

SUSPENSION

Rear Suspension - Canyon, Colorado

SPECIFICATIONS

FASTENER SPECIFICATIONS

Application	Specification	
	Metric	English
Rear Spring Front Mounting Nut	240 N.m	177 lb ft
Rear Spring Shackle Nuts	160 N.m	118 lb ft
Rear Shock Absorber Upper Bracket Bolt	115 N.m	85 lb ft
Rear Shock Absorber Lower Bolt	160 N.m	118 lb ft
Rear Spring Anchor Plate Nuts (1)		
First Pass	80 N.m	59 lb ft
Final Pass	additional 125 - 135 degrees	
(1) Tighten fasteners in sequence		

REPAIR INSTRUCTIONS

STRUT AND SHOCK ABSORBER INSPECTION

NOTE: The shock absorber assembly DOES NOT have to be removed from the vehicle to perform the following inspection procedure.

NOTE: A light film of oil on the top portion of the lower shock absorber tube is normal. DO NOT replace the shock absorber for this condition.

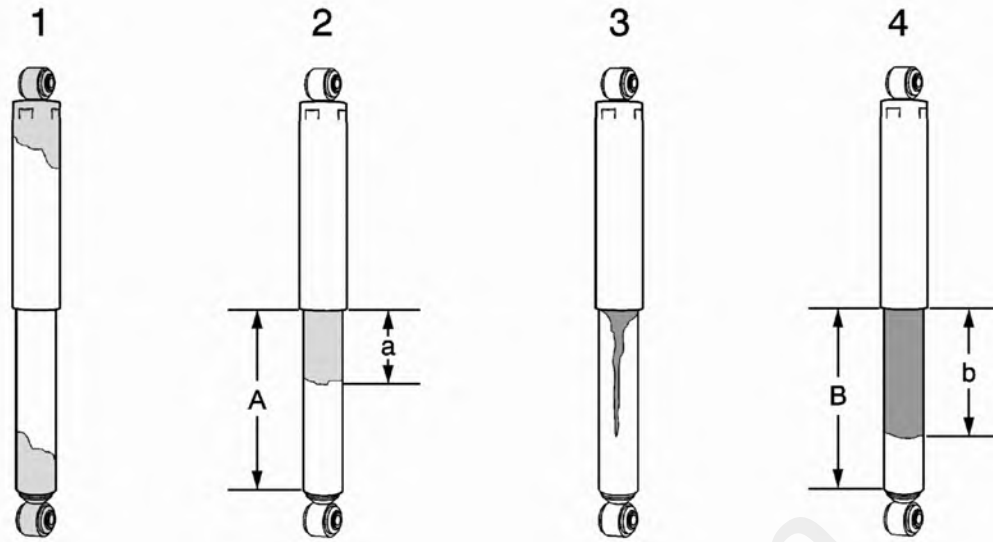


Fig. 1: Identifying Shock Absorber Conditions
Courtesy of GENERAL MOTORS COMPANY

Condition 1

Oil or fluid residue only on the bottom or top of the shock absorber and not originating from the shaft seal, is not a shock absorber related problem. DO NOT replace the shock absorber, look for other external leaks.

Condition 2

Light film/residue on approximately 1/3 (a) or less of the lower shock tube (A) and originating from the shaft seal, is a NORMAL condition. DO NOT replace the shock absorber.

Condition 3

Oil drip or trail down the lower shock tube and originating from the shaft seal, is an ABNORMAL condition. Replace the shock absorber.

Condition 4

An extreme wet film of oil covering more than 1/3 (b) of the lower shock tube and originating from the shaft seal (B), is an ABNORMAL condition. Replace the shock absorber.

Inspection

1. Verify the customer's concern is present. If the concern is present, continue to the next step. If the concern is not present, then the vehicle is operating normally.

NOTE: The shock absorber assembly DOES NOT have to be removed from the vehicle to perform the following inspection procedure.

id support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .

3. Visually inspect each of the shock absorbers for external fluid leaks. Refer to the following conditions 1, 2, 3, and 4 for visual inspection.
 - If conditions 1 or 2 are found, continue to step 4.
 - If conditions 3 or 4 are found, replace shock absorber.
4. If equipped with electronic suspension control system, ensure that the system is working properly. Refer to Diagnostic Starting Point - Electronic Suspension Control.
5. Use your hands in order to lift up and push down on each corner of the vehicle 3 times. Remove your hands from the vehicle. If the corner motion exceeds 2 cycles, replace the shock absorber. If the shock absorber does not exceed 2 cycles, NO repair is necessary.

SHOCK ABSORBER REPLACEMENT

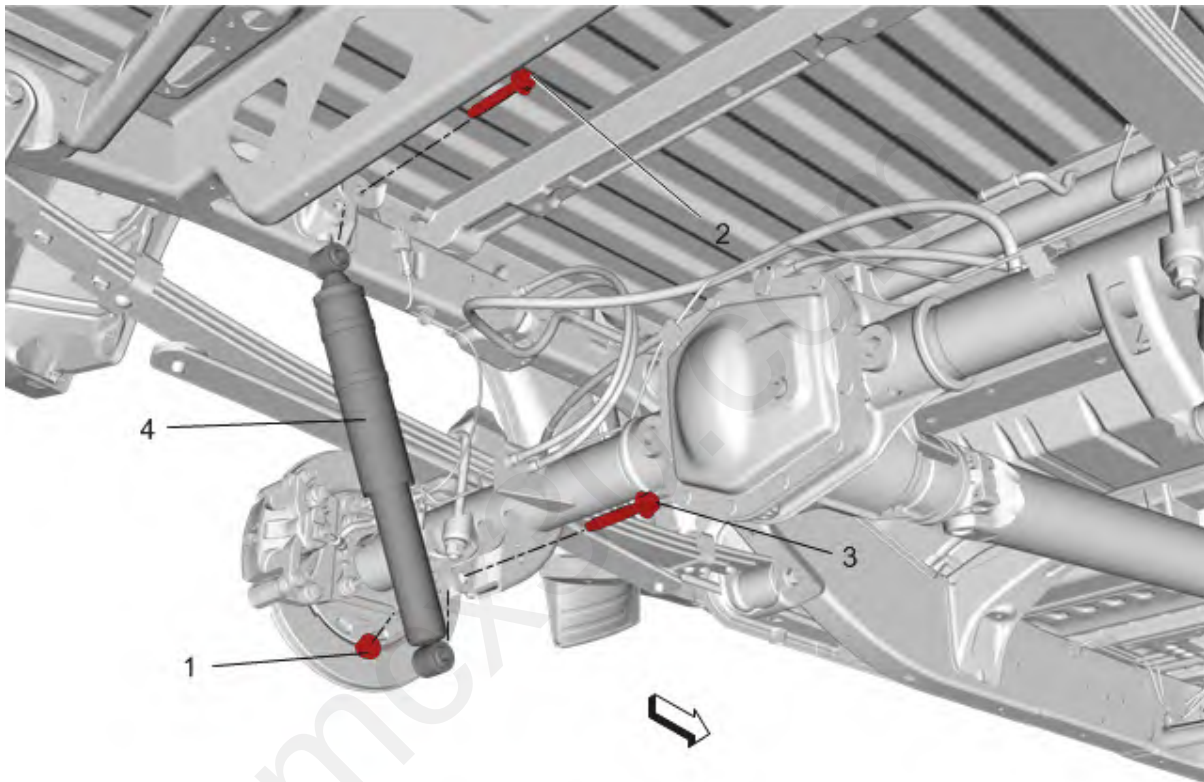


Fig. 2: Shock Absorber

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .	
1	Rear Shock Absorber Lower Nut CAUTION: Refer to Fastener Caution . Procedure Support the rear axle with a hydraulic transmission stand.

Component Name	
2	Rear Shock Absorber Upper Bracket Bolt Procedure Tighten 115 N.m (85 lb ft)
3	Rear Shock Absorber Bottom Bolt Procedure Tighten 160 N.m (118 lb ft)
4	Rear Shock Absorber

SHOCK ABSORBER DISPOSAL

WARNING: Gas charged shock absorbers contain high pressure gas. Do not remove the snap ring from inside the top of the tube. If the snap ring is removed, the contents of the shock absorber will come out with extreme force which may result in personal injury.

WARNING: To prevent personal injury, wear safety glasses when centerpunching and drilling the shock absorber. Use care not to puncture the shock absorber tube with the centerpunch.

