

2021 SUSPENSION

Rear Suspension - Canyon, Colorado

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE:

All fasteners listed in this table can be reused after removal.

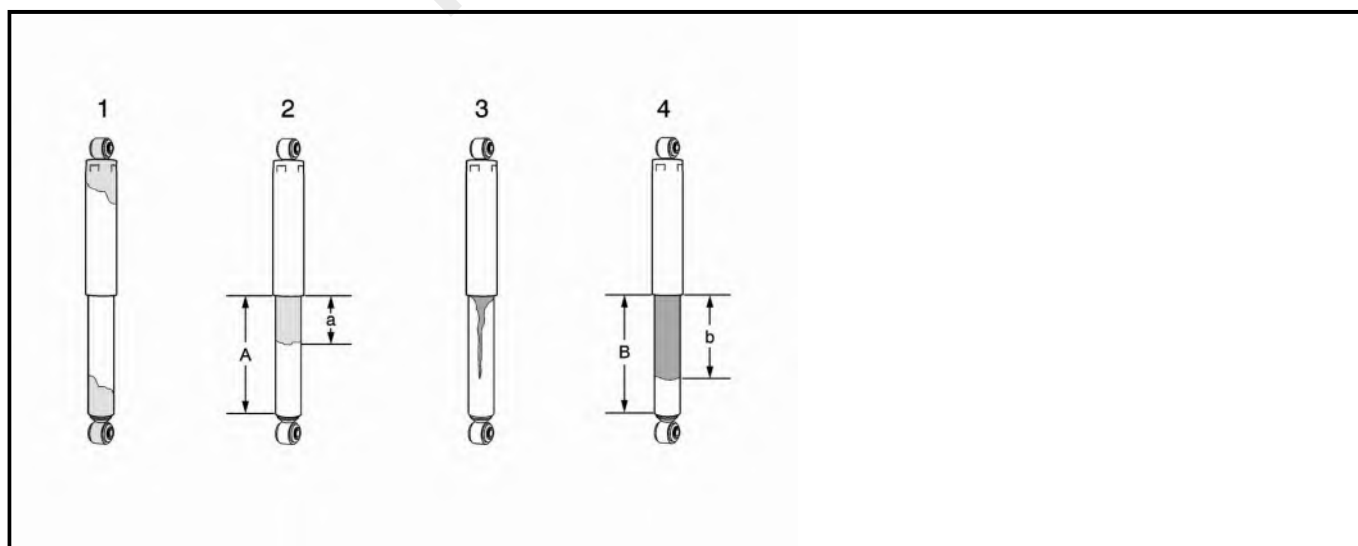
Application	Specification
	Metric (English)
Rear Shock Absorber Bottom Bolt	160 N.m (118 lb ft)
Rear Shock Absorber Upper Bracket Bolt	115 N.m (85 lb ft)
Rear Spring Front Nut	240 N.m (177 lb ft)
Rear Spring Shackle Bolt	160 N.m (118 lb ft)
Rear Spring Shackle Nut	160 N.m (118 lb ft)
Rear Spring U-Bolt Nut	
First Pass:	80 N.m (59 lb ft)
Final Pass:	125 - 135 degrees

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.



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.

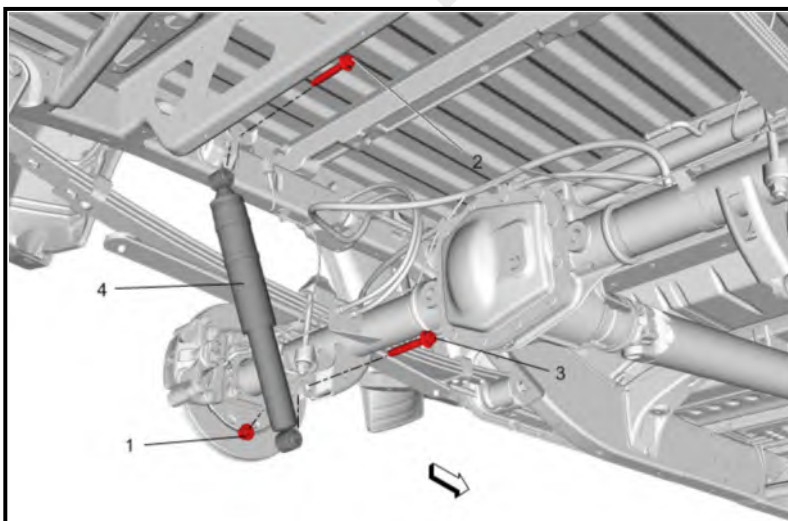
Inspection

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.

2. Raise and 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 (WITHOUT ZR2)

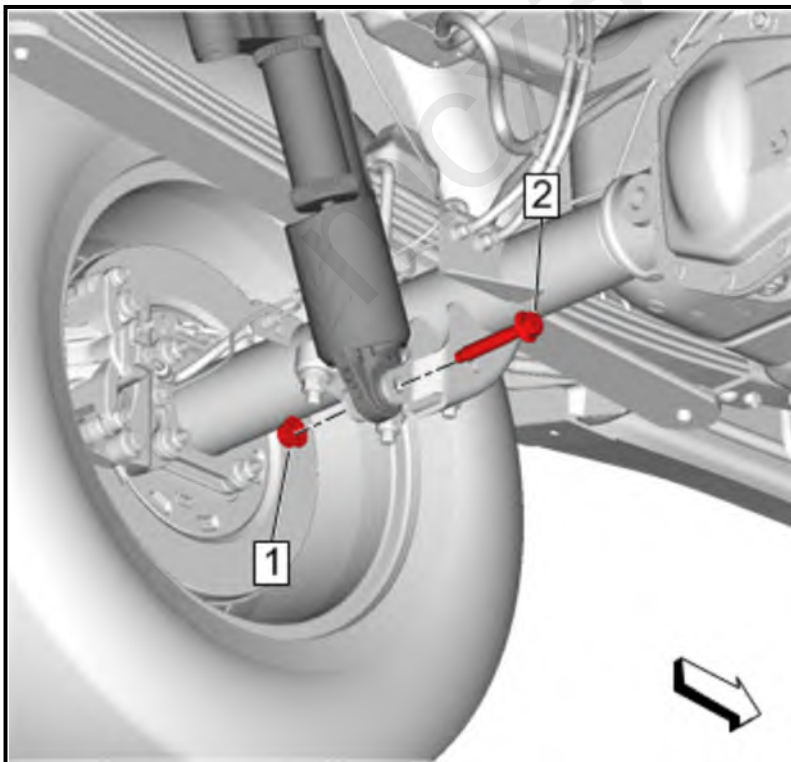


Callout	Component Name
Preliminary Procedure <u>Lifting and Jacking the Vehicle</u>	
1	Rear Shock Absorber Lower Nut CAUTION: Refer to <u>Fastener</u> <u>Caution</u> . Procedure Support the rear axle with a hydraulic transmission stand.
2	Rear Shock Absorber Upper Bracket Bolt Procedure Tighten 115 N.m (85 lb ft)
3	Rear Shock Absorber Bottom Bolt Procedure Tighten 160 N.m (118 lb ft)
4	Rear Shock Absorber

