Removal and Installation). REFER to: Front Brake Flexible Hose - Vehicles With: SVT Performance Package (206-03 Front Disc Brake, Removal and Installation). REFER to: Rear Brake Flexible Hose (206-04 Rear Disc Brake, Removal and Installation). REFER to: Rear Brake Flexible Hose - Vehicles With: SVT Performance Package (206-04 Rear Disc Brake, Removal and Installation).
Erratic brake pedal travel	Brake pedal	INSPECT the brake pedal for binding, obstructions and correct interface to booster rod. REPAIR as necessary. CHECK the brake pedal fasteners for correct torque. REFER to: Brake Pedal and Bracket - 6-Speed Manual Transmission - 3160/6-Speed Manual Transmission - MT82 (206-06 Hydraulic Brake Actuation, Removal and Installation). REFER to: Brake Pedal and Bracket - 6-Speed Automatic Transmission - 6R80 (206-06 Hydraulic Brake Actuation, Removal and Installation).
	ABS	REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
Brake drag	Parking brake component	INSPECT the parking brake system. INSTALL new components as necessary.
	• Brake caliper and/or guide pins • Brake flexible hose • Brake booster	INSPECT the brake system components. INSTALL new components as necessary.
	Brake master cylinder	CARRY OUT the Brake Master Cylinder - Compensator Port Component Test.

Condition	Possible Sources	Actions
	Hydraulic Control Unit (HCU)	REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
	Stoplamp switch	VERIFY correct installation of the stoplamp switch. REFER to: Stoplamp Switch (417-01 Exterior Lighting, Removal and Installation).
Excessive brake pedal effort	• Insufficient vacuum for brake booster operation • Brake booster manifold vacuum hose • Brake booster • Brake booster check valve • Brake booster vacuum pump	CARRY OUT the Brake Booster Component Test in this section.
	Brake pads	INSPECT the brake pads.INSTALL new components as necessary. REFER to: Brake Pads - Vehicles With: 2-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: 4-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: 6-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: SVT Performance Package (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads (206-04 Rear Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: SVT Performance Package (206-04 Rear Disc Brake, Removal and Installation).

Symptom Chart: NVH

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.
REFER to: Diagnostic Methods (100-00 General Information, Description and Operation).

Condition	Possible Sources	Actions
Vibration when the brakes are applied	• Brake disc(s)/ • Suspension components	GO to Pinpoint Test A
Brake vibration/shudder — occurs when the brake pedal is released	Brake drag	REFER to Symptom Chart: Brake System

Condition	Possible Sources	Actions
Rattling noise	• Caliper guide pins or guide pin bolts • Missing or damaged anti-rattle clips or springs • Loose brake disc shield	• INSPECT the caliper guide pins and guide pin bolts. INSTALL new components as necessary. • INSPECT the brake pads for missing clips or broken springs. INSTALL new components as necessary. • TIGHTEN the brake disc shield bolts to specification. REFER to: Brake Pads - Vehicles With: 2-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: 4-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: 6-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: SVT Performance Package (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads (206-04 Rear Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: SVT Performance Package (206-04 Rear Disc Brake, Removal and Installation).
Squealing noise — occurs on first (morning) brake application	Brake pads	Acceptable condition. Caused by humidity and low brake pad temperature.
Squealing noise — a continuous squeal	Brake pads	INSPECT the brake pads. INSTALL new components as necessary. REFER to: Brake Pads - Vehicles With: 2-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: 4-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: 6-Piston Brake Caliper (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: SVT Performance Package (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads (206-04 Rear Disc Brake, Removal and Installation). REFER to: Brake Pads - Vehicles With: SVT Performance Package (206-04 Rear Disc Brake, Removal and Installation).
Squealing noise — an intermittent squeal	Brake pads	Acceptable condition. Caused by cold, heat, water, mud or snow.
Groaning noise — occurs at low speeds with brake lightly applied (creeping)	Brake pads	Acceptable condition.
Grinding/moaning noise — continuous	• Brake pads • Brake disc	INSPECT the brake pads, brake discs and attaching hardware for damage. VERIFY brake components are within specifications. INSTALL new components as necessary.

Pinpoint Tests

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. REFER to: Diagnostic Methods (100-00 General Information, Description and Operation).

Vibration When Brakes Are Applied

Normal Operation and Fault Conditions

During moderate to heavy braking, noise from the HCU and pulsation in the brake pedal can be observed. Pedal pulsation coupled with noise during heavy braking or on loose gravel, bumps, wet or snowy surfaces is acceptable and indicates correct functioning of the ABS. Pedal pulsation or steering wheel nibble when the brakes are applied (frequency is proportioned to the vehicle speed) indicates a concern with a brake or suspension component.

PINPOINT TEST A : VIBRATION WHEN BRAKES ARE APPLIED

A1 ROAD TEST THE VEHICLE -LIGHT BRAKING

- Road test the vehicle. Warm the brakes by slowing the vehicle from 80 to 32 km/h (50 to 20 mph) using light brake force. At highway speeds of 89-97 km/h (55-60 mph), apply the brake using light pedal force.

Is there a vibration/shudder felt in the steering wheel, seat or brake pedal?

Yes	GO to A4
No	GO to A2

A2 ROAD TEST THE VEHICLE -MODERATE TO HEAVY BRAKING

- Road test the vehicle. At highway speeds of 89-97 km/h (55-60 mph), apply the brake using a moderate to heavy pedal force.

Is there a vibration/shudder?

Yes	GO to A3
No	The concern is not present at this time.

A3 CHECK ABS (ANTI-LOCK BRAKE SYSTEM) OPERATION

NOTE: *During moderate to heavy braking, noise from the Hydraulic Control Unit (HCU) and pulsation in the brake pedal can be observed. Pedal pulsation coupled with noise during heavy braking or on loose gravel, bumps, wet or snowy surfaces is acceptable and indicates correct operation of the ABS. Pedal pulsation or steering wheel nibble with the frequency proportional to vehicle speed indicates a concern with a brake or suspension component.*

- Road test the vehicle and apply the brakes on a dry, firm surface, then apply the brakes on a wet, snowy or loose surface (such as gravel).

Is the vibration/shudder only present on a wet, snowy or loose surface?

Yes	This is a normal operating condition of the ABS.
No	GO to A5

A4 ISOLATE BRAKE VIBRATION

NOTE: *This test step is not applicable to vehicles with drum-in-hat type or electronic parking brakes. For vehicles with drum-in-hat or electronic parking brakes, proceed to the next test step. For all other vehicles, apply the parking brake to identify if the problem is in the front or rear brake.*

- Apply the parking brake to identify if the problem is in the front or rear brake. At highway speeds of 89-97 km/h (55-60 mph), lightly apply the parking brake until the vehicle slows down. Release the parking brake immediately after the test.

Is there a vibration/shudder?

Yes	GO to A7
No	GO to A5

A5 CHECK THE FRONT SUSPENSION

- Check the front suspension.

Are all the suspension components in satisfactory condition?

Yes	GO to A6
No	REPAIR or INSTALL new components as necessary. TEST the system for normal operation.

A6 CHECK THE FRONT BRAKE DISCS

- Inspect the front brake discs. MACHINE or INSTALL new brake discs as necessary.
  REFER to: Brake Disc Machining (206-00 Brake System - General Information, General Procedures).
  REFER to: Brake Disc (206-03 Front Disc Brake, Removal and Installation).
  REFER to: Brake Disc - Vehicles With: SVT Performance Package (206-03 Front Disc Brake, Removal and Installation).
- Road test the vehicle.

Is the vibration/shudder present?

Yes	GO to A7
No	The concern has been repaired.

A7 CHECK THE REAR SUSPENSION

- Check the rear suspension.

Are all the suspension components in satisfactory condition?

Yes	INSPECT the rear brake discs. MACHINE or INSTALL new brake discs as necessary. REFER to: Brake Disc Machining (206-00 Brake System - General Information, General Procedures). REFER to: Brake Disc (206-04 Rear Disc Brake, Removal and Installation). REFER to: Brake Disc - Vehicles With: SVT Performance Package (206-04 Rear Disc Brake, Removal and Installation).
No	REPAIR or INSTALL new components as necessary. TEST the system for normal operation.