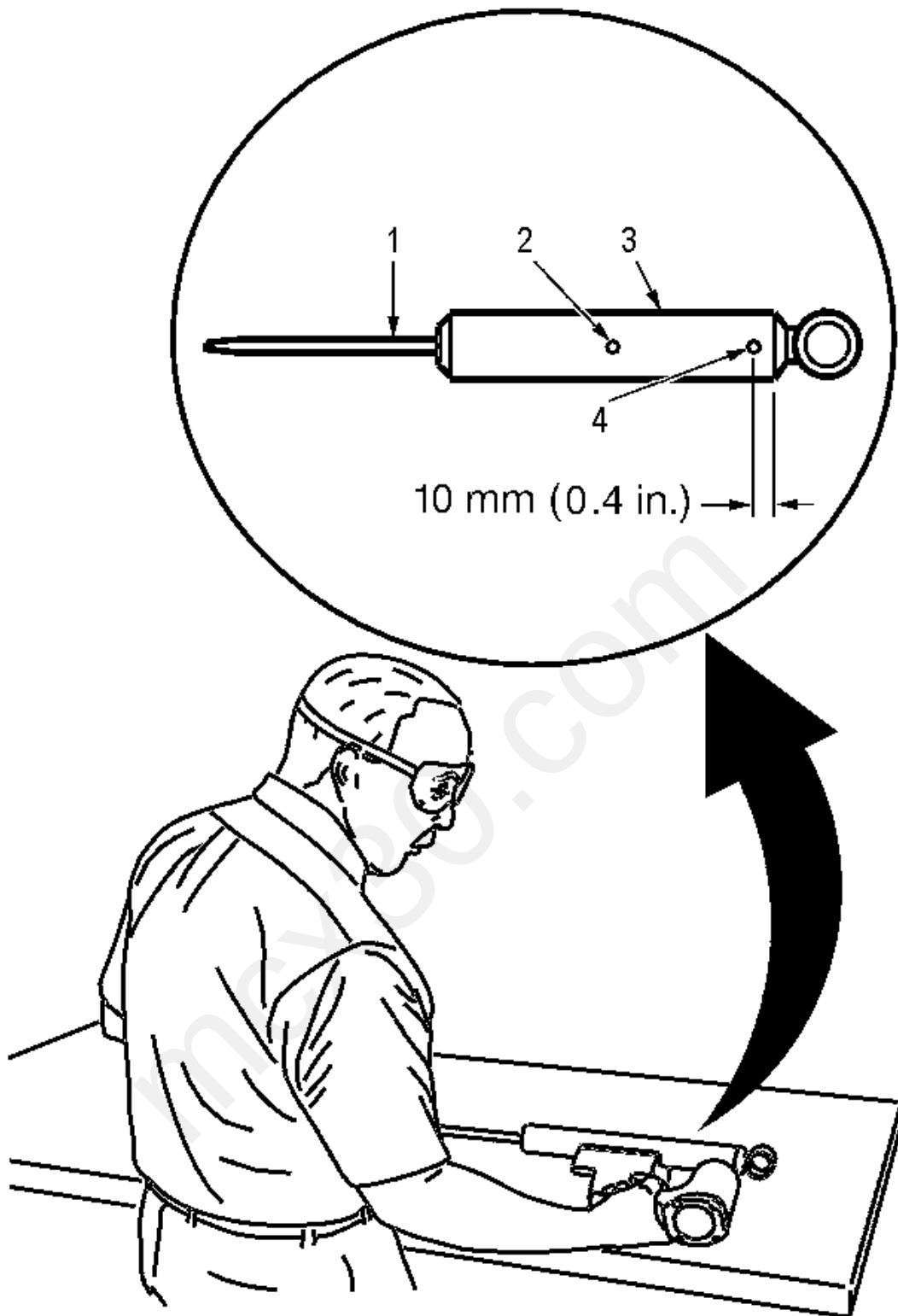


Fig. 3: Drilling Hole In Shock Absorber At Centerpunched Locations

Courtesy of GENERAL MOTORS COMPANY

1. Make an indentation 10 mm (0.4 in) from the bottom (4) of the tube (3) using a centerpunch.
2. Clamp the shock absorber in a vise horizontally with the shock absorber rod (1) completely extended.
3. Drill a hole in the shock absorber at the centerpunch (4) using a 5 mm (3/16 in) drill bit. Gas or a gas/oil mixture will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.

1 indentation in the middle (2) of the tube (3) with a centerpunch.

Component Name

5. Drill a second hole in the shock absorber at the centerpunch (2) using a 5 mm (3/16 in) drill bit. Oil will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.
6. Remove the shock absorber from the vise. Hold the shock absorber over a drain pan horizontally with the holes down. Move the rod (1) in and out of the tube (3) to completely drain the oil from the shock absorber.

REAR SPRING ANCHOR PLATE REPLACEMENT

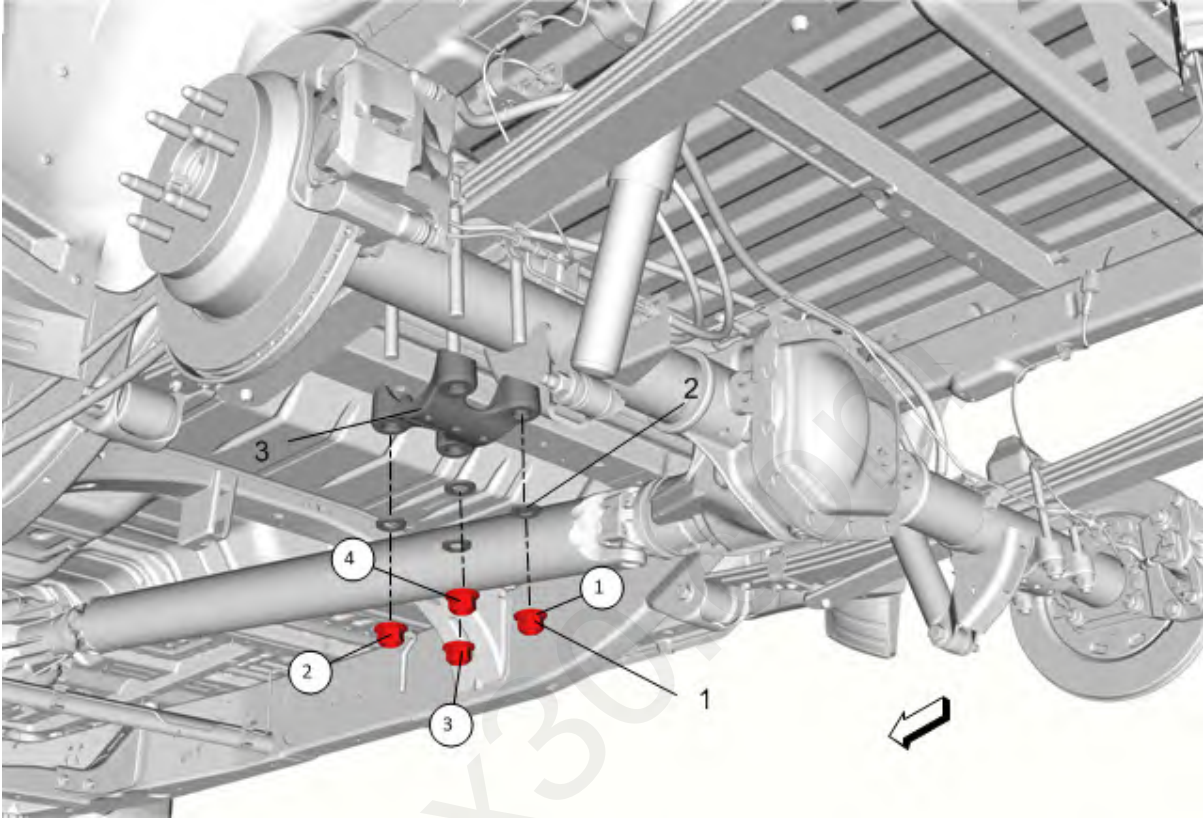


Fig. 4: U-bolts and Anchor Plates Under Axle
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Support the rear axle to relieve the tension on the leaf springs.	
1	Rear Spring Unit Bolt Nuts (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 1. Tighten nuts in sequence 1, 2, 3, 4. 2. First Pass 80 N.m (59 ft. lb.) 3. Final Pass 125 - 135 Degrees

	Component Name
2	Rear Spring Anchor Plate Washers (Qty: 4)
3	Rear Spring Anchor Plate

REAR AXLE BUMPER REPLACEMENT

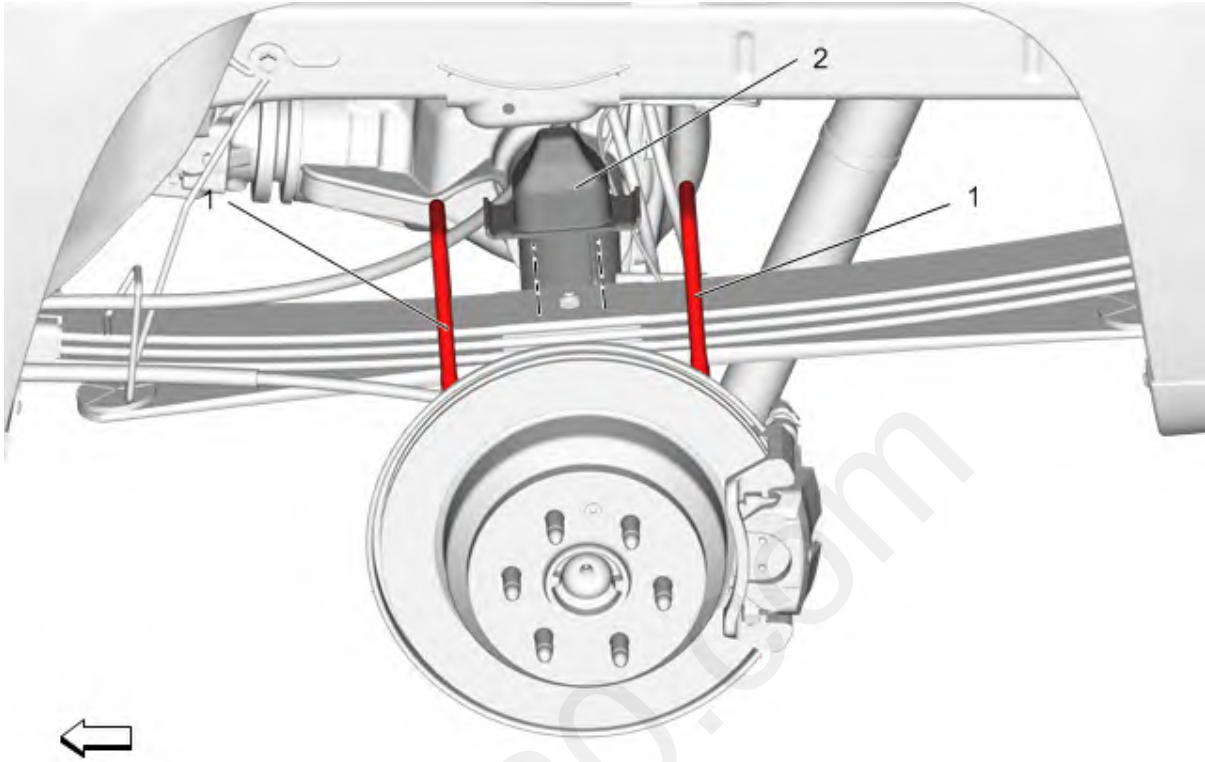


Fig. 5: Rear Axle Bumper

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation . 3. Support the rear axle with a jack stand. 4. Loosen the Rear Spring Anchor Plate Nuts. Refer to Rear Spring Anchor Plate Replacement.	
1	Rear Spring Unit Bolt Procedure Reposition the rear spring unit bolts.
2	Rear Axle Bumper