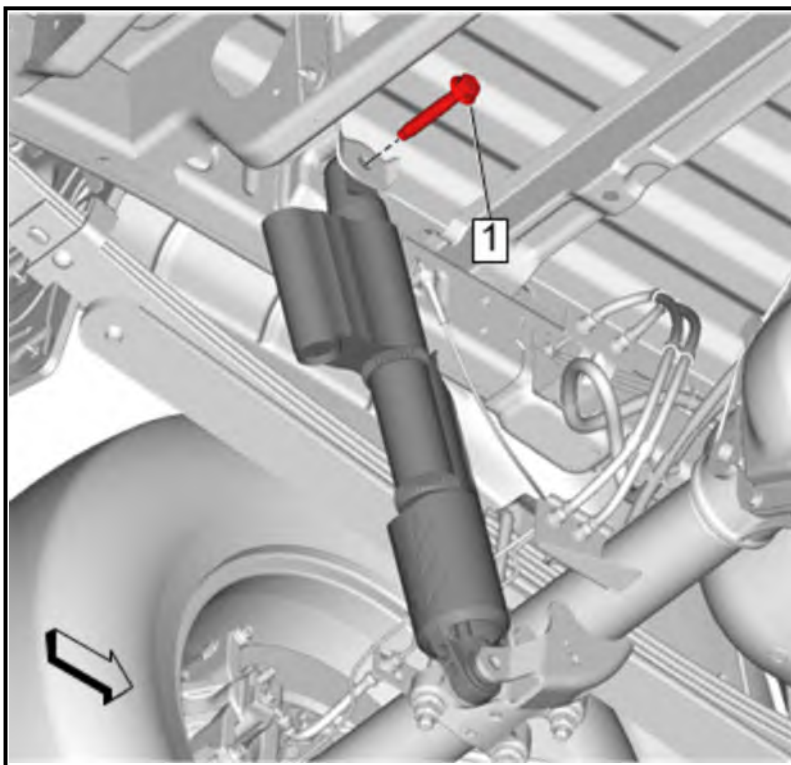
SHOCK ABSORBER REPLACEMENT (WITH ZR2)

Removal Procedure

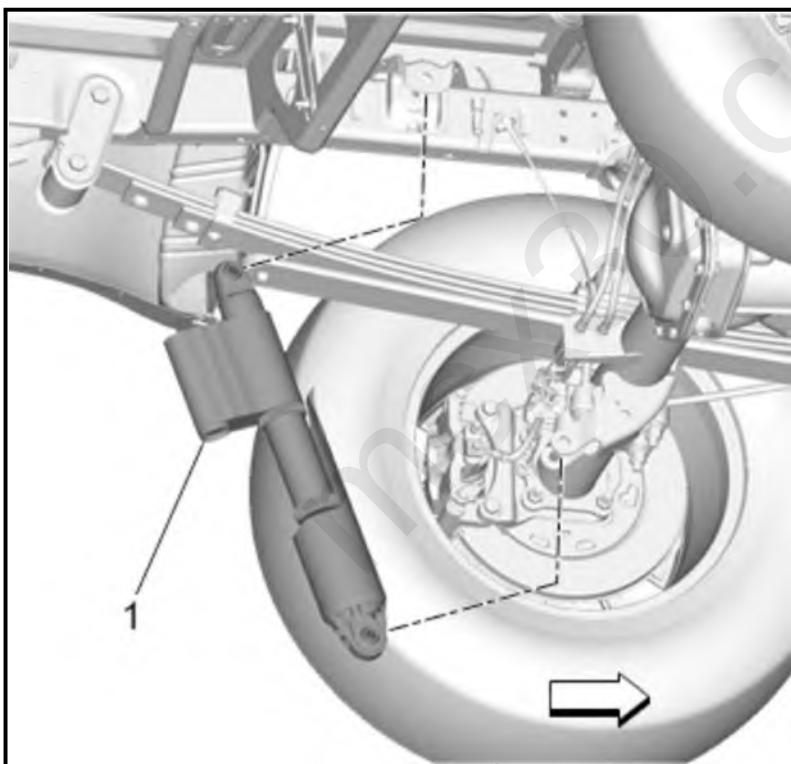
1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Rear Shock Absorber Nut (1) @ Rear Axle - Remove