Component Test- Brake Booster

1. Disconnect the brake booster vacuum sensor/check valve from the brake booster and connect a suitable vacuum/pressure tester to the booster side of the vacuum sensor/check valve.

2. Apply the parking brake, start the engine and place the transmission in NEUTRAL.
    - Allow the engine to reach normal operating temperature.

3. Verify that vacuum is available at the vacuum sensor/check valve with engine running at normal idle speed.
    - The vacuum gauge should read between 51-74 kPa (15-22 in-Hg).
    - If specified vacuum is available, stop the engine, connect the vacuum sensor/check valve and continue with Step 5.
    - If specified vacuum is not available, continue with Step 4.

4. Disconnect the vacuum sensor/check valve from the vacuum hose and verify that the specified vacuum is available at the hose with the engine at idle speed and the transmission in NEUTRAL.
    - If specified vacuum is available, stop the engine, install a new check valve and continue with Step 5.
    - For vehicles equipped with a brake vacuum pump, if specified vacuum is not available, inspect the vacuum hose and install new as necessary. If the vacuum hose is ok, install a new vacuum pump.
    - For vehicles not equipped with a brake vacuum pump, if specified vacuum is not available, stop the engine, connect the vacuum hose to the check valve and diagnose the no/low vacuum condition. REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing).

5. Apply the brake pedal several times to exhaust all vacuum from the system.

6. Apply the brake pedal and hold it in the applied position. Start the engine and verify that the brake pedal moves downward after the engine starts.
    - If the brake pedal moves, the brake booster is operating correctly.
    - If the brake pedal does not move, install a new brake booster.
      REFER to: Brake Booster - 2.3L EcoBoost (201kW/273PS) (206-07 Power Brake Actuation, Removal and Installation).
      REFER to: Brake Booster - 3.7L Duratec (227kW/301PS) (206-07 Power Brake Actuation, Removal and Installation).
      REFER to: Brake Booster - 5.0L 32V Ti-VCT/5.2L 32V Ti-VCT (206-07 Power Brake Actuation, Removal and Installation).

7. Operate the engine a minimum of 20 seconds at idle. Stop the engine and let the vehicle stand for 10 minutes, then apply the brake pedal. The brake pedal feel should be the same as that noted with the engine operating.
    - If the brake pedal feels hard (no power assist), install a new brake booster vacuum sensor/check valve and retest.
    - If condition still exists, install a new brake booster.
      REFER to: Brake Booster - 2.3L EcoBoost (201kW/273PS) (206-07 Power Brake Actuation, Removal and Installation).
      REFER to: Brake Booster - 3.7L Duratec (227kW/301PS) (206-07 Power Brake Actuation, Removal and Installation).
      REFER to: Brake Booster - 5.0L 32V Ti-VCT/5.2L 32V Ti-VCT (206-07 Power Brake Actuation, Removal and Installation).

    - If the brake pedal feels the same as noted with the engine operating, the vacuum sensor/check valve is functioning properly.

Component Test- Brake Master Cylinder - Bypass Condition

1. Inspect the master cylinder.

2. Disconnect the brake tubes from the master cylinder.

3. **NOTE:** *Make sure the outlet port plugs do not show signs of leakage.*

   Plug the outlet ports of the master cylinder.

4. Lightly apply the brakes and hold for 10 seconds. Release the brakes and then reapply with heavy force. If brake pedal height cannot be maintained, the brake master cylinder has an internal leak and a new brake master cylinder must be installed.

- If brake pedal height is maintained, reinstall brake tubes and tighten to specification.
  REFER to: Brake Master Cylinder (206-06 Hydraulic Brake Actuation, Removal and Installation).
  After installation, bleed the brake system.REFER to: Brake System Pressure Bleeding (206-00 Brake

System - General Information, General Procedures).

Component Test- Brake Master Cylinder - Compensator Port

1. Inspect the master cylinder.
2. REFER to: Jacking and Lifting - Overview (100-02 Jacking and Lifting, Description and Operation).
3. Apply and release the brakes.
4. With the brakes released, attempt to rotate each wheel and check for any brake drag.

- If an excessive amount of brake drag exists at multiple wheels, continue to Step 5.
- If an excessive amount of brake drag exists at only one wheel, it indicates a possible seized brake caliper, brake wheel cylinder or parking brake component. Repair or install new components as necessary.

5. Check the brake stoplamp switch and the brake pedal free play to verify the brake pedal is not partially applied.
6. Loosen the brake master cylinder nuts and position the brake master cylinder away from the brake booster.
7. With the brakes released, attempt to rotate each wheel and check for any brake drag.

- If the brake drag is no longer present, install a new brake booster.
  REFER to: Brake Booster - 2.3L EcoBoost (201kW/273PS) (206-07 Power Brake Actuation, Removal and Installation).
  REFER to: Brake Booster - 3.7L Duratec (227kW/301PS) (206-07 Power Brake Actuation, Removal and Installation).
  REFER to: Brake Booster - 5.0L 32V Ti-VCT/5.2L 32V Ti-VCT (206-07 Power Brake Actuation, Removal and Installation).
- If the brake drag is still present, install a new master cylinder.
  REFER to: Brake Master Cylinder (206-06 Hydraulic Brake Actuation, Removal and Installation).

Brake Disc Machining

Base Part Number: 1102

Repair

NOTE: ***On-Vehicle Brake Lathe Training Videos***

1. Vehicle preparation.

Click here to view a video version of this procedure.

2. Mounting the machine.

Click here to view a video version of this procedure.

3. Lateral runout adjustment.

Click here to view a video version of this procedure.

4. Making the cut.

Click here to view a video version of this procedure.

5. Cutting the opposite side.

Click here to view a video version of this procedure.

6. Lathe maintenance.

Click here to view a video version of this procedure.

Repair

NOTE: ***On-Vehicle Brake Disc Machining***

NOTE: *Do not use a bench lathe to machine the brake discs. Use an on-vehicle brake lathe only. Read the entire operating manual and/or view the video shipped with the lathe before installing, operating or repairing the lathe.*

NOTE: *Lateral runout and disc thickness variation measurements are not required because correct adjustment of the on-vehicle brake lathe will make sure that these dimensions are within specification.*

1. Refer to: Wheel and Tire (204-04A Wheels and Tires, Removal and Installation).
2. **NOTICE: Do not allow the caliper to hang from the brake hose or damage to the hose may occur.**

   NOTE: *It is not necessary to disconnect the brake hose from the brake caliper.*

   Remove the bolts and position the brake caliper or brake caliper and anchor plate assembly aside, as required. Support the brake caliper using mechanic's wire.
3. **NOTICE: On some vehicle applications the axle on the opposing side may rotate during the machining process. On these applications the brake disc must be secured or damage may occur.**

   If necessary, secure the opposing brake disc by installing 2 wheel nuts finger tight.
4. - Install the hub adapter using four wheel nuts on a 4, 7 or 8-stud wheel hub.
   - Install the hub adapter using five wheel nuts on a 5 or 10-stud wheel hub.
   - Install the hub adapter using six wheel nuts on a 6-stud wheel hub.
5. Install the cutting lathe.
6. **NOTE:** *An on-vehicle brake lathe with an automatic runout adjustment feature is preferred. However, if the lathe is not self adjusting, the lathe oscillation must be adjusted using a dial indicator. The total indicated runout target is 0.000 mm (0.000 in). The maximum indicated runout should be no more than 0.050 mm (0.002 in). If the runout adjustment (automatic or manual) is carried out correctly prior to machining, then the final brake disc runout will be within specification and a runout measurement is not necessary after machining.*

   If the lathe is not self-adjusting, adjust the lathe oscillation using a dial indicator.
7. Center the cutting head, adjust the cutting bits and install the chip deflector/silencer.
8. **NOTE:** *The depth of the cut should be between 0.10 and 0.40 mm (0.004 and 0.015 in). Lighter cuts will cause the bit to heat up and wear faster. Heavier cuts will cause poor brake disc surface finish.*

   Machine the brake disc.
9. Remove the lathe and the silencer.
10. Remove the wheel nuts and hub adapter.
11. Remove the metal shavings.
12. Measure the brake disc thickness. If the measurement is below the minimum specification, install a new brake disc.
13. **NOTE:** *It is not required to install new brake pads if friction material is within specifications.*

    Position the brake caliper or brake caliper and anchor plate assembly and install the bolts.
    Refer to: Brake Caliper Anchor Plate (206-03 Front Disc Brake, Removal and Installation).
    Refer to: Brake Caliper Anchor Plate (206-04 Rear Disc Brake, Removal and Installation).
14. Refer to: Wheel and Tire (204-04A Wheels and Tires, Removal and Installation).