REAR LEAF SPRING REPLACEMENT (LEFT SIDE)

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the tires and wheels. Refer to [Tire and Wheel Removal and Installation](#) .
3. Remove the fuel tank assembly. refer to [Fuel Tank Replacement](#) .

ie proper jack stands, support the rear axle assembly.

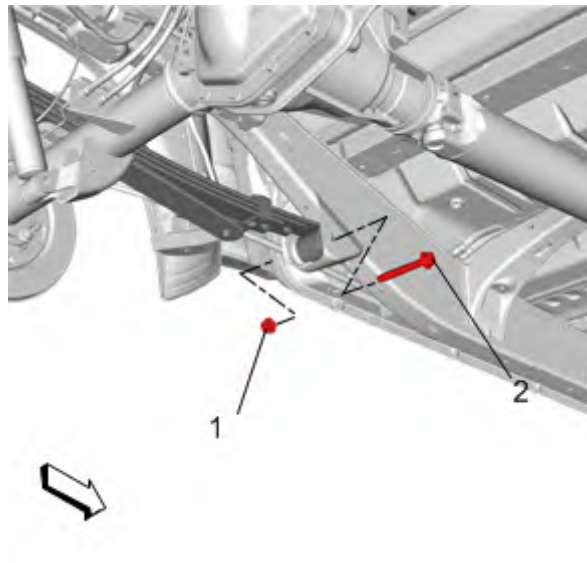


Fig. 6: Rear Leaf Spring Front Nut And Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Remove the rear leaf spring front nut (1) and bolt (2).

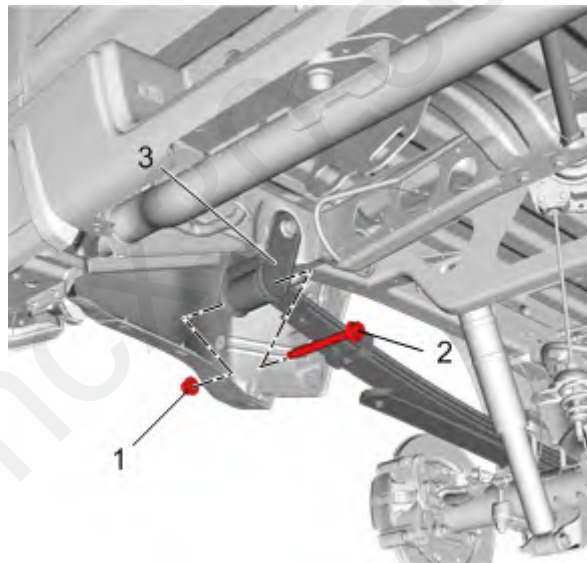


Fig. 7: Bottom Rear Spring Shackle Nut And Bolt
Courtesy of GENERAL MOTORS COMPANY