3. Rear Shock Absorber Bolt (2) @ Rear Axle - Remove
4. Rear Shock Absorber Bolt @ Frame (1) - Remove

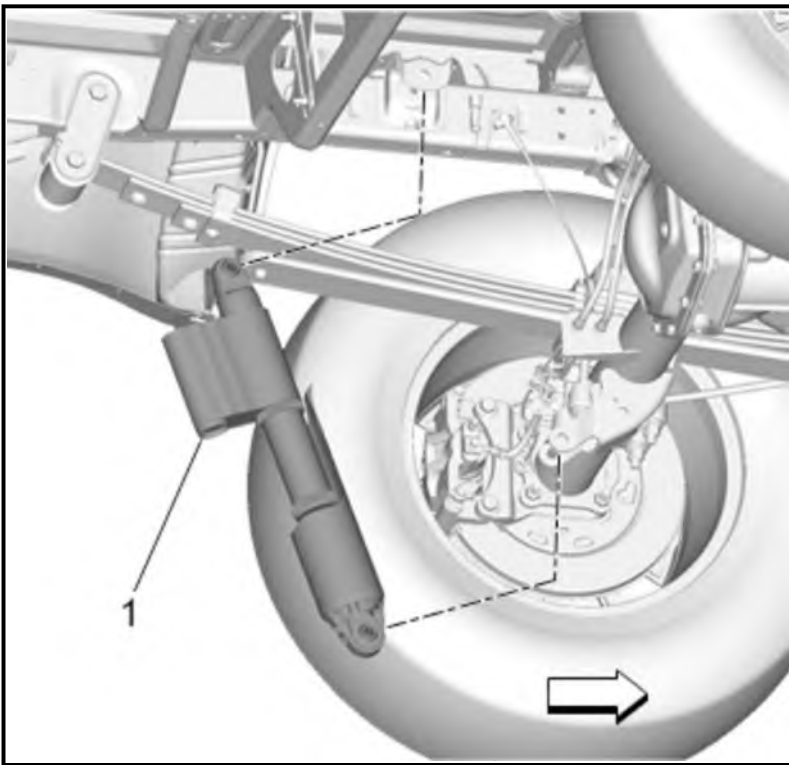


5. Rear Shock Absorber (1) - Remove

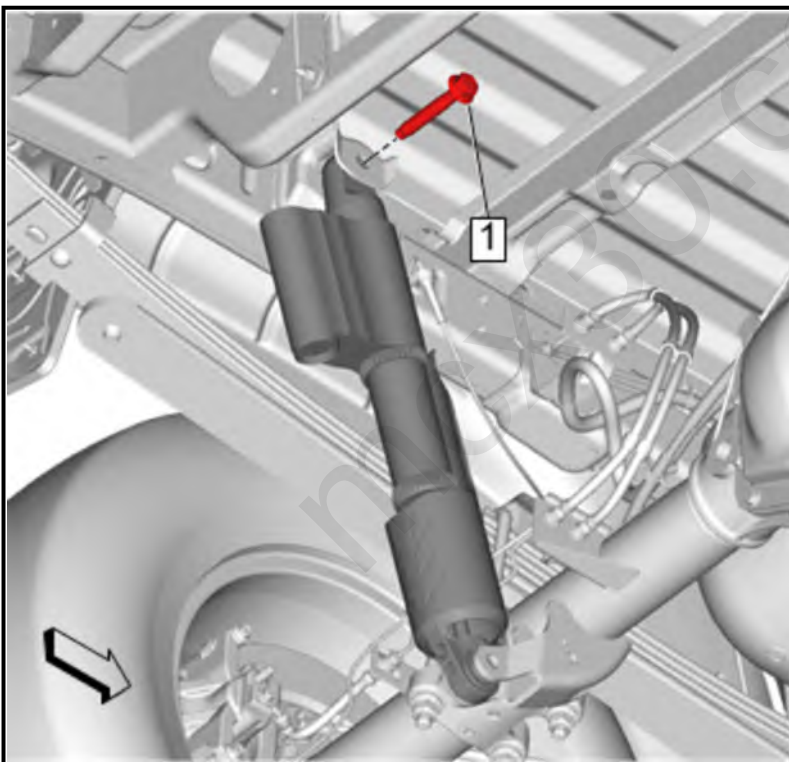


Installation Procedure

1. Rear Shock Absorber (1) - Install

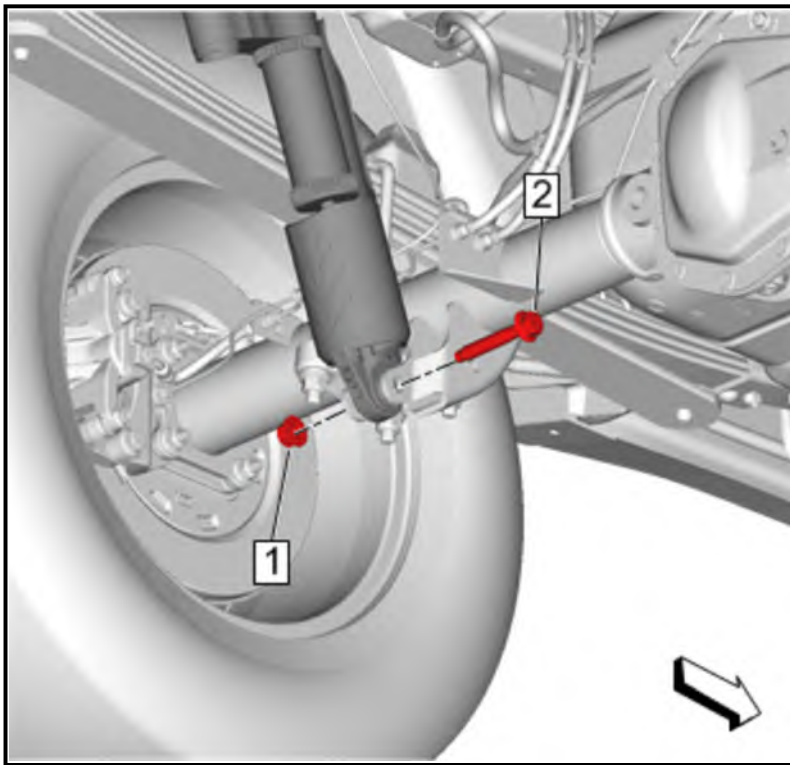


2. Rear Shock Absorber Bolt @ Frame (1) - Install and tighten 115 N.m (85 lb ft)



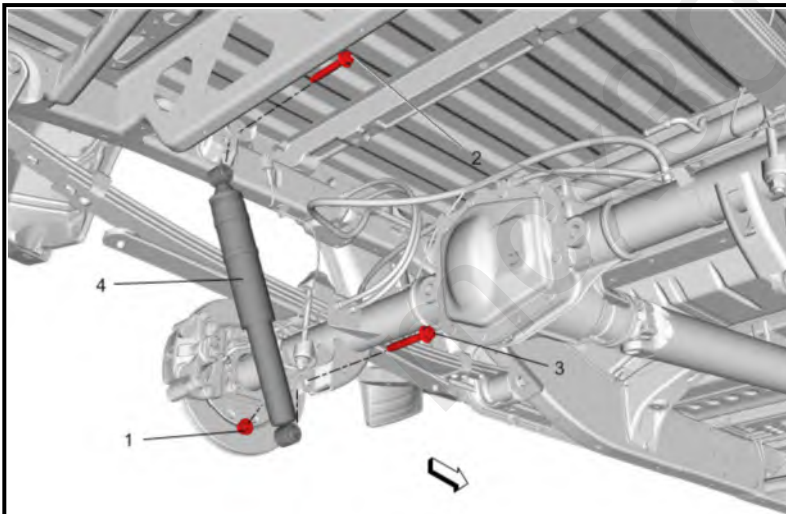
CAUTION: Refer to [Fastener Caution](#) .

3. Rear Shock Absorber Bolt (2) @ Rear Axle - Install



4. Rear Shock Absorber Nut (1) @ Rear Axle - Install
5. Rear Shock Absorber Bolt (2) @ Rear Axle - Tighten 160 N.m (118 lb ft)
6. Remove the support and lower the vehicle.

SHOCK ABSORBER REPLACEMENT (LEFT SIDE LWN WITHOUT ZR2)



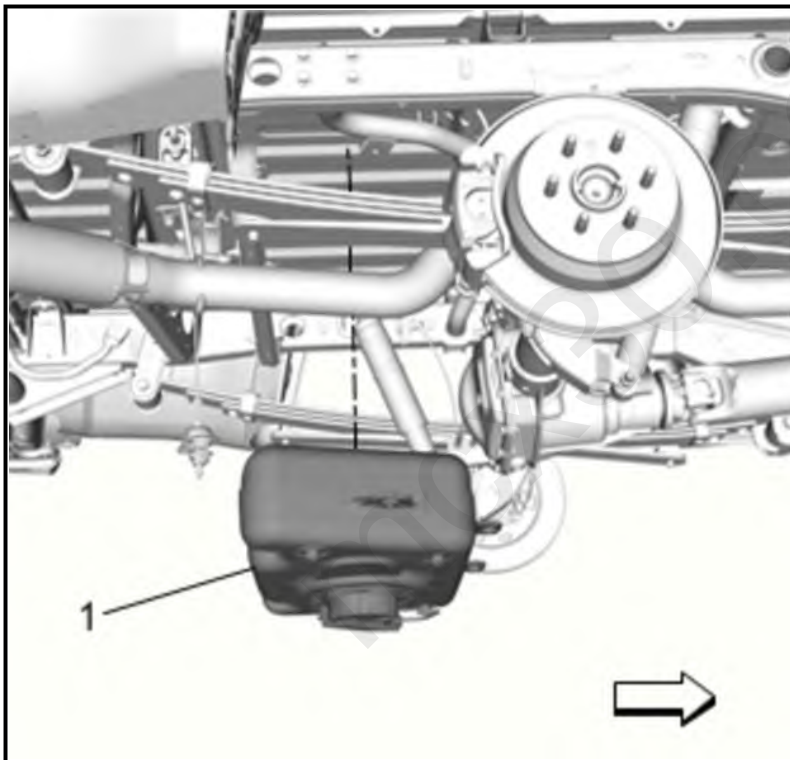
Callout	Component Name
Preliminary Procedure 1. <u>Lifting and Jacking the Vehicle</u> 2. <u>Emission Reduction Fluid Tank Replacement</u>	
1	Rear Shock Absorber Lower Nut CAUTION: Refer to <u>Fastener Caution</u> .