Brake System Pressure Bleeding

Special Tool(s) / General Equipment

Brake/Clutch System Pressure Bleeder/Filler
Fluid Container

Bleeding

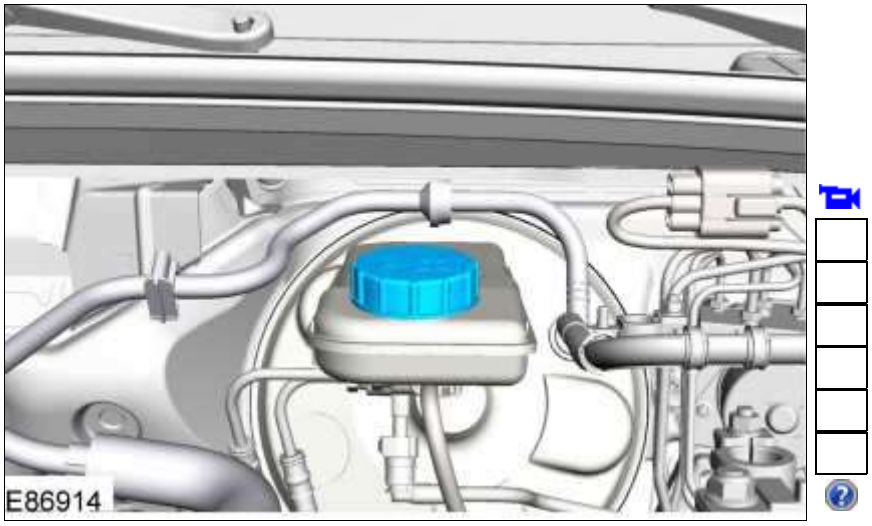
All vehicles

NOTICE: If the fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

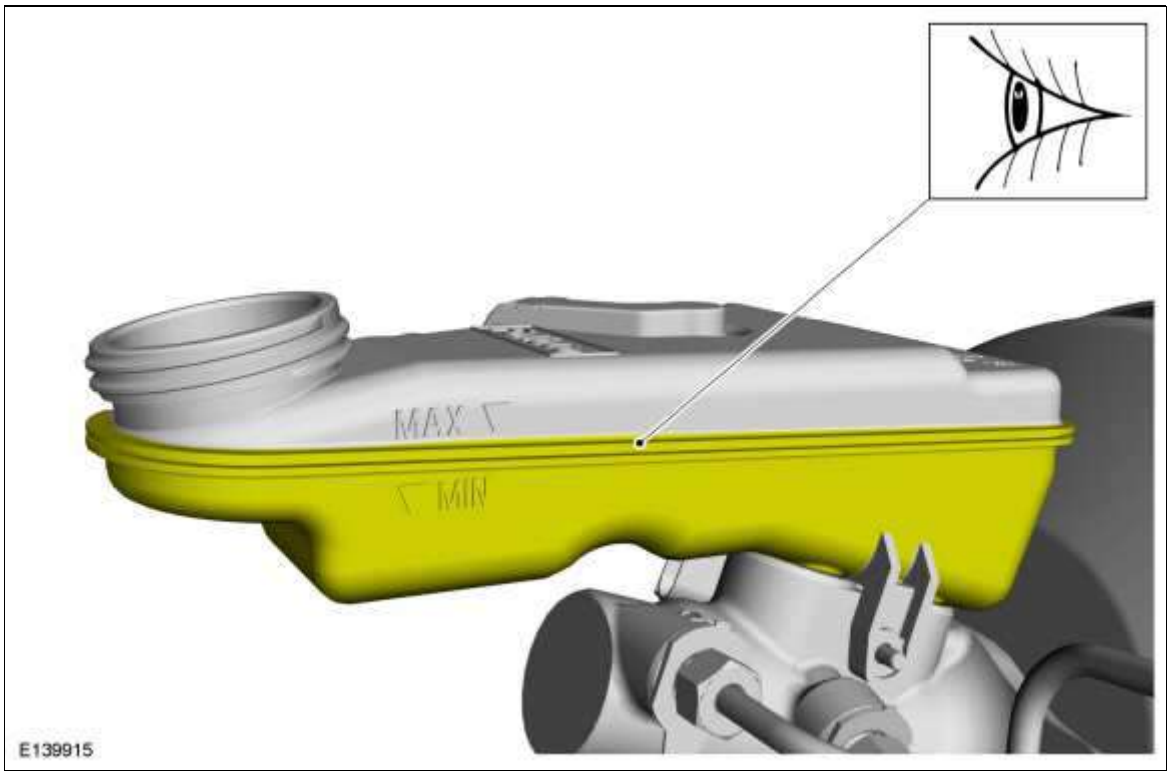
NOTE: *The HCU bleeding procedure and a second brake system pressure bleed must be carried out if a new HCU has been installed.*

1. **NOTE:** *Make sure the area around the master cylinder cap is clean and free of foreign material.*

   Remove the brake fluid reservoir cap.



2. Make sure the fluid reservoir is filled with clean specified brake fluid.
   Refer to: Specifications (206-00 Brake System - General Information, Specifications).



3. 1. **NOTE:** *Master cylinder pressure bleeder adapter tools are available from various manufacturers of pressure bleeding equipment. Follow the instructions of the manufacturer when installing the adapter.*

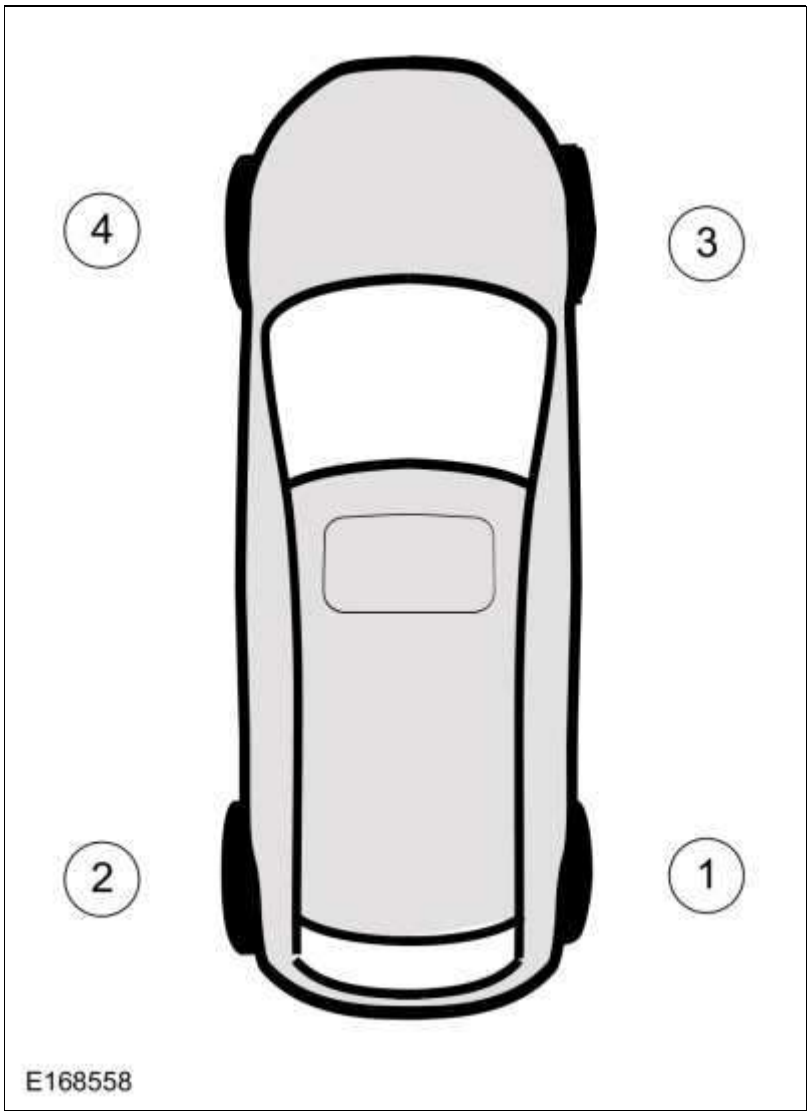
   Install the bleeder adapter to the brake master cylinder reservoir and attach the bleeder tank hose to the fitting on the adapter.
   Use the General Equipment: Brake/Clutch System Pressure Bleeder/Filler