6. Remove the bottom rear spring shackle nut (1) and the bolt (2) from the shackle.

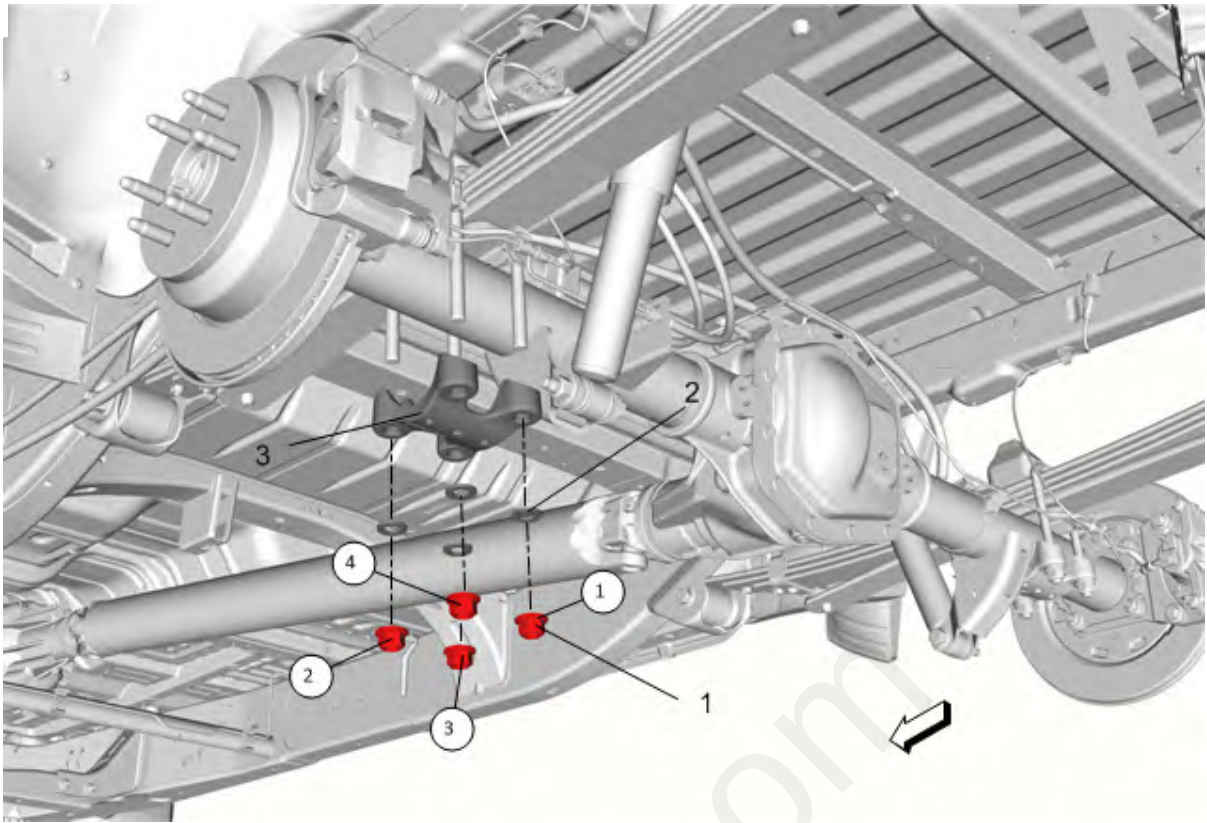


Fig. 8: U-bolts and Anchor Plates Under Axle
Courtesy of GENERAL MOTORS COMPANY

7. Remove the rear spring anchor plate (3).

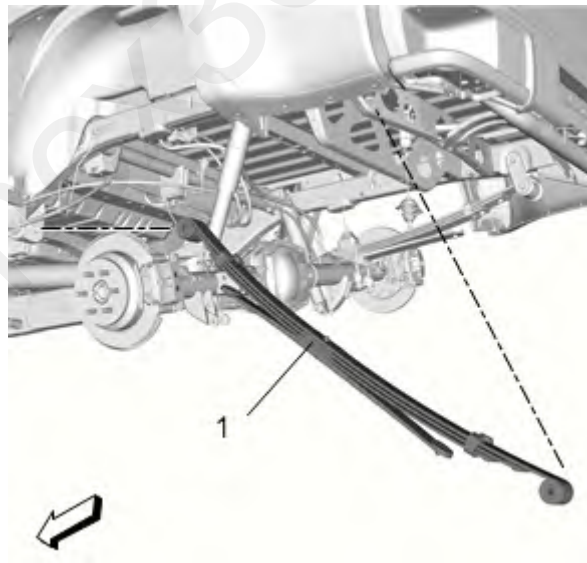


Fig. 9: Rear Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

8. With the aid of an assistant, remove the rear spring assembly (1) from the vehicle.

Installation Procedure

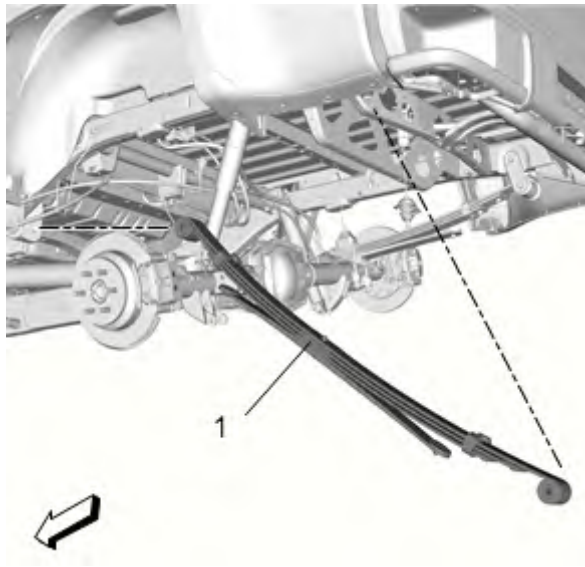


Fig. 10: Rear Spring Assembly

Courtesy of GENERAL MOTORS COMPANY

1. With the aid of an assistant, position the rear spring assembly (1) in the vehicle.

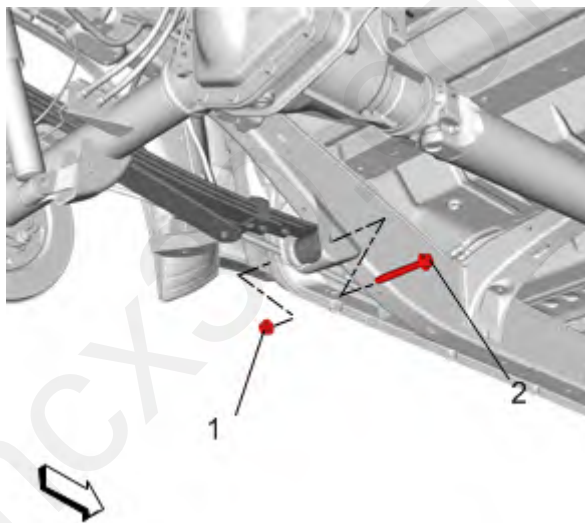


Fig. 11: Rear Leaf Spring Front Nut And Bolt

Courtesy of GENERAL MOTORS COMPANY

2. Install the rear spring front bolt (2).

CAUTION: Refer to **Fastener Caution** .

3. Install the rear spring front nut (1) and tighten to 240 N.m (177 lb ft).

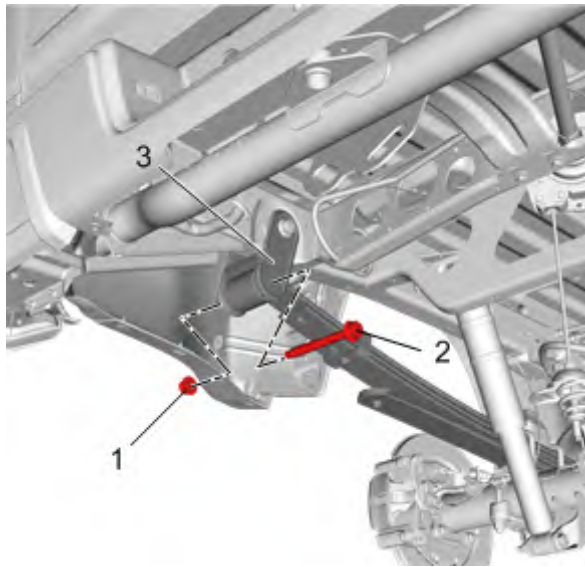


Fig. 12: Bottom Rear Spring Shackle Nut And Bolt
 Courtesy of GENERAL MOTORS COMPANY

4. Install the rear spring into the shackle and install the bolt (2) and the nut (1). Then tighten the nut to 160 N.m (118 lb ft).

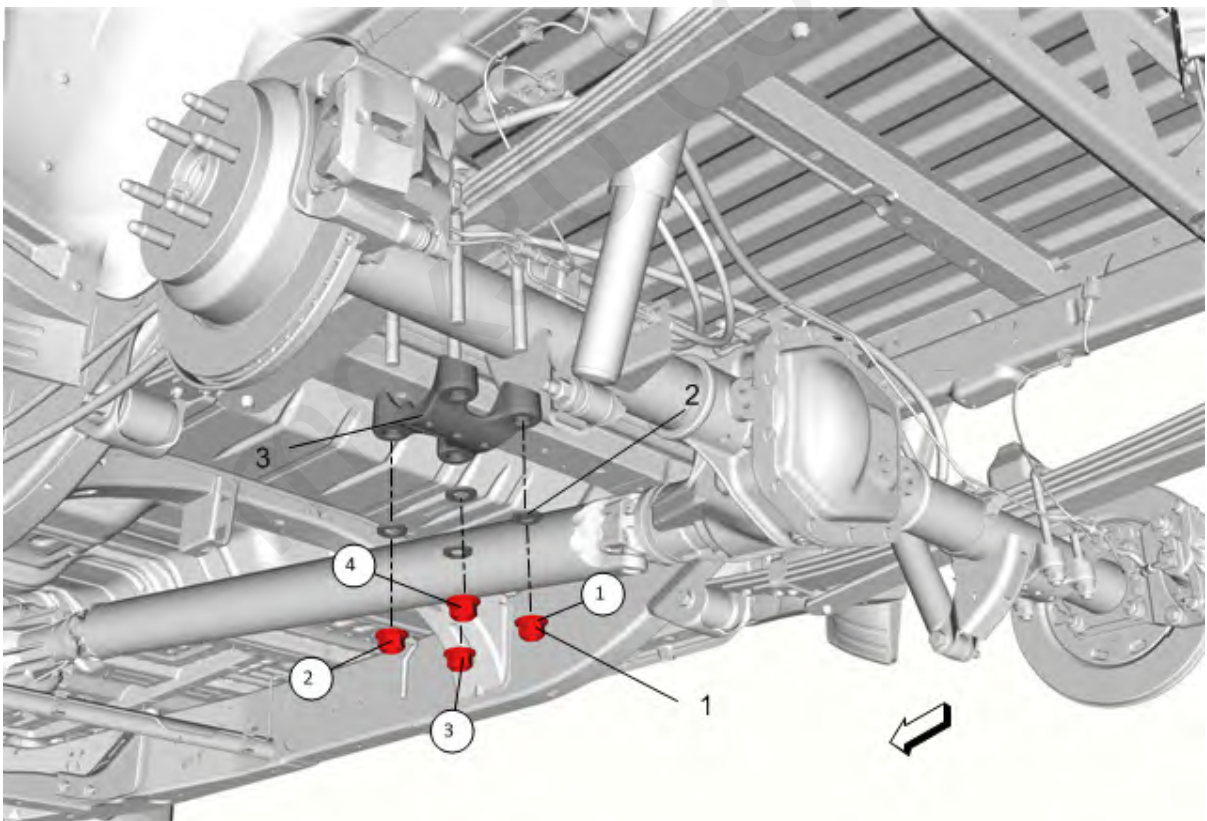


Fig. 13: U-bolts and Anchor Plates Under Axle
 Courtesy of GENERAL MOTORS COMPANY

5. Install the rear spring anchor plate (3) install then washers (2) and then nuts (1).

Tighten

1. Tighten nuts in sequence 1, 2, 3, 4.

rst Pass 80 N.m (59 lb ft).

3. Final Pass 125 - 135 Degrees

6. Install the tires and wheels. Refer to [Tire and Wheel Removal and Installation](#) .
7. Install the fuel tank assembly, refer to [Fuel Tank Replacement](#) .
8. Remove the jack stands
9. Lower the vehicle.

REAR LEAF SPRING REPLACEMENT (RIGHT SIDE)

Removal Procedure

1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#) .
2. Remove the tires and wheels. [Tire and Wheel Removal and Installation](#) .
3. Using the proper jack stands, support the rear axle assembly.
4. Using an appropriate jack, raise the exhaust system just enough to allow the front leaf spring bolt clearance for removal.

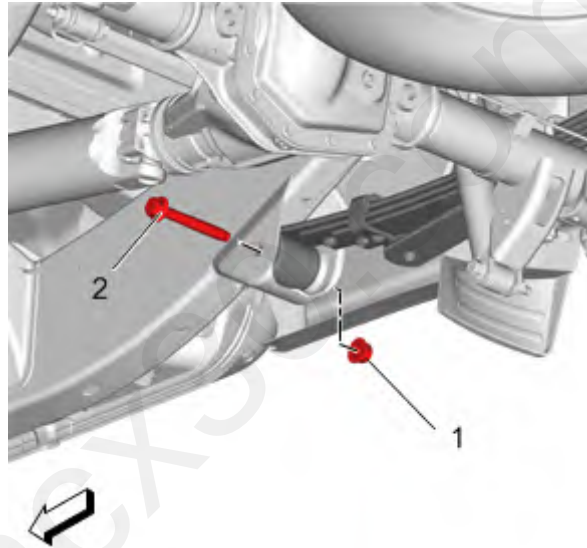


Fig. 14: Rear Leaf Spring Front Nut And Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Remove the rear leaf spring front nut (1) and bolt (2).