Callout	Component Name
	Procedure Support the rear axle with a hydraulic transmission stand.
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

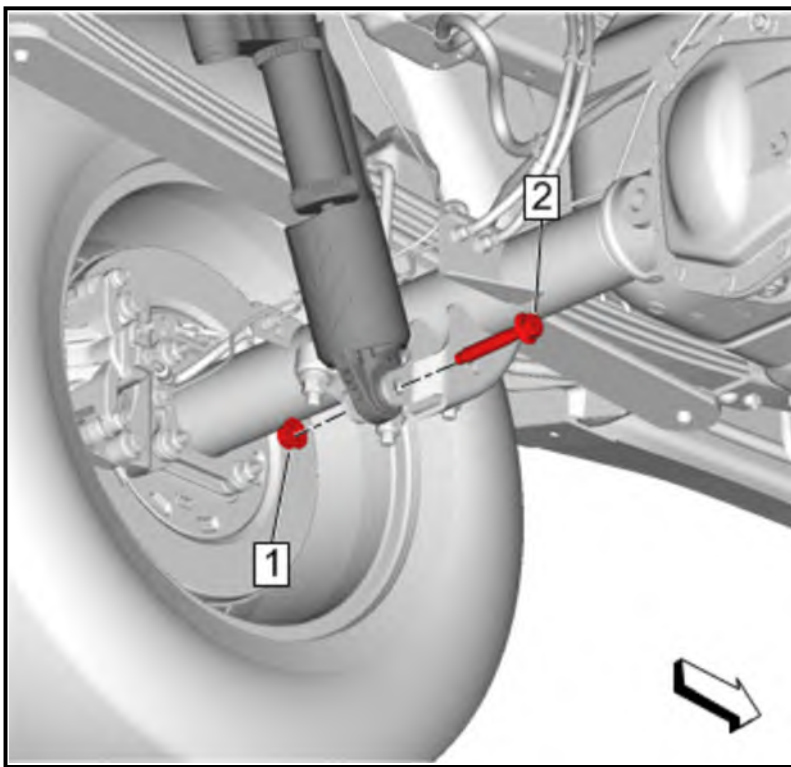
SHOCK ABSORBER REPLACEMENT (LEFT SIDE LWN WITH ZR2)

Removal Procedure

1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)
2. Emission Reduction Fluid Tank (1) - Remove - [Emission Reduction Fluid Tank Replacement](#)