   2. **NOTE:** *Make sure the bleeder tank contains enough clean, specified brake fluid to complete the bleeding operation.*

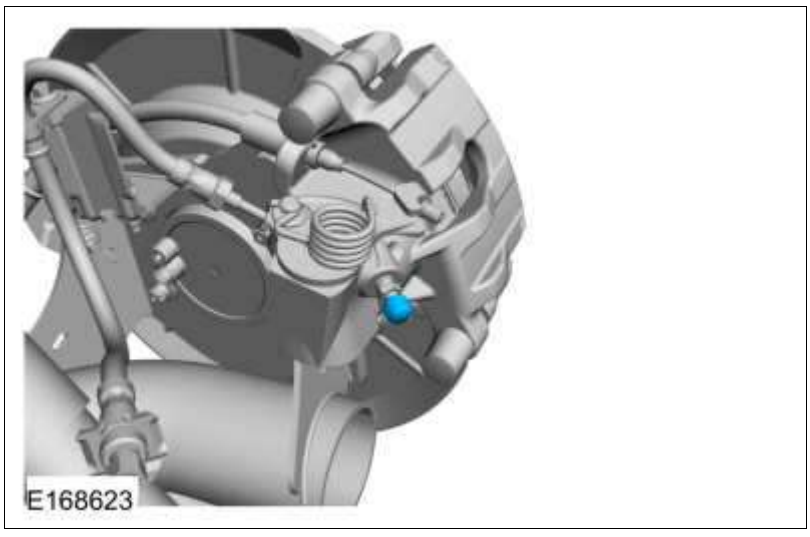
   Open the valve on the bleeder tank and apply 207-345 kPa (30-50 psi) to the brake system.

4. With the vehicle in NEUTRAL, position it on a hoist.
   Refer to: Jacking and Lifting - Overview (100-02 Jacking and Lifting, Description and Operation).

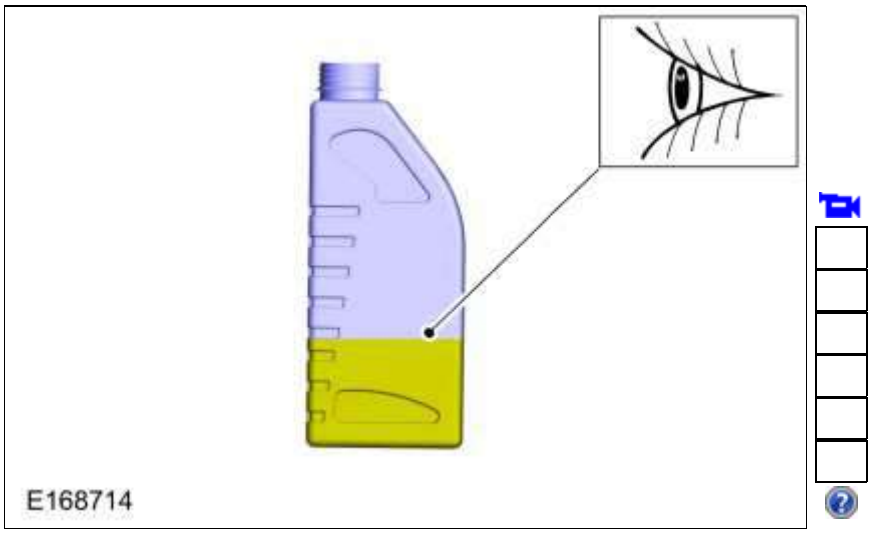
5. Bleeding steps must be followed in the order indicated in the graphic. For vehicles equipped with 4 or 6 piston brake calipers, bleed the inner bleeder screw first, followed by the outer bleeder screw.



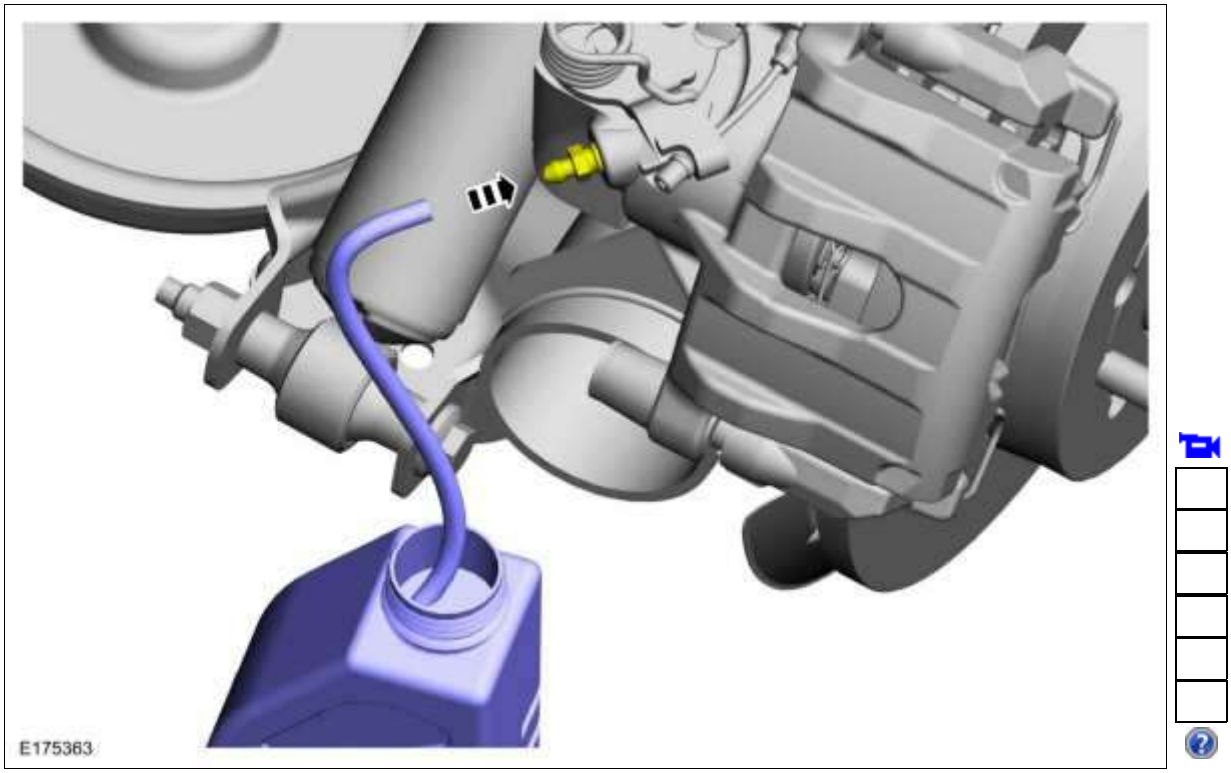
6. If equipped, remove the bleeder screw cap.