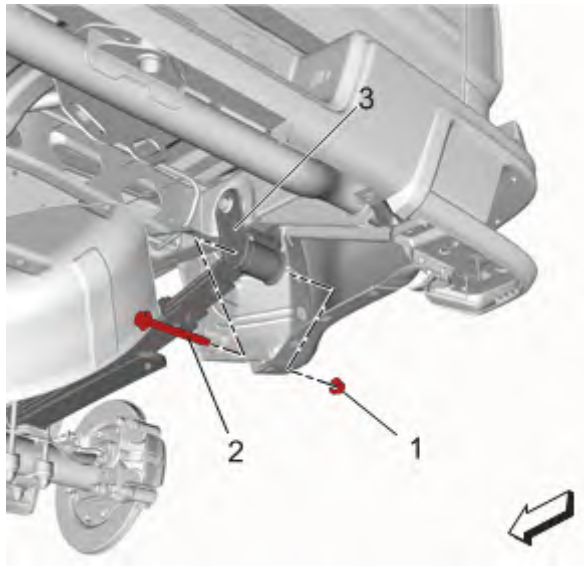


Fig. 15: Bottom Rear Spring Shackle Nut

Courtesy of GENERAL MOTORS COMPANY

6. Remove the bottom rear spring shackle nut (1) and the bolt (2) from the shackle.

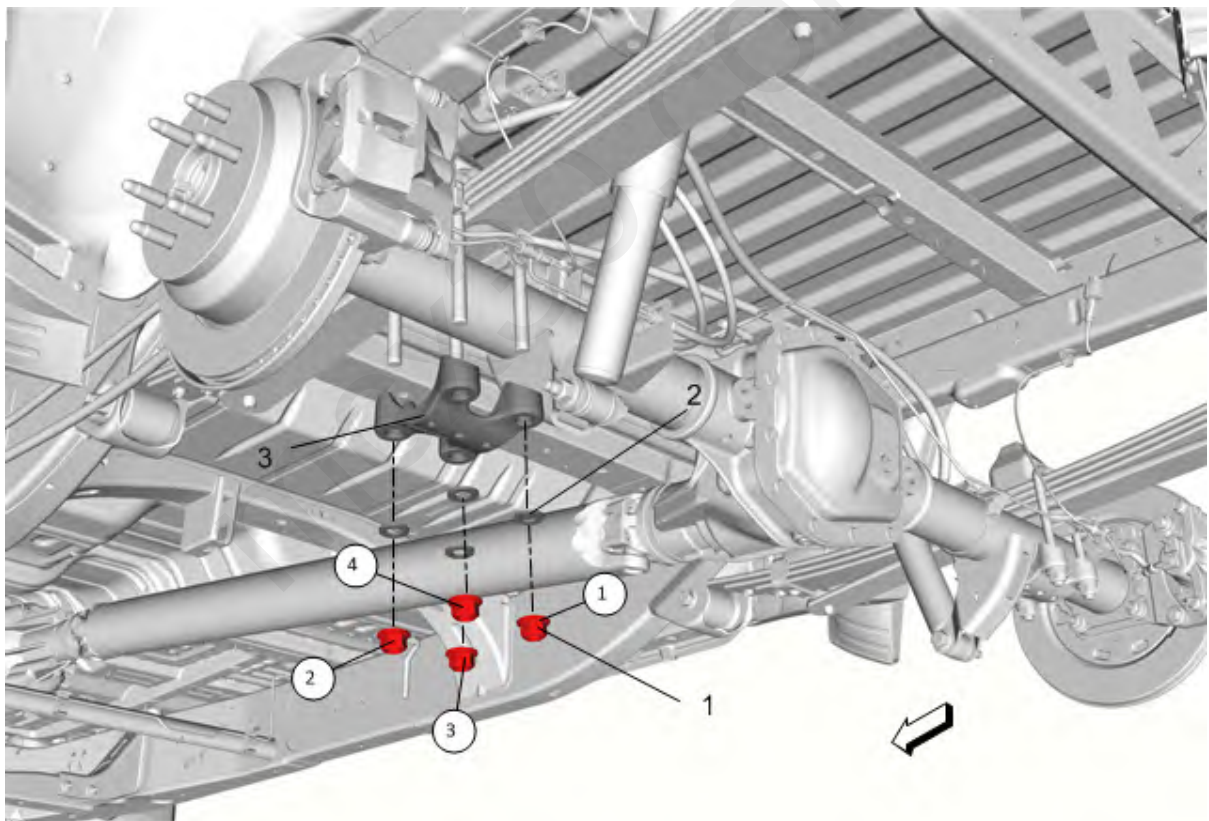


Fig. 16: U-bolts and Anchor Plates Under Axle

Courtesy of GENERAL MOTORS COMPANY

7. Remove the rear spring anchor plate (3).

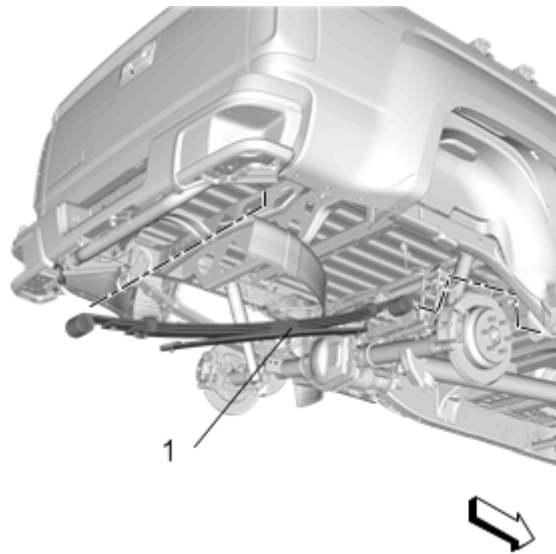


Fig. 17: Rear Spring Assembly

Courtesy of GENERAL MOTORS COMPANY

8. With the aid of an assistant, remove the rear spring assembly (1) from the vehicle.

Installation Procedure

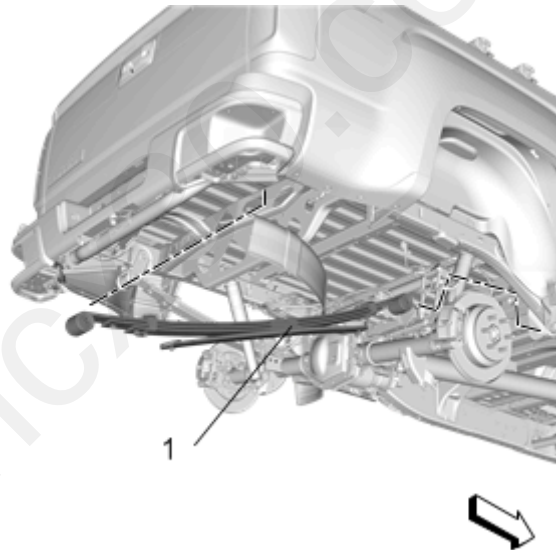


Fig. 18: Rear Spring Assembly

Courtesy of GENERAL MOTORS COMPANY

1. With the aid of an assistant, position the rear spring assembly (1) in the vehicle.

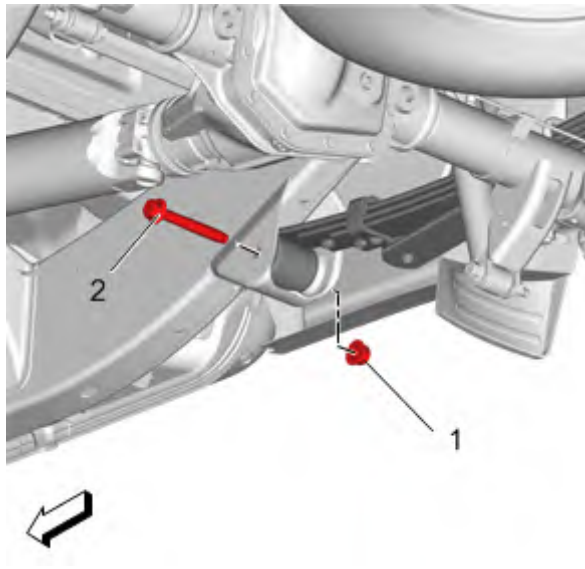


Fig. 19: Rear Leaf Spring Front Nut And Bolt
 Courtesy of GENERAL MOTORS COMPANY

2. Install the rear spring front bolt (2).
3. Remove the jack and allow the exhaust to return to its original position.

CAUTION: Refer to [Fastener Caution](#) .

4. Install the rear spring front nut (1) and tighten to 240 N.m (177 lb ft).

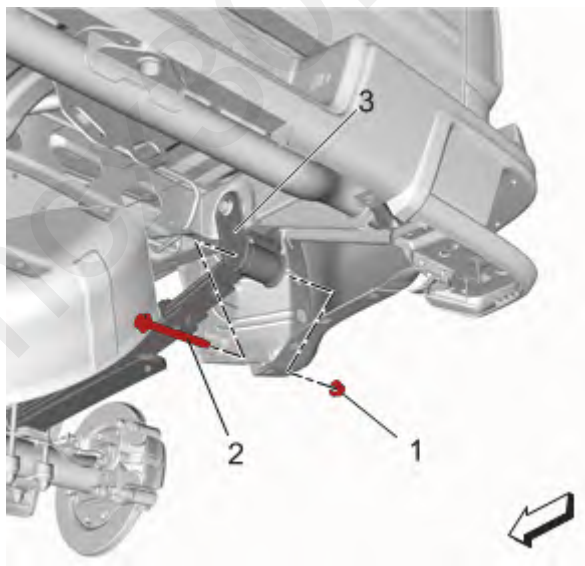


Fig. 20: Bottom Rear Spring Shackle Nut
 Courtesy of GENERAL MOTORS COMPANY

5. Install the rear spring into the shackle and install the bolt (2) and the nut (1). Then tighten the nut to 160 N.m (118 lb ft).