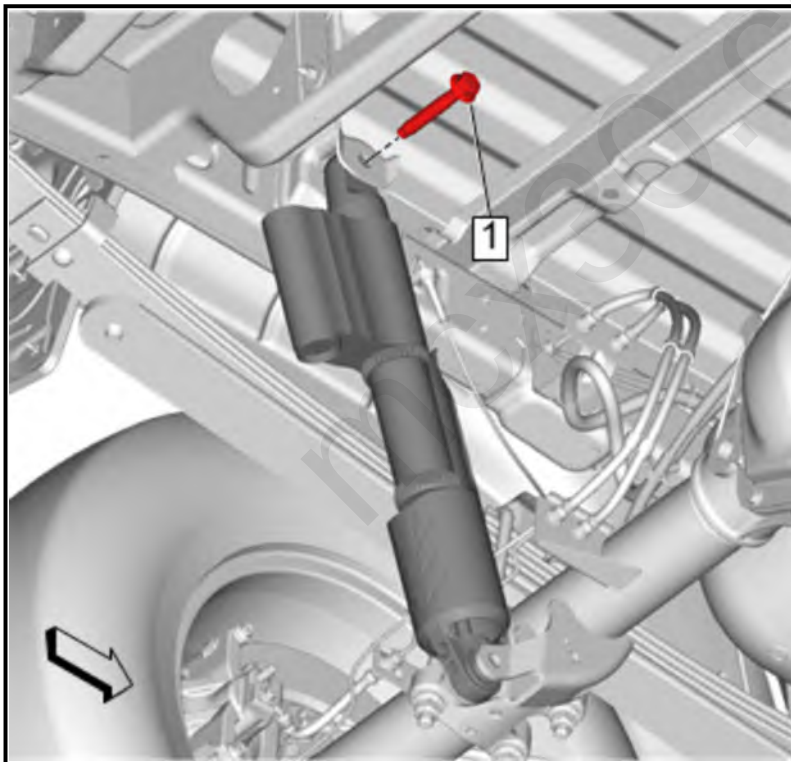


3. Rear Shock Absorber Nut (1) @ Rear Axle - Remove

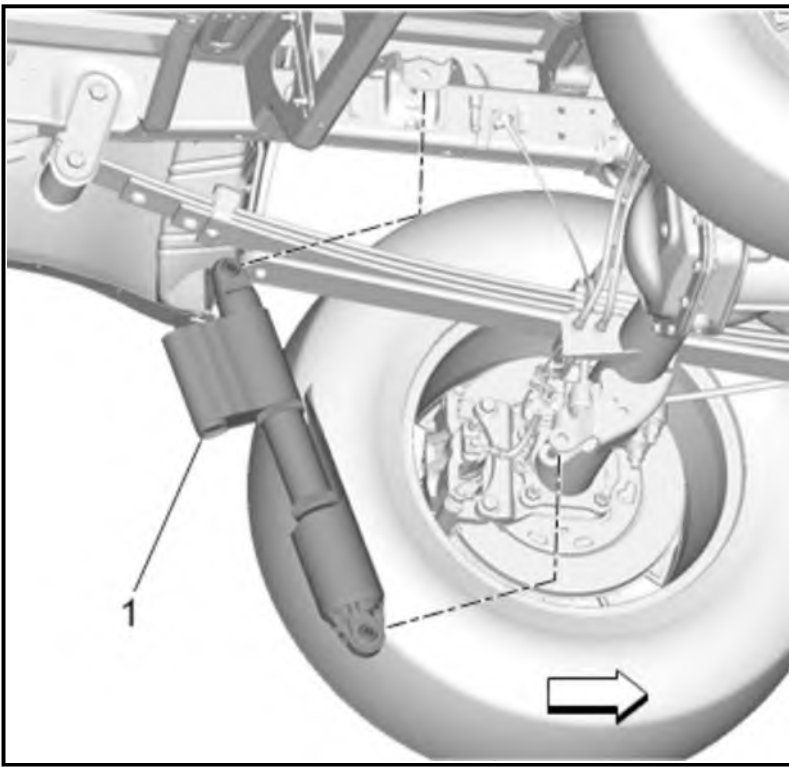


4. Rear Shock Absorber Bolt (2) @ Rear Axle - Remove

5. Rear Shock Absorber Bolt @ Frame (1) - Remove

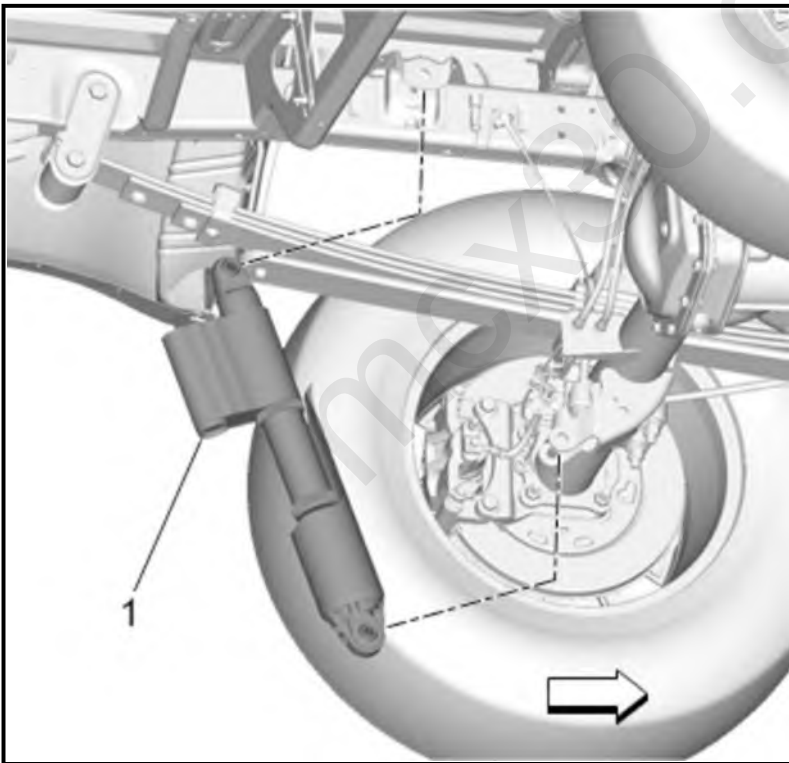


6. Rear Shock Absorber (1) - Remove

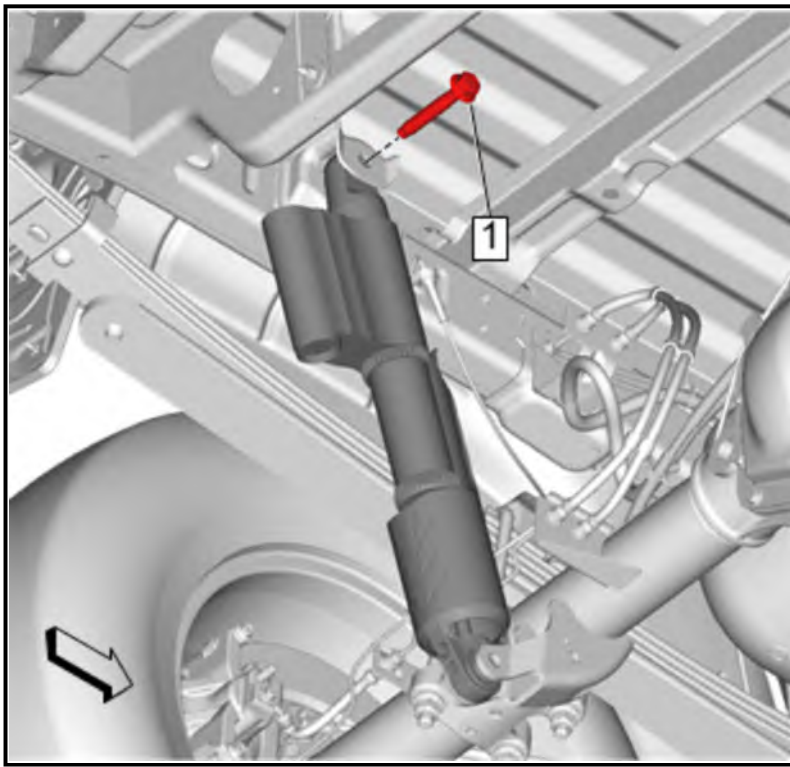


Installation Procedure

1. Rear Shock Absorber (1) - Install

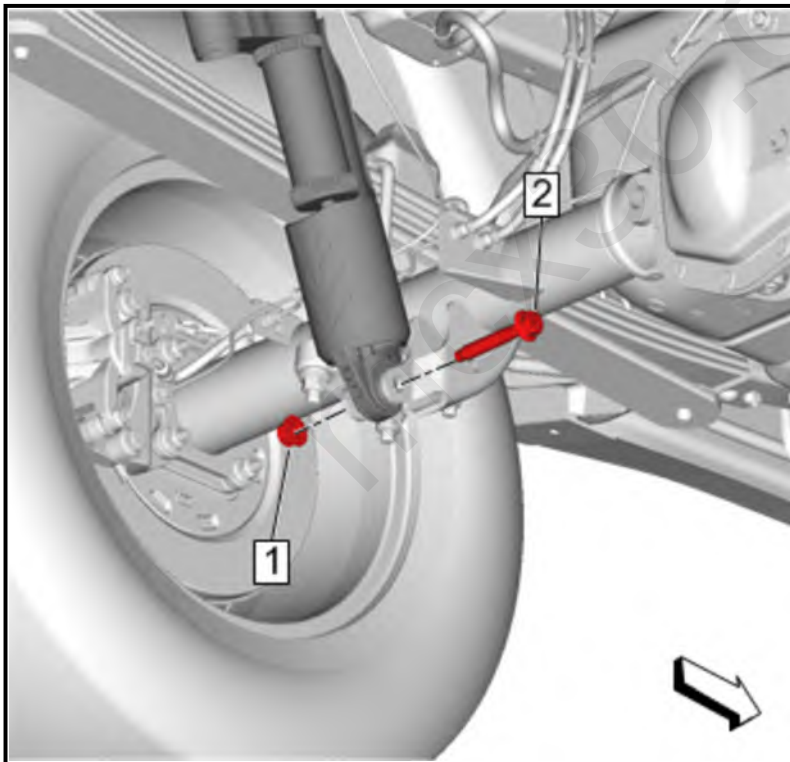


2. Rear Shock Absorber Bolt @ Frame (1) - Install and tighten 115 N.m (85 lb ft)



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

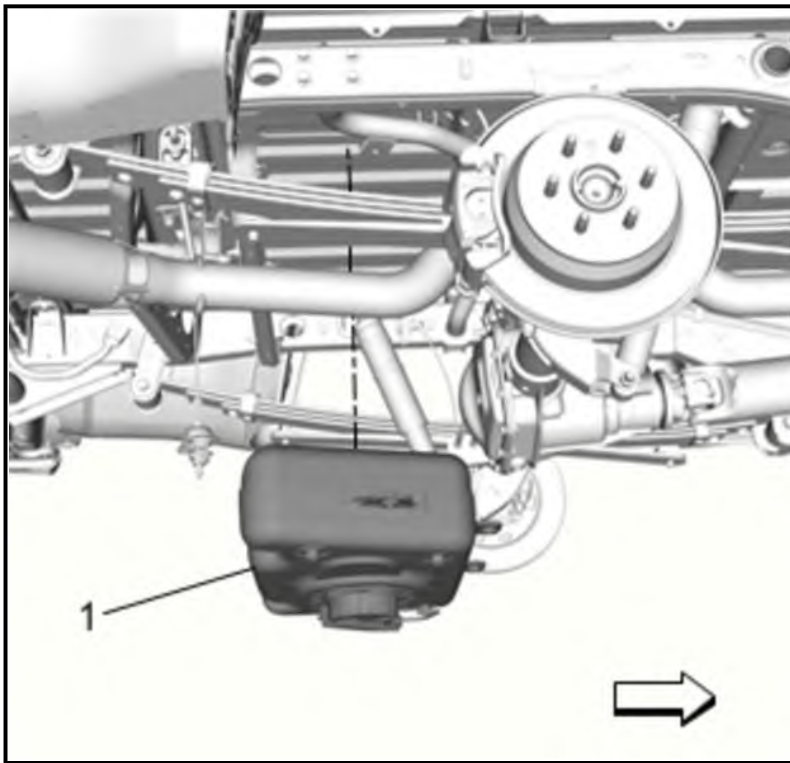
3. Rear Shock Absorber Bolt (2) @ Rear Axle - Install