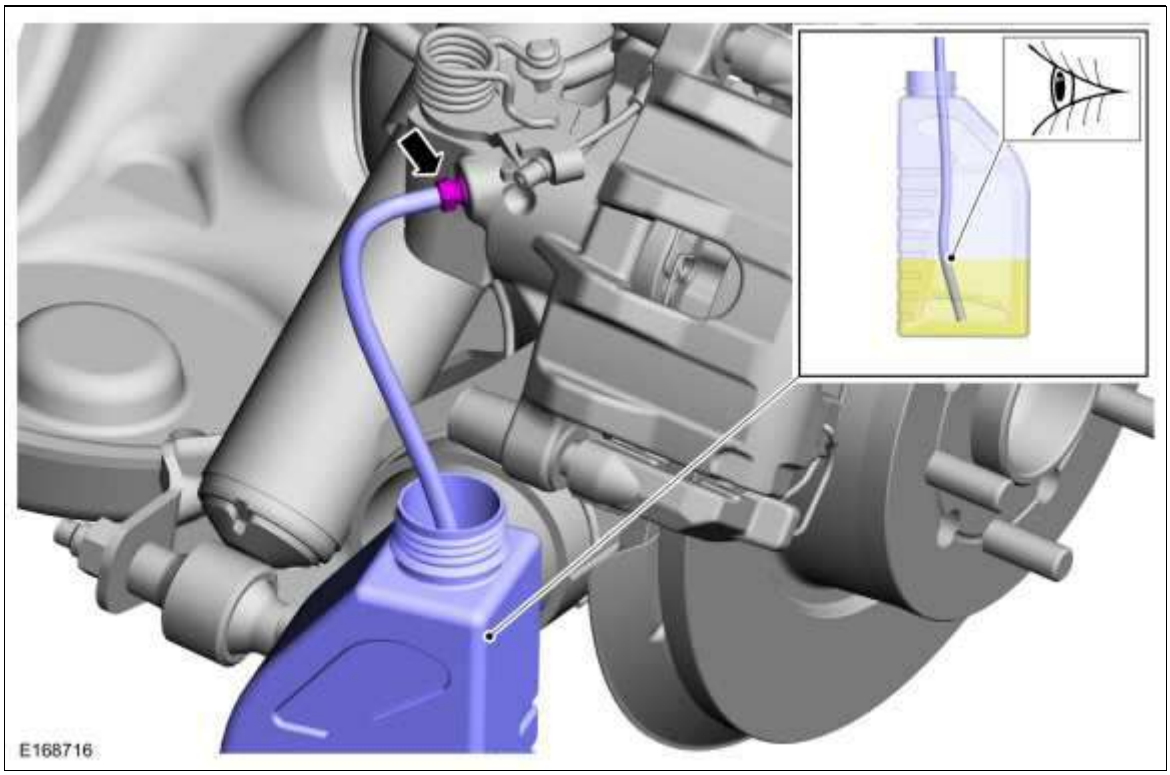
7. Partially fill a clean brake fluid container with clean specified brake fluid.
   Refer to: Specifications (206-00 Brake System - General Information, Specifications).
   Use the General Equipment: Fluid Container



8. Submerge a hose into the brake fluid in the container and connect the hose to bleeder screw.



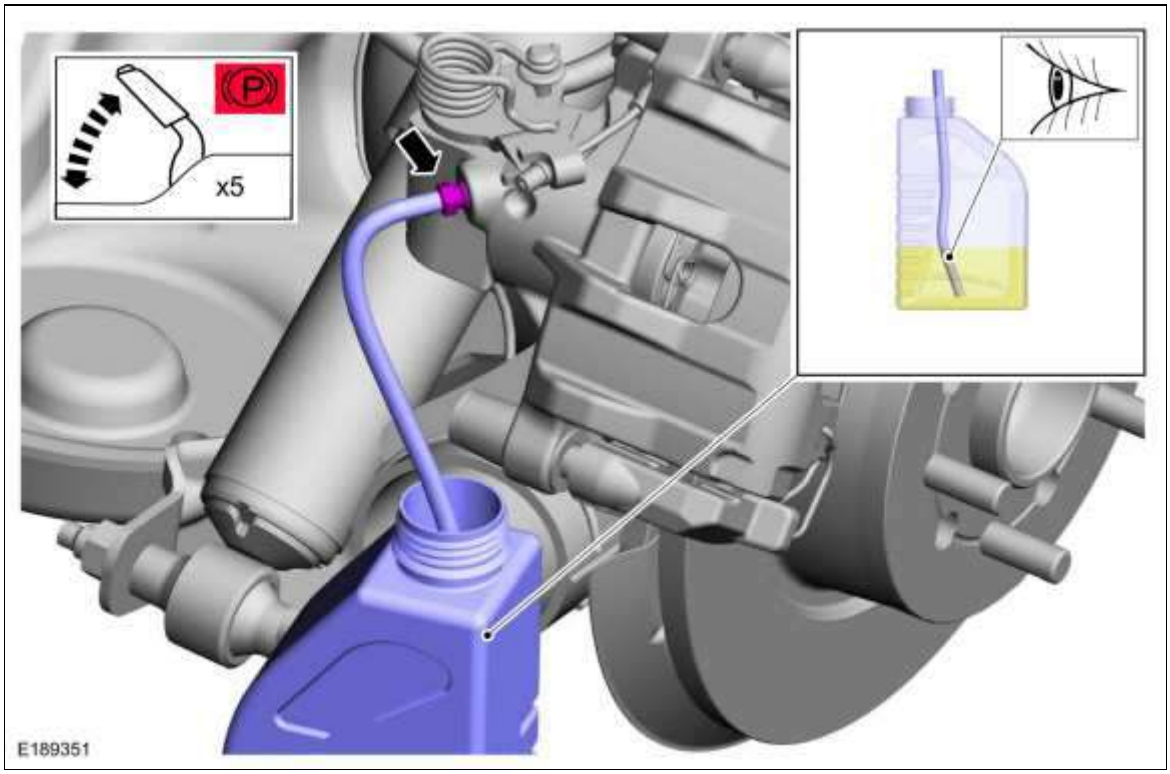
9. 1. Loosen the bleeder screw.
   Loosen:
   : 180°
2. Leave open until clear, bubble-free brake fluid flows, then tighten the bleeder screw.



Vehicles with rear integral parking brake calipers

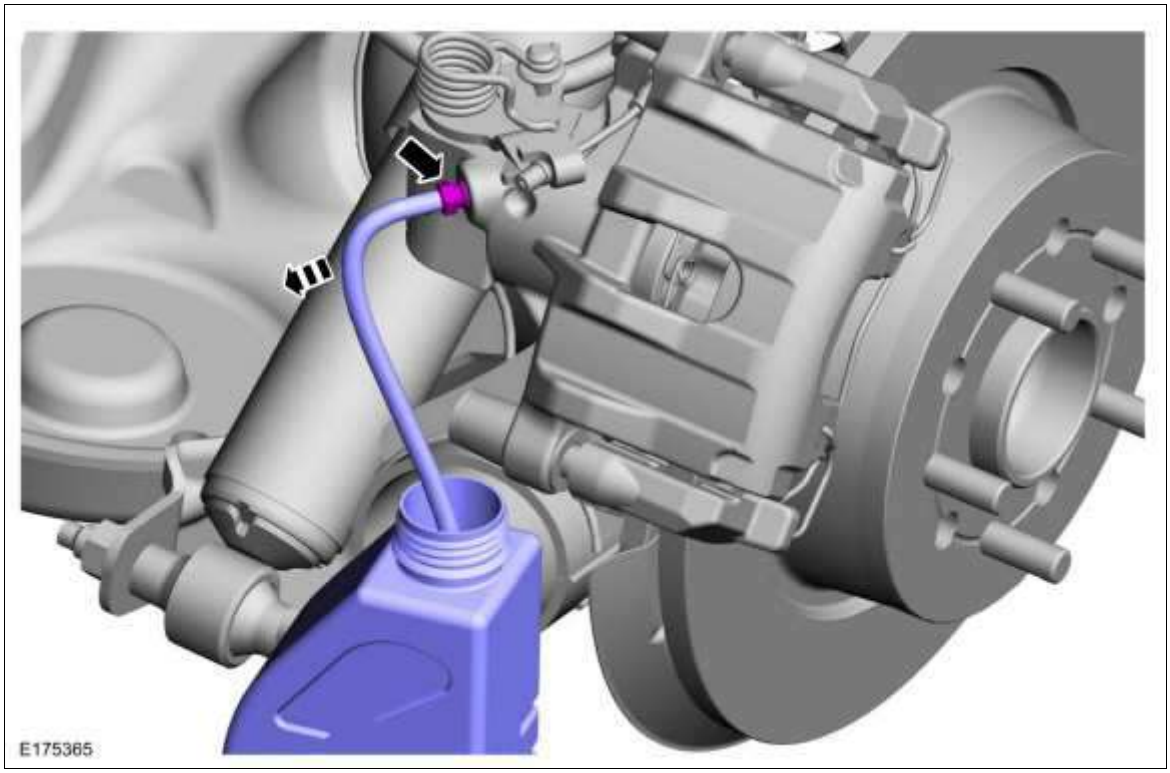
10. **NOTE:** *Due to the complexity of the fluid path within the rear integral parking brake calipers, it is necessary to apply and release the parking brake during the bleed procedure.*

    1. Apply and release the parking brake 5 times.
    2. Loosen the bleeder screw.
       Loosen: 180°
    3. Leave open until clear, bubble-free fluid flows and then tighten the bleeder screw.
    4. Repeat as necessary.