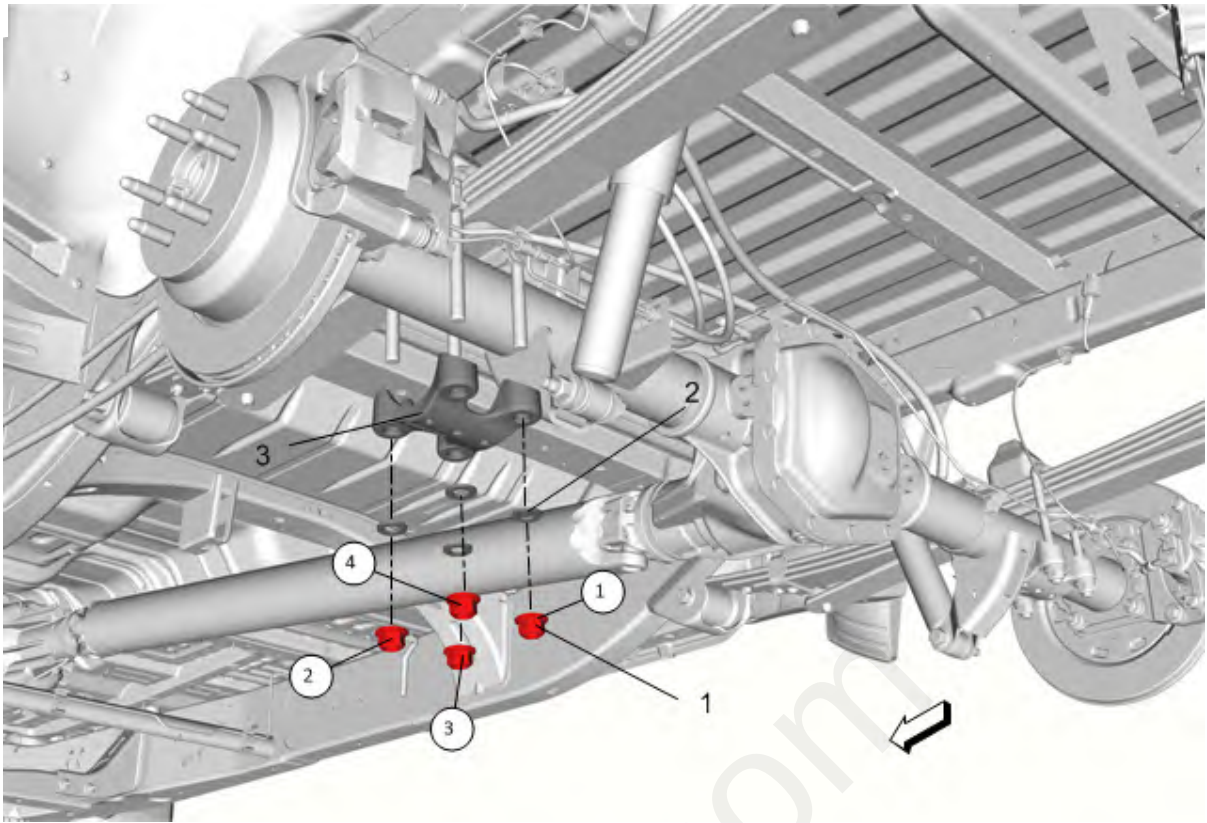


Fig. 21: U-bolts and Anchor Plates Under Axle
Courtesy of GENERAL MOTORS COMPANY

6. Install the rear spring anchor plate (3) install the washers (2) and install the nuts (1).

Tighten

1. Tighten nuts in sequence 1, 2, 3, 4.
 2. First Pass 80 N.m (59 lb ft).
 3. Final Pass 125 - 135 Degrees
7. Install the tires and wheels. **Tire and Wheel Removal and Installation** .
 8. Remove the jack stands
 9. Lower the vehicle.

REAR SPRING SHACKLE REPLACEMENT

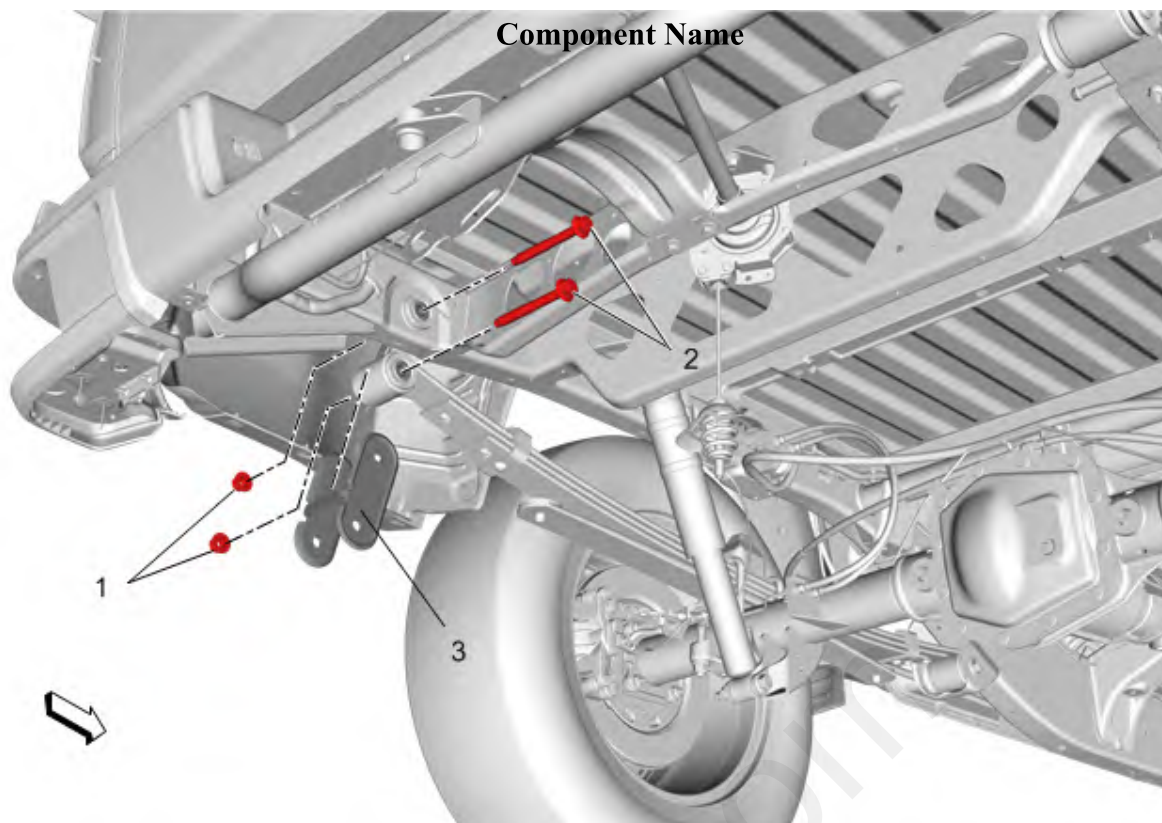


Fig. 22: Rear Spring Shackle

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Support the rear axle assembly.	
1	Rear Spring Shackle Nut CAUTION: Refer to Fastener Caution . Tighten 160 N.m (118 lb ft)
2	Rear Spring Shackle Bolt
3	Rear Spring Shackle

REAR SPRING SHACKLE BUSHING REPLACEMENT

Removal Procedure

Special Tools

- J-45296 Insulator Cup Replacer
- J-21474 Control Arm Bushing Set

Equivalent regional tools: [Special Tools](#)

- the tire and wheel assembly. **Tire and Wheel Removal and Installation**
2. Support the rear axle assembly with the proper jack stand.
 3. **Rear Spring Shackle Replacement** » Remove

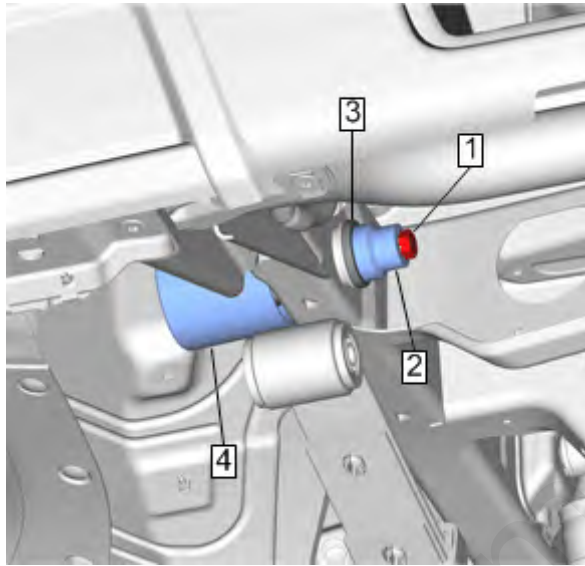


Fig. 23: Bushing Remover/Installer And Rear Spring Shackle Bushing
Courtesy of GENERAL MOTORS COMPANY

4. Install the bolt (1) and the bushing remover/installer (2) from the **J-21474** control arm bushing set onto the rear spring shackle bushing (3).
5. Install the **J-45296** insulator cup replacer (4).
6. Rotate the bolt clockwise to force the bushing out of the bushing sleeve.