4. Rear Shock Absorber Nut (1) @ Rear Axle - Install

5. Rear Shock Absorber Bolt (2) @ Rear Axle - Tighten 160 N.m (118 lb ft)

6. Emission Reduction Fluid Tank (1) - Install - [Emission Reduction Fluid Tank Replacement](#)



7. Remove the support and lower the vehicle.

SHOCK ABSORBER DISPOSAL

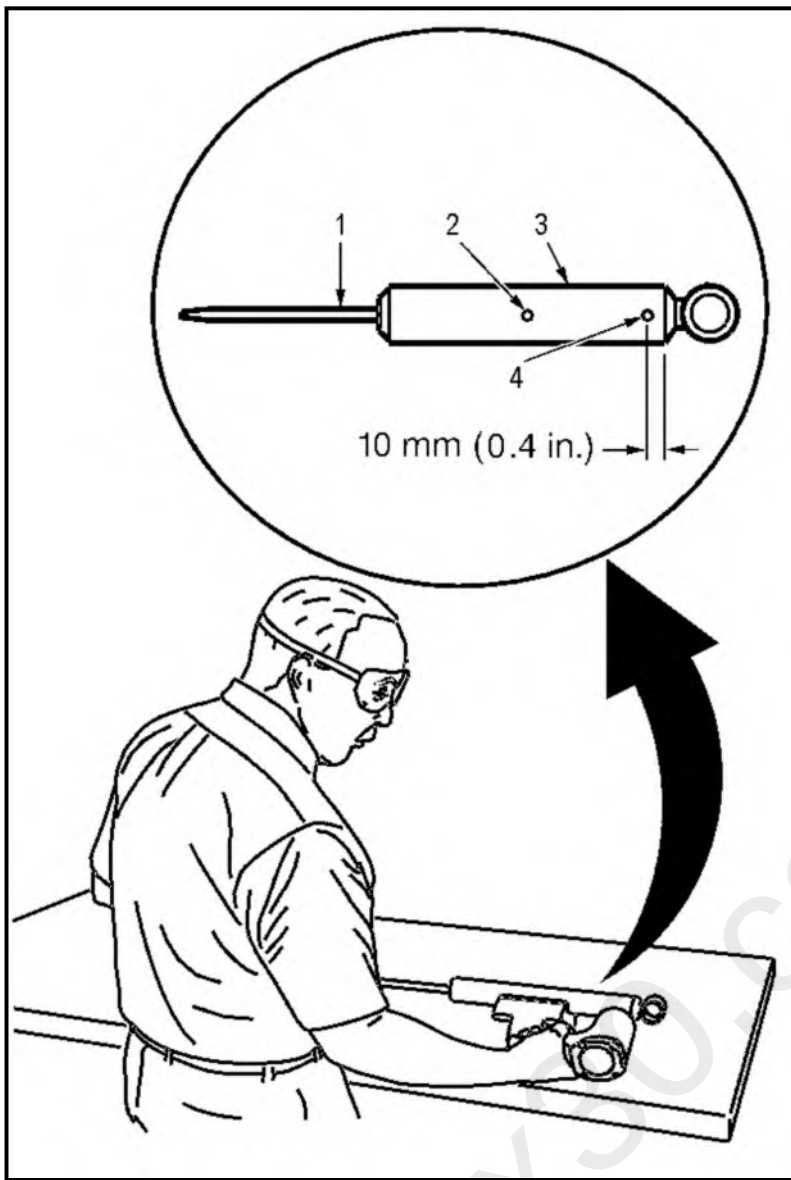
WARNING:

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.

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.
4. Make an indentation in the middle (2) of the tube (3) with a centerpunch.
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

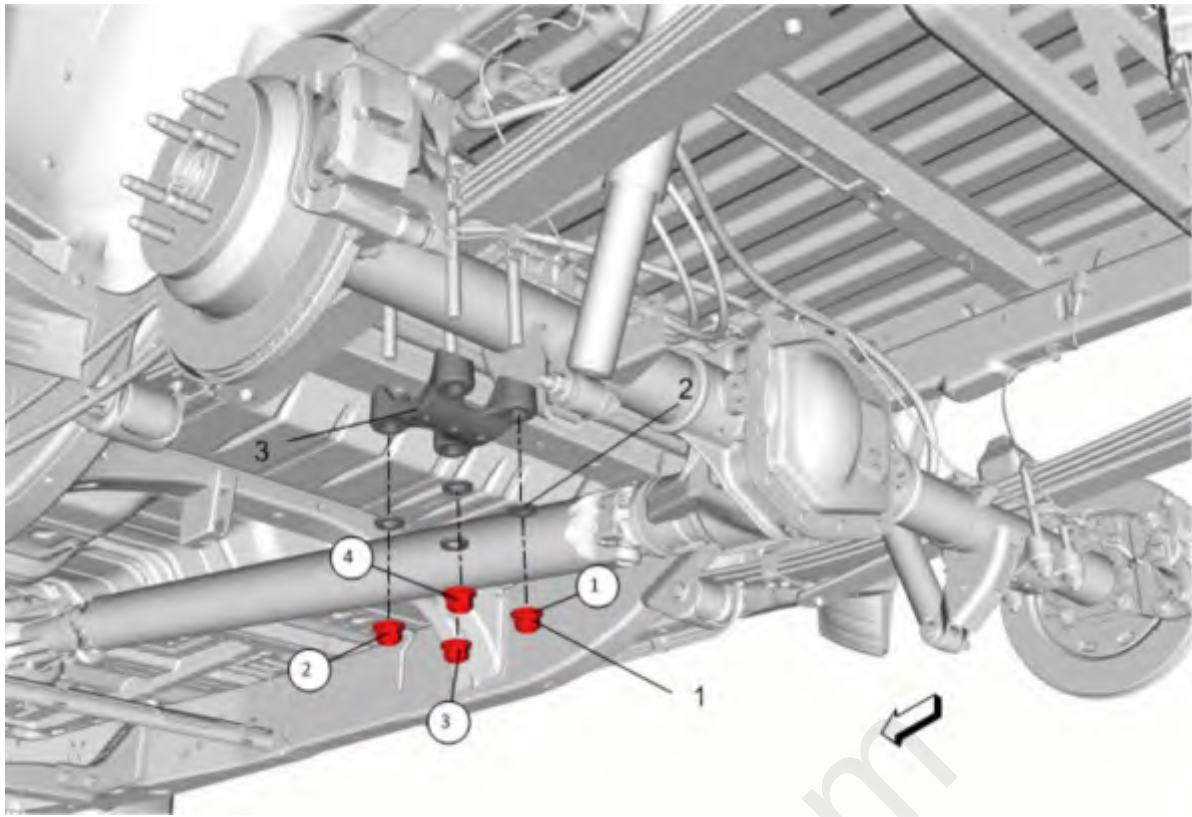
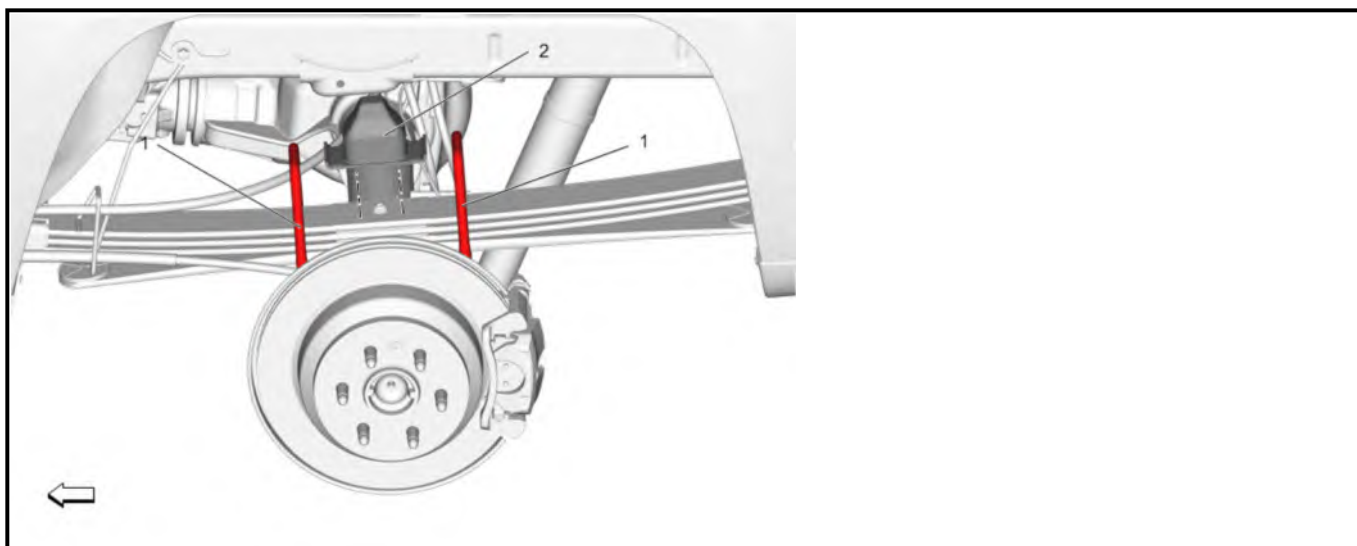