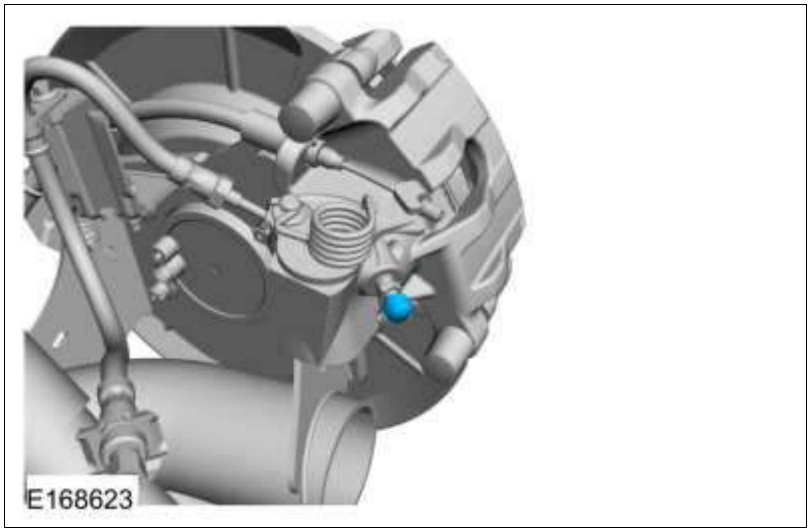


All vehicles

11. 1. Tighten the bleeder screw to specification abd remove the hose and brake fluid container.
Refer to: Specifications (206-00 Brake System - General Information, Specifications).



12. If equipped, install the bleeder screw cap.



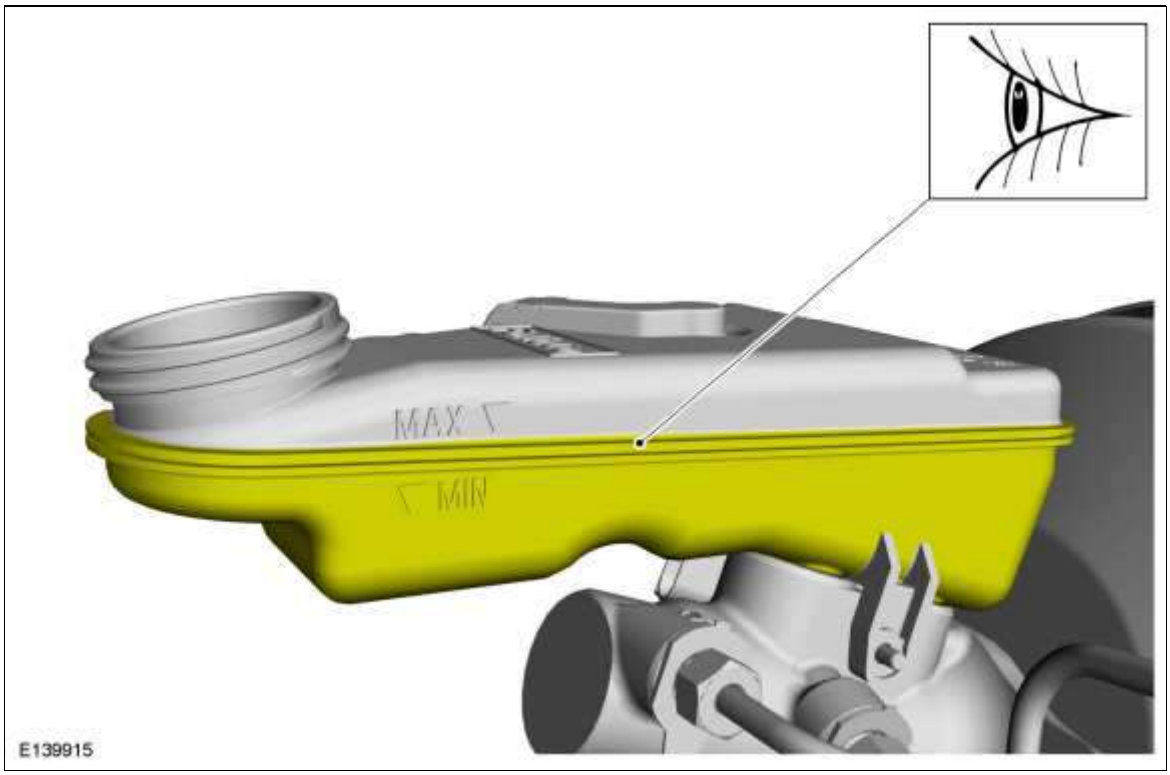
13. **NOTE:** *For vehicles equipped with 4 or 6 piston brake calipers, bleed the inner bleeder screw first, followed by the outer bleeder screw.*

Repeat steps 5-12 at the remaining wheel ends.

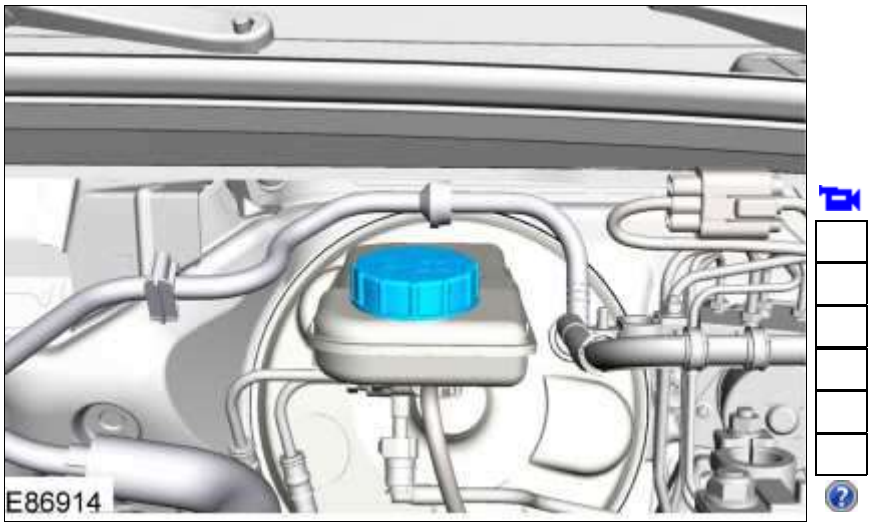
14. Lower the vehicle.

15. Close the bleeder tank valve and release the pressure.
Remove the General Equipment: Brake/Clutch System Pressure Bleeder/Filler

16. Fill the reservoir with clean, specified brake fluid.
Refer to: Specifications (206-00 Brake System - General Information, Specifications).



17. Install the brake fluid reservoir cap.



Vehicles with new hydraulic control unit (HCU) installed

NOTE: *The HCU bleeding procedure and a second brake system pressure bleed must be carried out if a new HCU has been installed.*

18. Using the diagnostic scan tool, follow the ABS Service Bleed instructions.

19. Repeat brake system pressure bleeding steps.

Component Bleeding

Special Tool(s) / General Equipment

Master Cylinder Bleeding Set

Bleeding

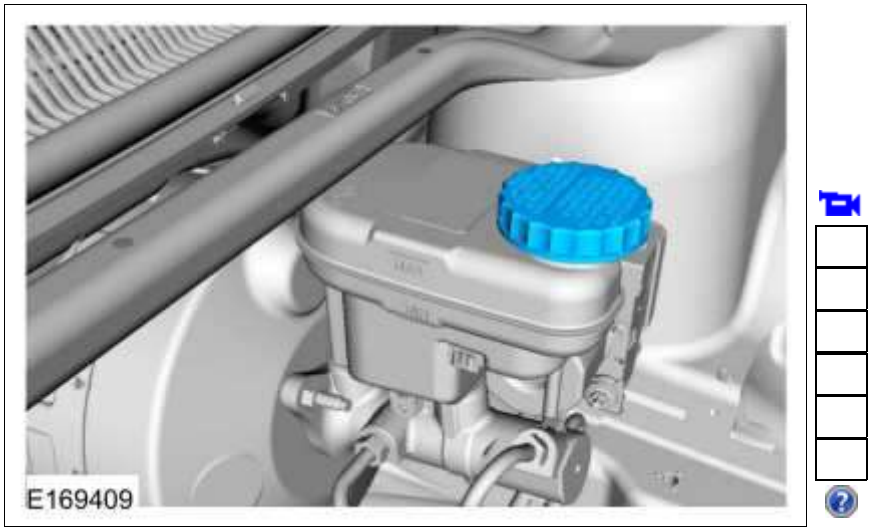
NOTICE: If the fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