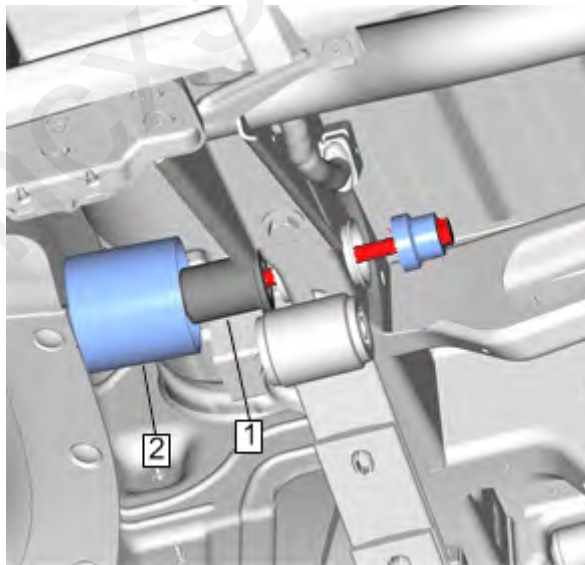


Fig. 24: Rear Spring Shackle Bushing
Courtesy of GENERAL MOTORS COMPANY

7. Remove the rear spring shackle bushing (1) from the **J-45296** insulator cup replacer (2).

Installation Procedure

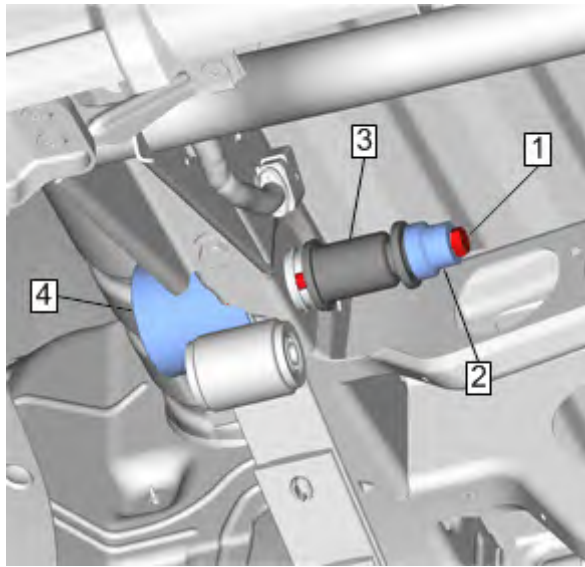


Fig. 25: Bushing Remover/Installer And Rear Spring Shackle Bushing
Courtesy of GENERAL MOTORS COMPANY

1. Position the bolt (1), the **J-21474** bushing remover/installer (2), the rear spring shackle bushing (3), and the **J-45296** insulator cup replacer (4).

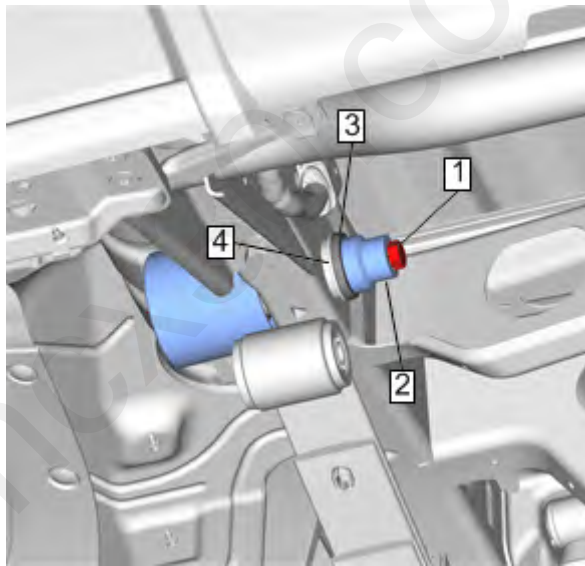


Fig. 26: Rear Spring Shackle Bushing And Bushing Sleeve
Courtesy of GENERAL MOTORS COMPANY

2. Rotate the bolt (1) until the **J-21474** bushing remover/installer (2) places the rear spring shackle bushing (3), fully against the bushing sleeve (4).
3. **Rear Spring Shackle Replacement** » Install
4. Remove the jack stand from the rear axle assembly.
5. Install the tire and wheel assembly. **Tire and Wheel Removal and Installation**

WHEEL STUD REPLACEMENT

Special Tools

CH 43631 Ball Stud Remover

regional tools, refer to [Special Tools](#).

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the tire and wheel. Refer to [Tire and Wheel Removal and Installation](#) .
3. Remove the brake rotor. Refer to [Rear Brake Rotor Replacement](#) .