Fig. 1: Identifying Anchor Plates, U-Bolt Nuts And Washers With Tightening Sequence
 Courtesy of GENERAL MOTORS COMPANY

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

REAR AXLE BUMPER REPLACEMENT



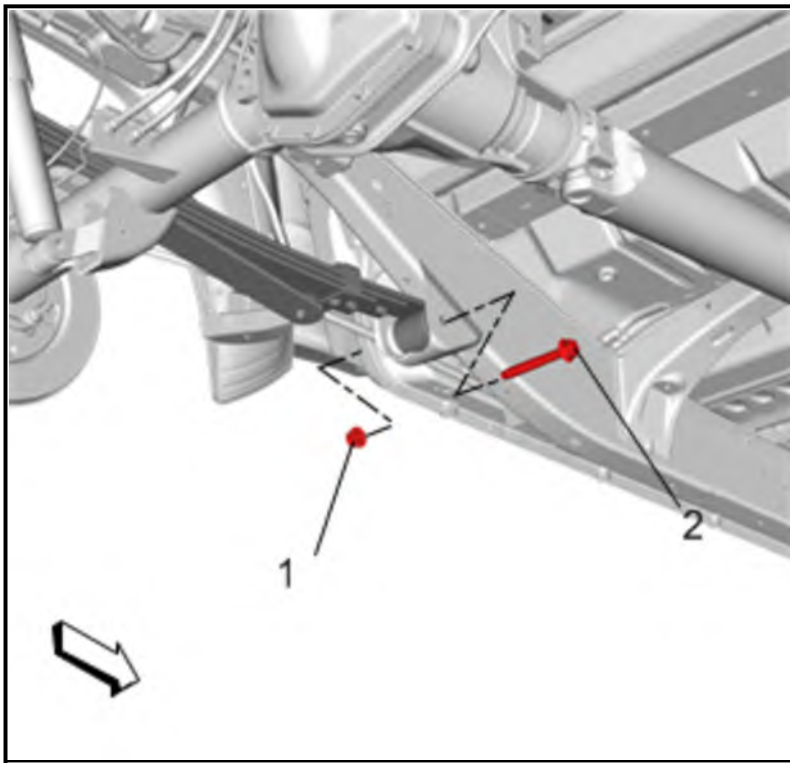
Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation . 3. Support the rear axle with a jack stand. 4. Loosen the Rear Spring Anchor Plate Nuts. Refer to 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 WITHOUT ZR2)

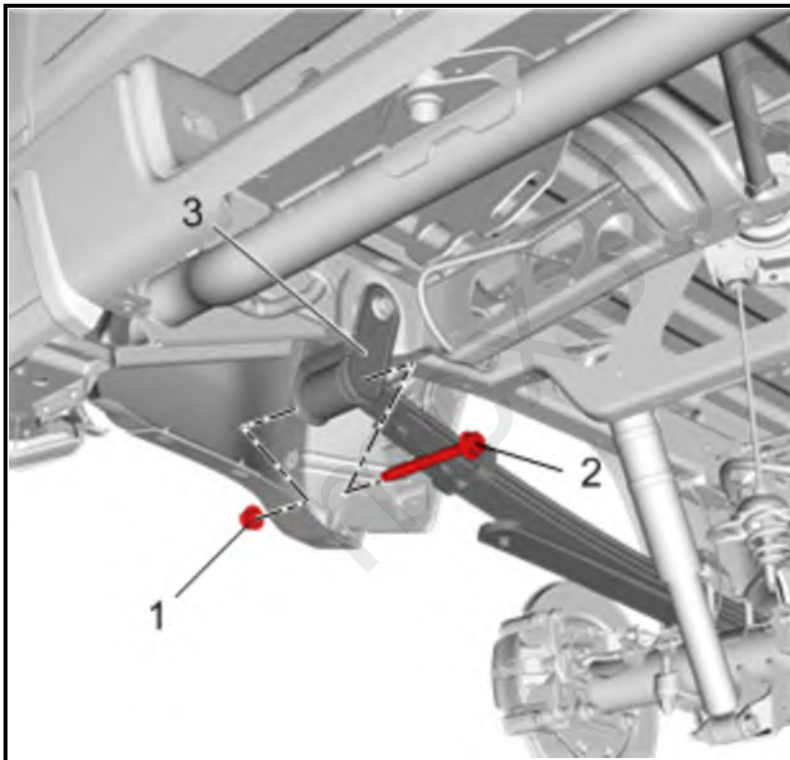
Removal Procedure

NOTE: Before replacing the rear leaf spring for a noise complaint, proper noise diagnosis must be performed and the technician should check for any available bulletins.

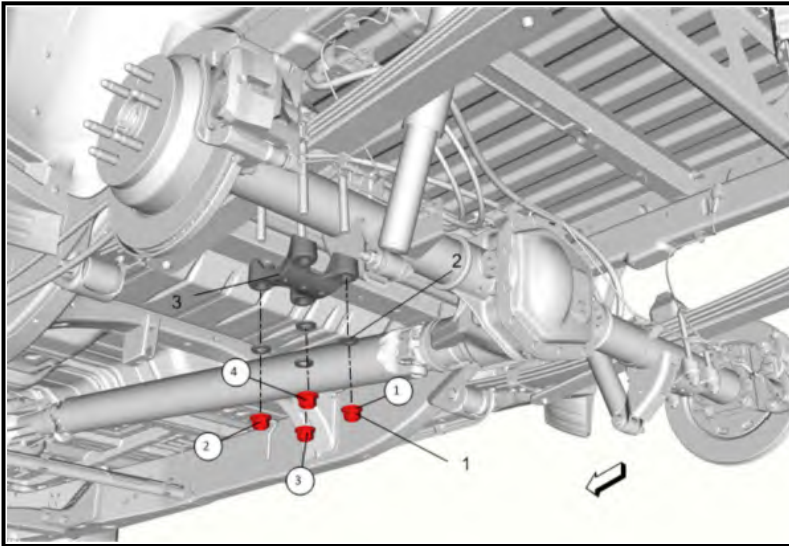
1. Remove the tires and wheels. [Tire and Wheel Removal and Installation](#)
2. Remove the fuel tank assembly. [Fuel Tank Replacement](#)
3. Using the proper jack stands, support the rear axle assembly.
4. Remove the rear leaf spring front nut (1) and bolt (2).