Master Cylinder

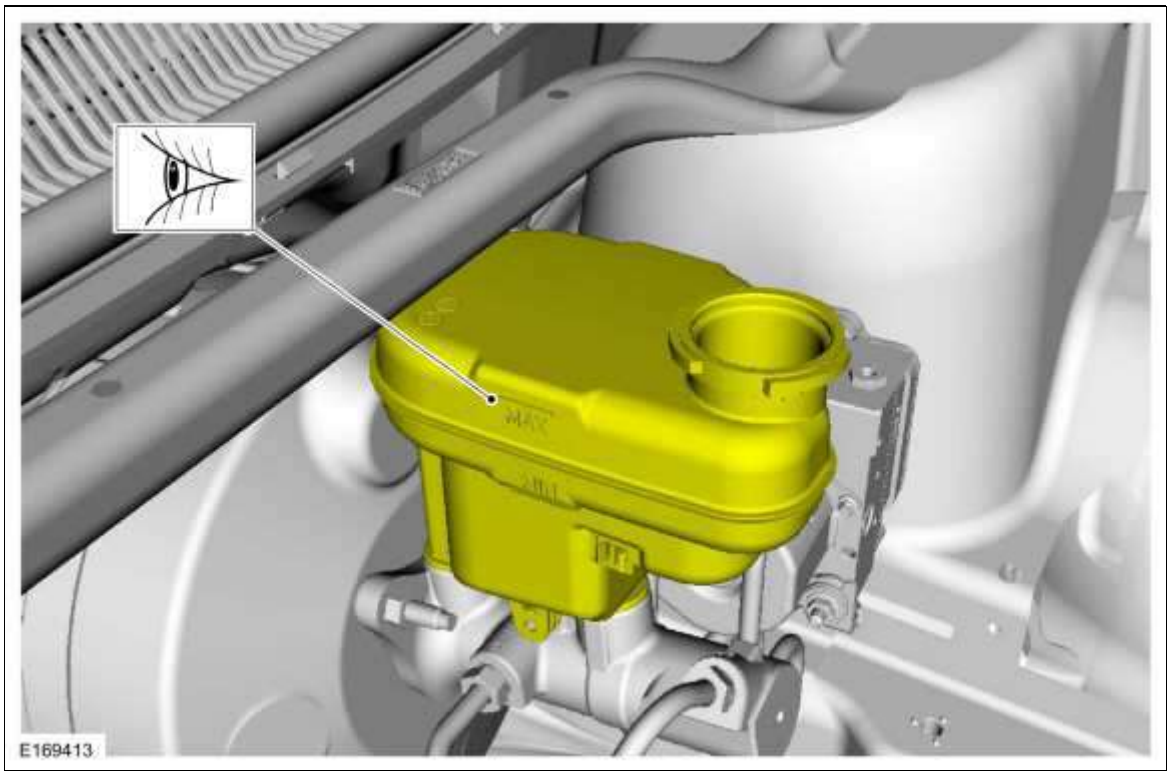
NOTE: *When a new brake master cylinder has been installed, it should be primed to prevent air from entering the system.*

1. **NOTE:** *Make sure the area around the master cylinder cap is clean and free of foriegn material.*

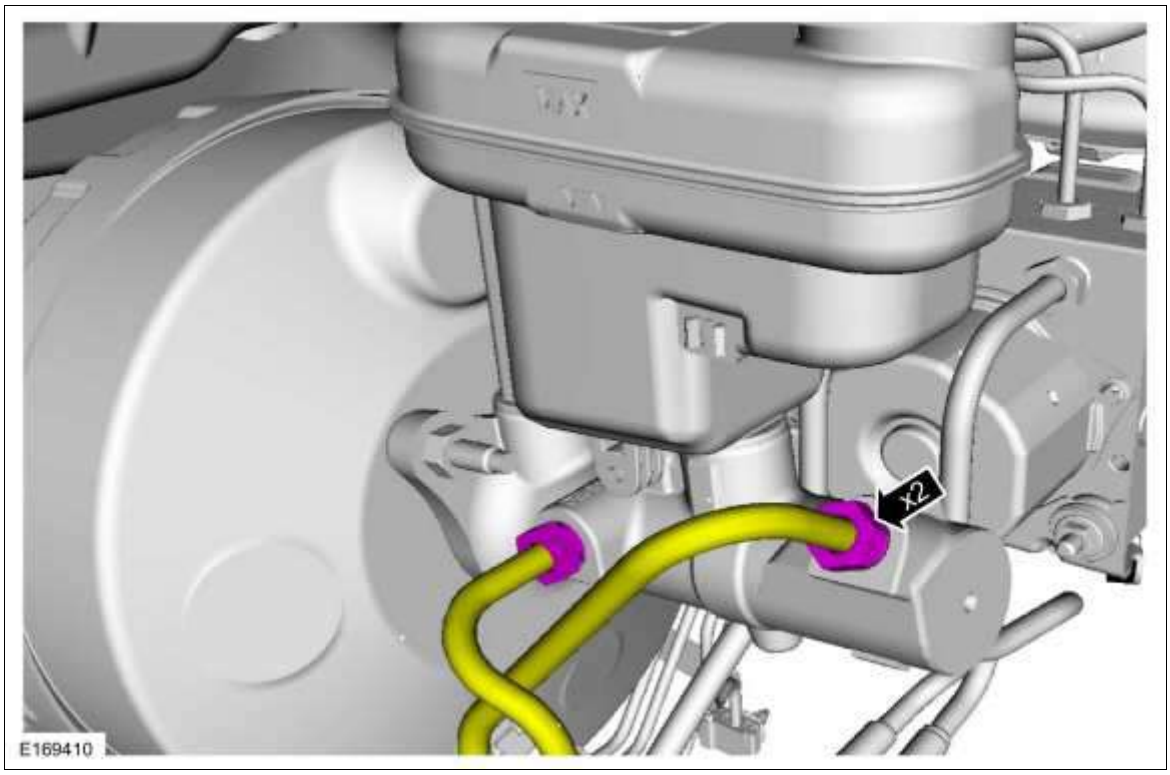
   Remove the brake fluid reservoir cap.



2. Fill the reservoir with clean, specified brake fluid.
   Refer to: Specifications (206-00 Brake System - General Information, Specifications).