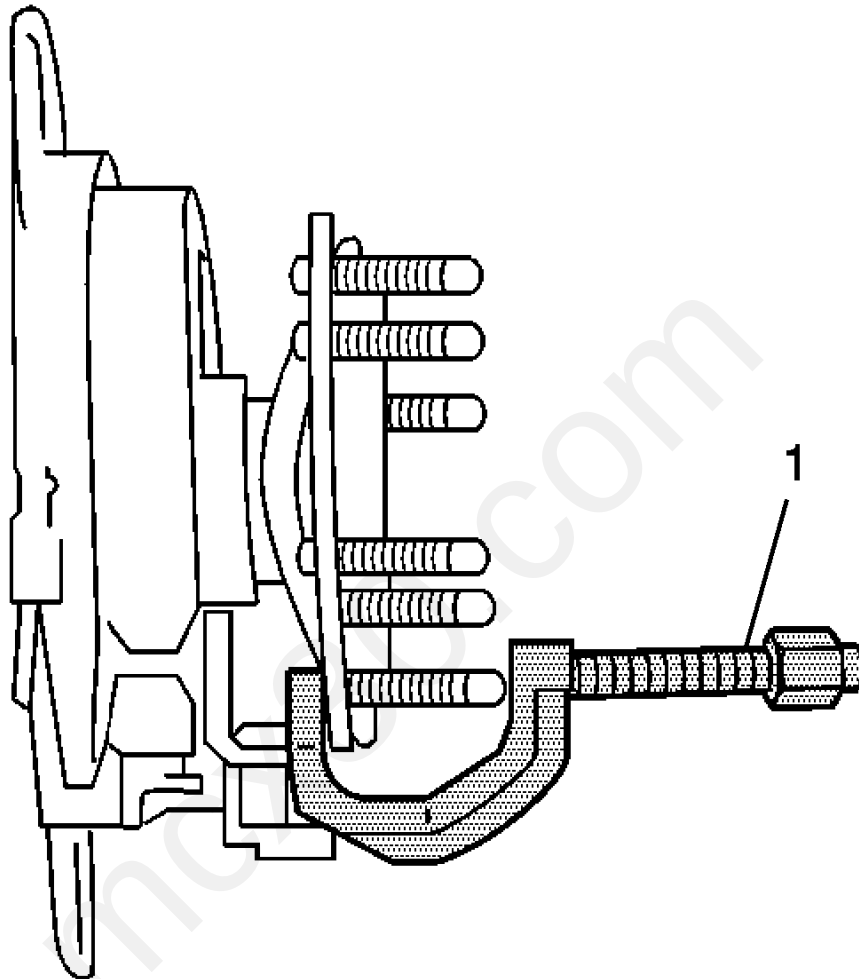


Fig. 27: Wheel Stud & Hub Flange

Courtesy of GENERAL MOTORS COMPANY

4. Using the **CH 43631** remover (1), remove the wheel stud.
5. Remove the wheel stud from the hub flange.

Installation Procedure

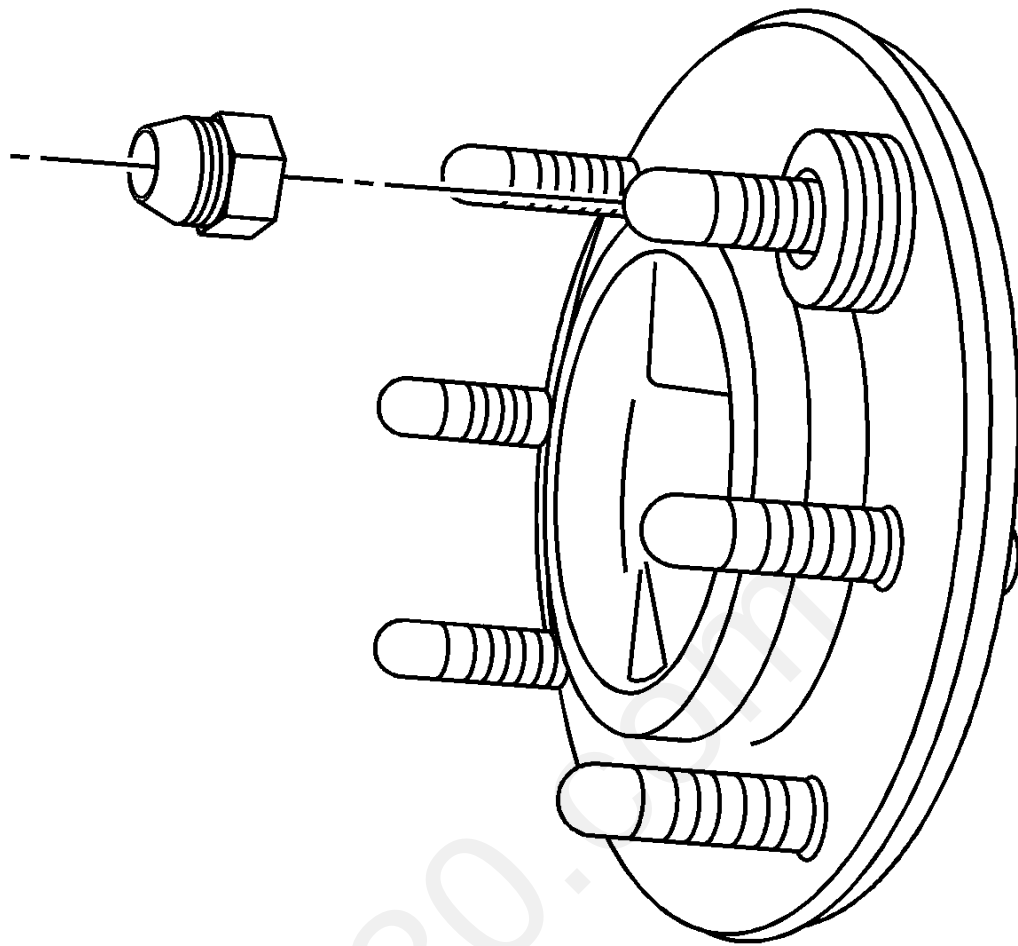


Fig. 28: View Of Wheel Nut & Studs

Courtesy of GENERAL MOTORS COMPANY

1. Install the new stud into the hub flange hole using firm hand pressure.
2. Install 4 washers to the new wheel stud.
3. Thread a wheel nut onto the new stud with the flat side facing the front hub flange.
4. Tighten the lug nut until the stud contacts the back of the hub flange.
5. Remove the wheel nut.
6. Remove the washers.
7. Install the brake rotor. Refer to [Rear Brake Rotor Replacement](#) .
8. Install the tire and wheel. Refer to [Tire and Wheel Removal and Installation](#) .
9. Remove the safety stands.
10. Lower the vehicle.

DESCRIPTION AND OPERATION

GENERAL DESCRIPTION

These vehicles use a leaf spring and a solid rear axle suspension system.

assembly is attached to multi-leaf springs with U-bolts. The front ends of the springs are attached to the frame at the front hangers with bolts and are isolated utilizing rubber bushings. The rear ends of the springs are attached to the frame with bolts at the shackles. The shackles also utilize rubber bushings for isolation. Shackles allow the springs to change position while the vehicle is in motion.

Two direct double-acting shock absorbers provide ride control. The shock absorbers are angle-mounted between the frame and the rear axle.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

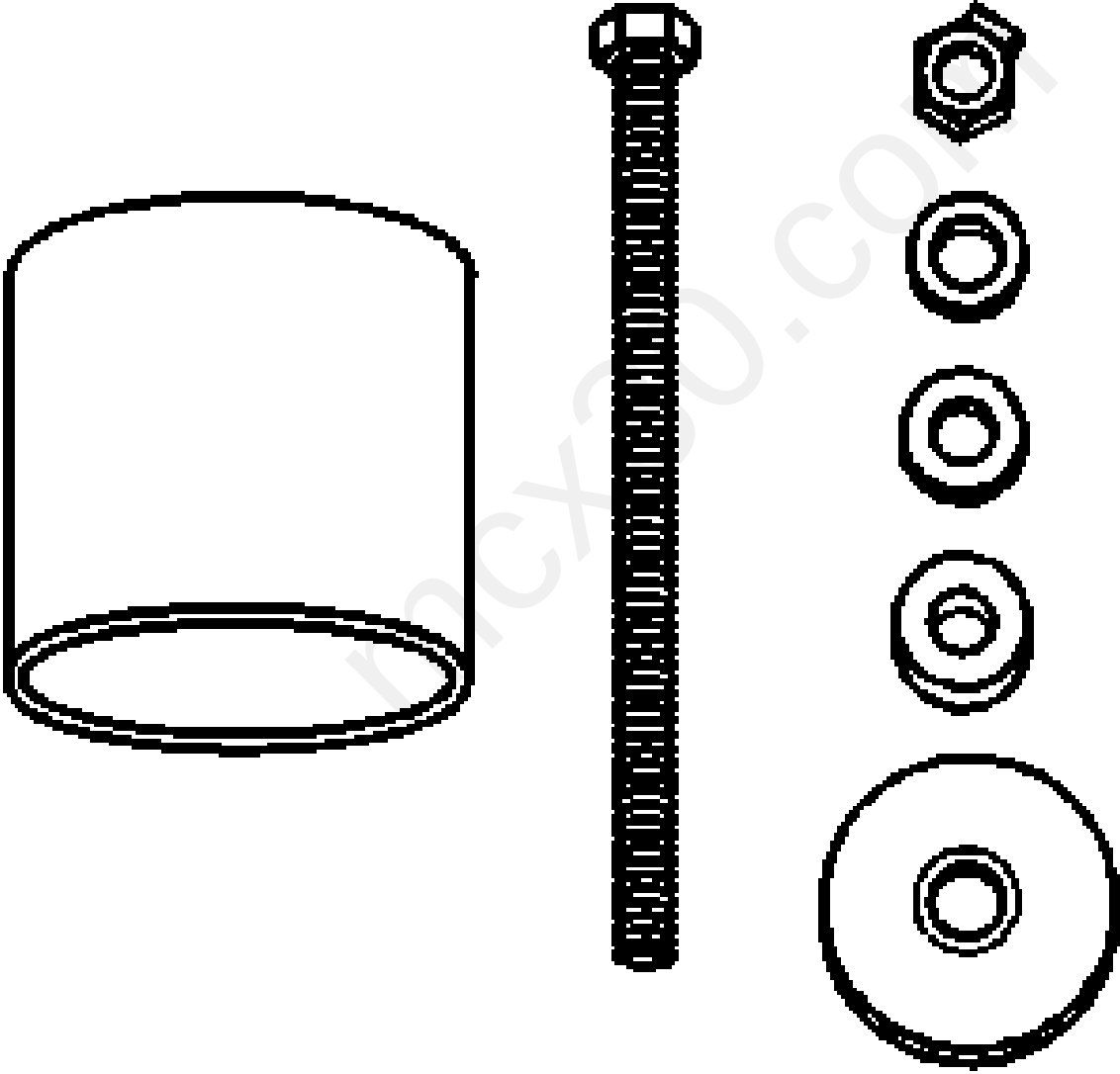
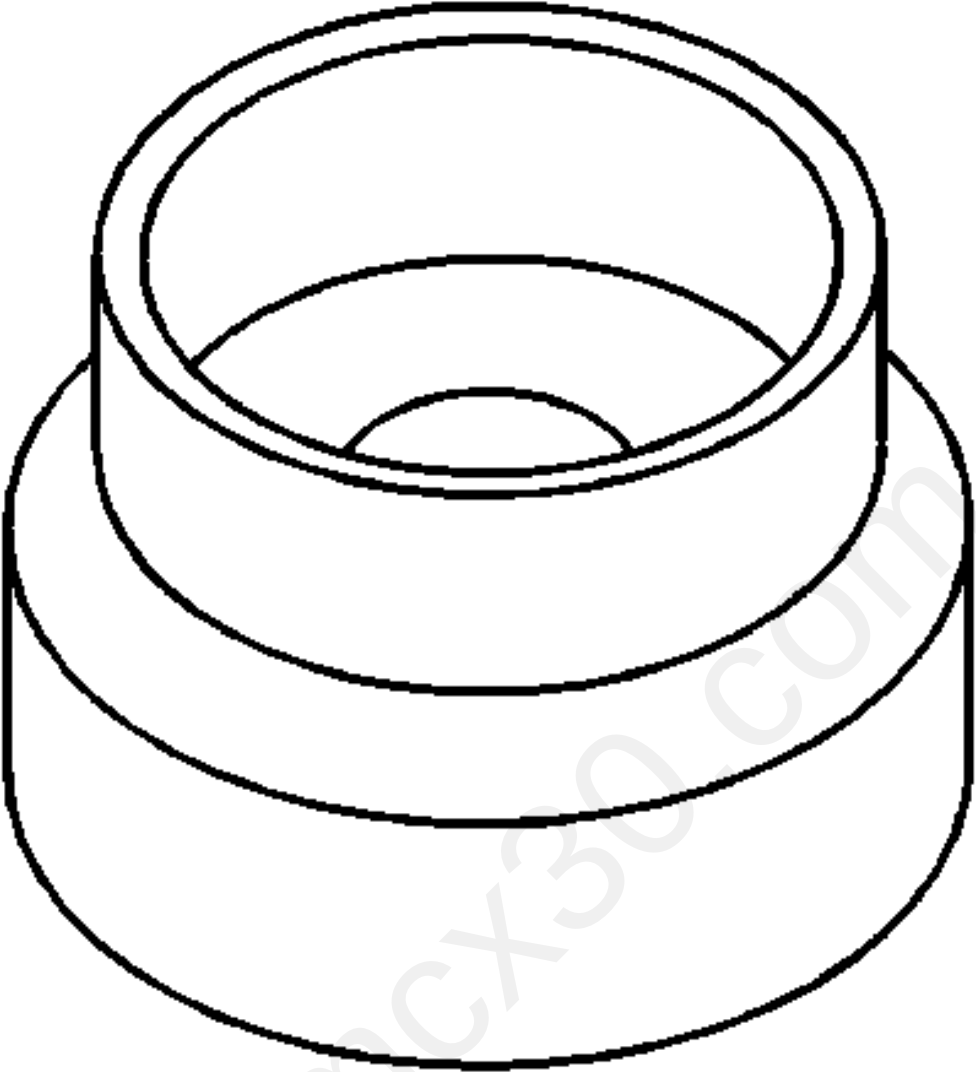
Illustration	Tool Number/Description
	CH-21474 J-21474 Control Arm Bushing Set

Illustration	Tool Number/ Description
	CH-45296 J-45296 Isolator Cup Replacer