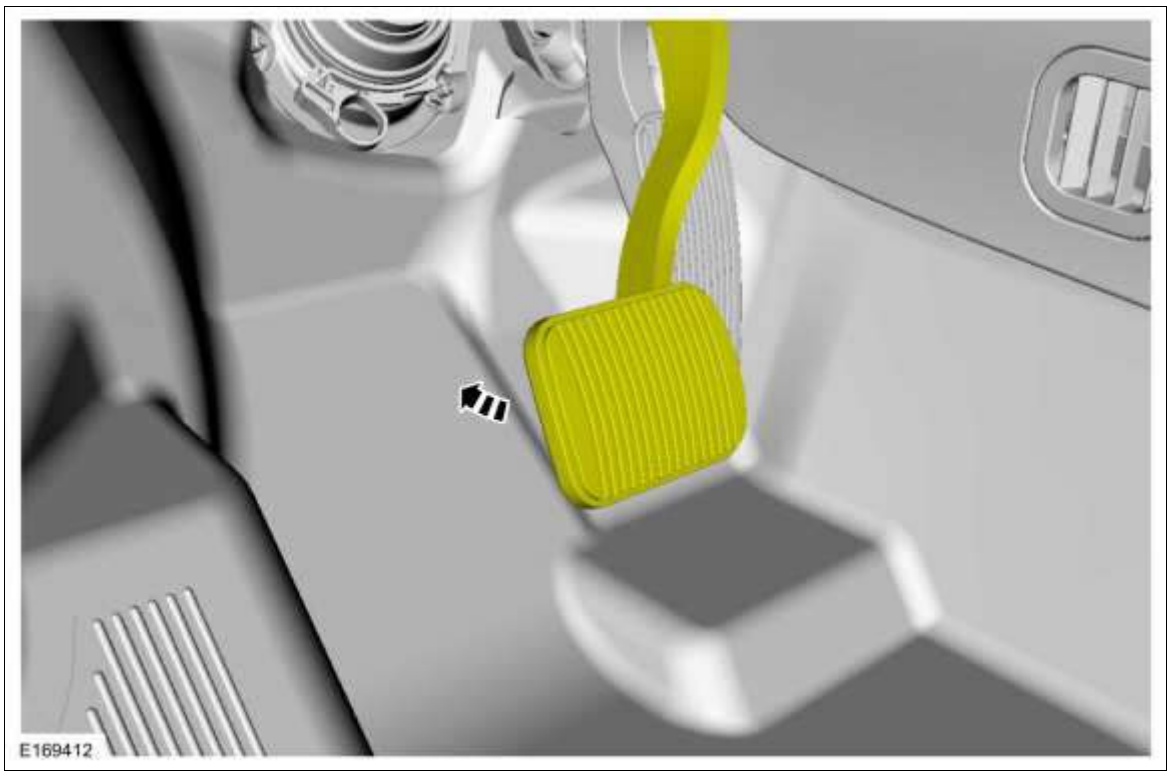


3. Loosen and remove the brake tube fittings.



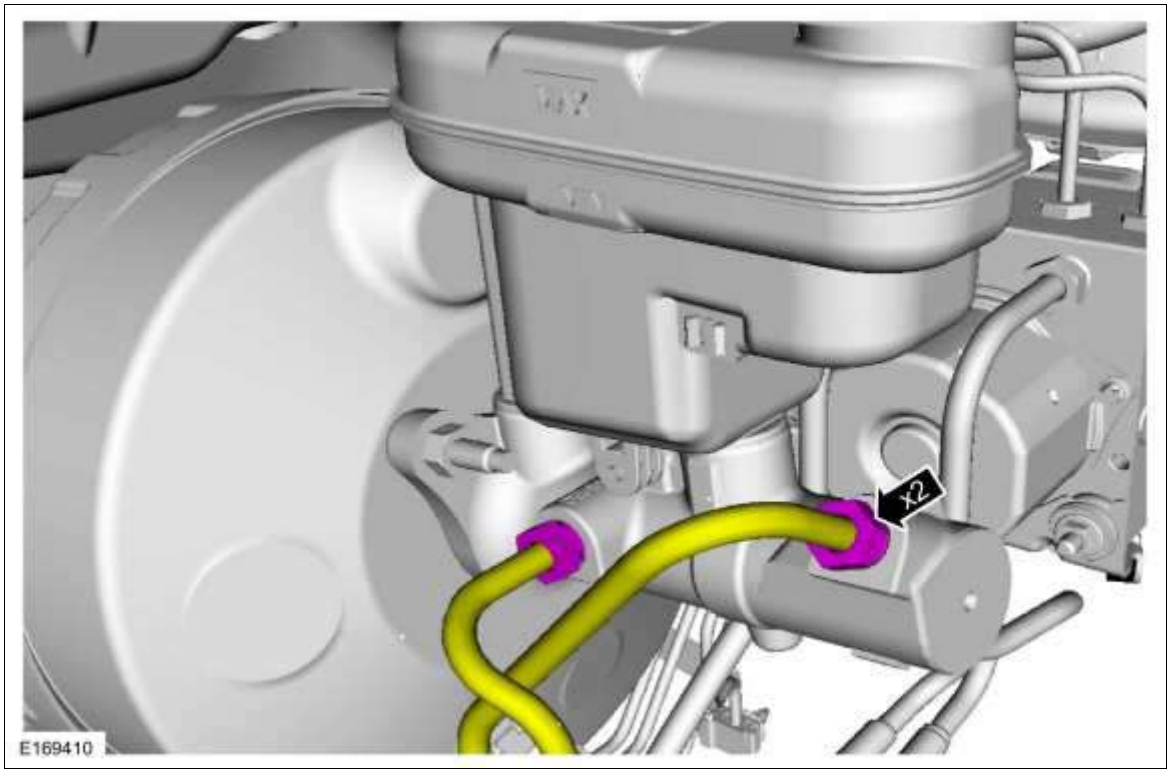
4. Install the master cylinder bleeding set.
   Use the General Equipment: Master Cylinder Bleeding Set

5. Have an assistant pump the brake pedal slowly until clear bubble free fluid flows from the brake tubes.

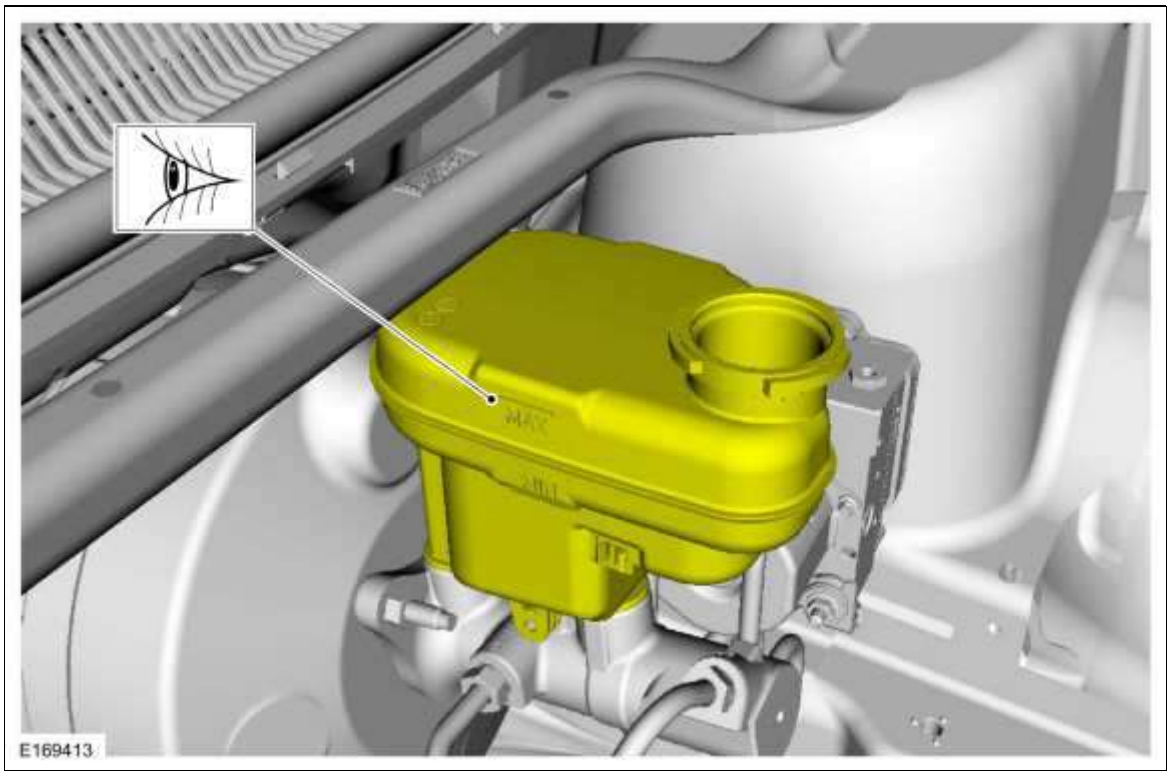


6. Remove the master cylinder bleeding set.
   Use the General Equipment: Master Cylinder Bleeding Set

7. Tighten the brake tube fittings.
   Refer to: Specifications (206-00 Brake System - General Information, Specifications).



8. Fill the reservoir with clean, specified brake fluid.
   Refer to: Specifications (206-00 Brake System - General Information, Specifications).



9. Refer to: Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).

Brake Caliper, Wheel Cylinder, Brake Hose or Brake Tube

10. **NOTE:** *Pressure bleeding the brake system is required anytime a hydraulic brake system component has been disconnected.*

    Refer to: Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).