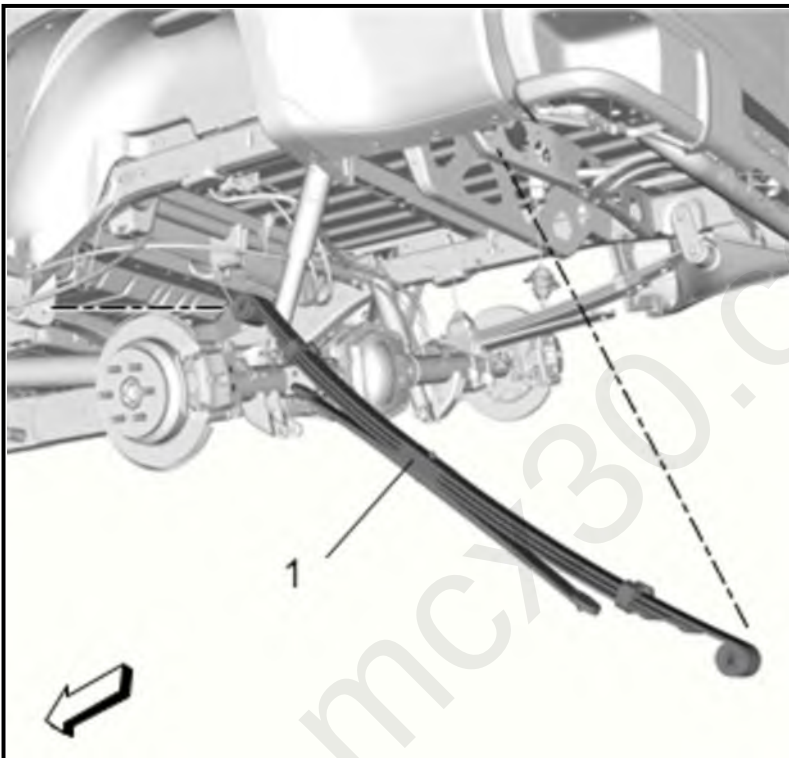
5. Remove the bottom rear spring shackle nut (1) and the bolt (2) from the shackle.



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

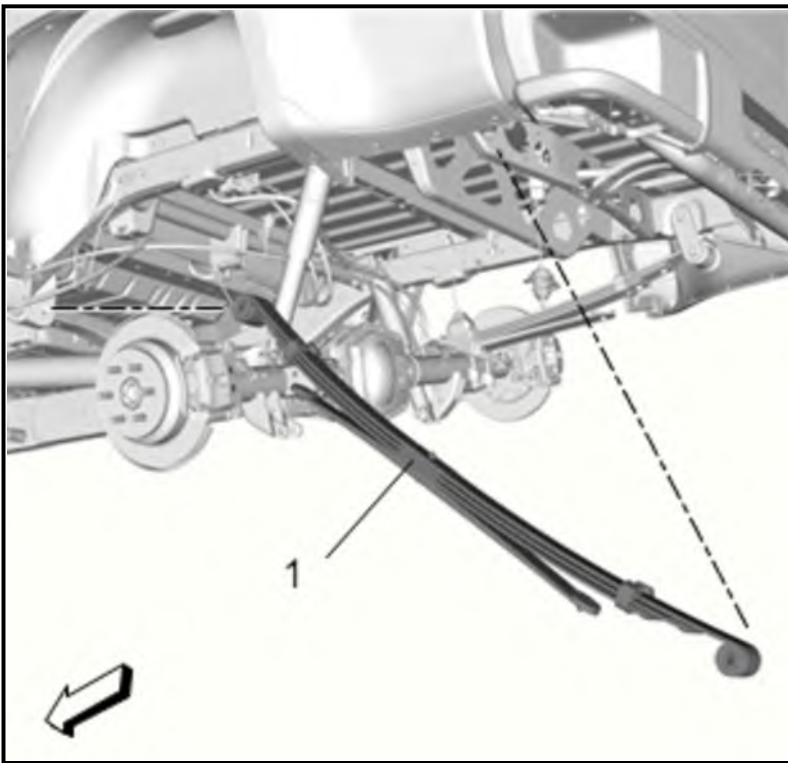


7. With the aid of an assistant, remove the rear spring assembly (1) from the vehicle.

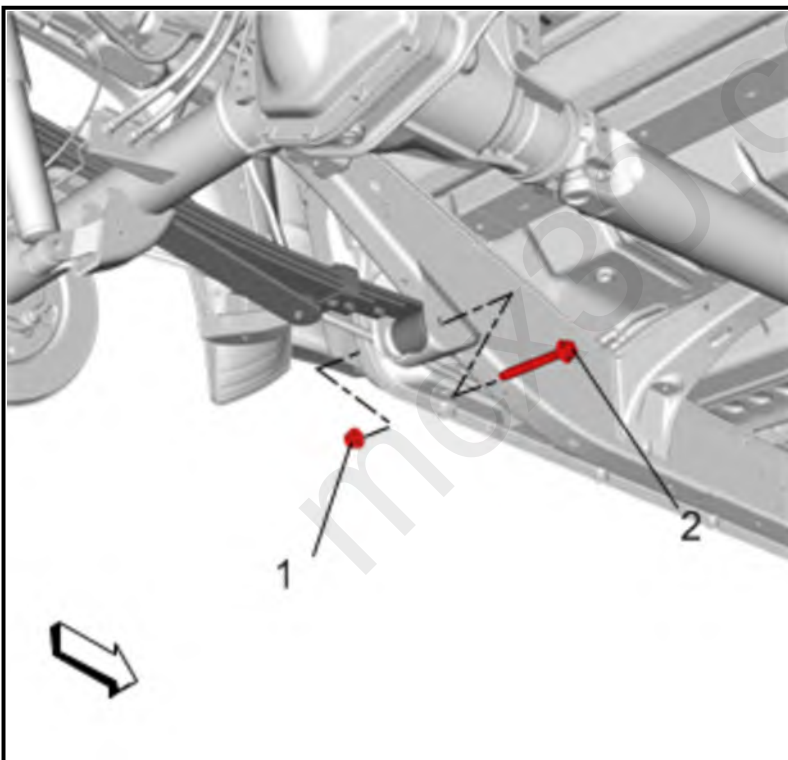


Installation Procedure

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



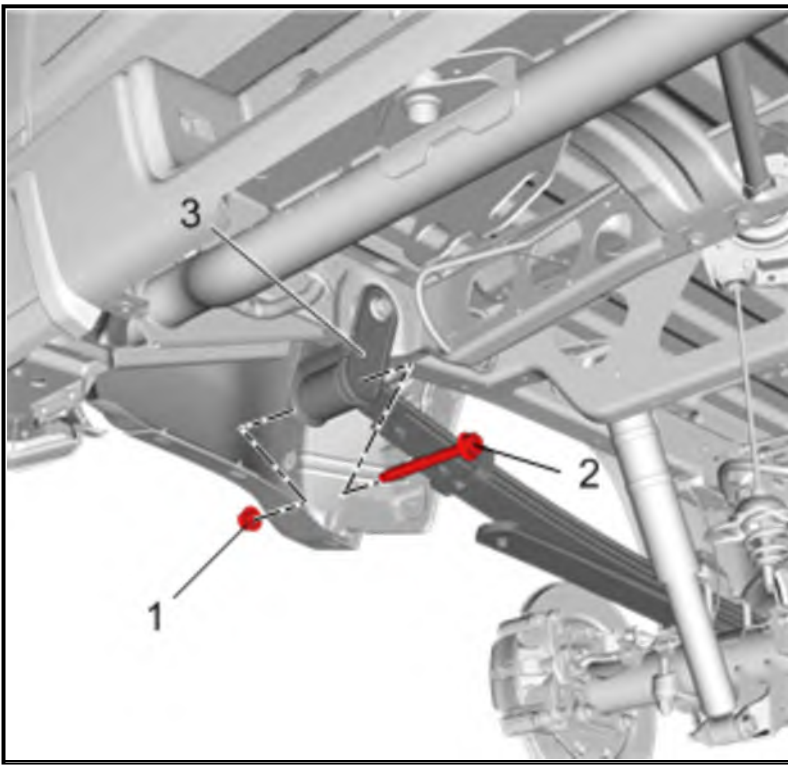
2. Install the rear spring front bolt (2).



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

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

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



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

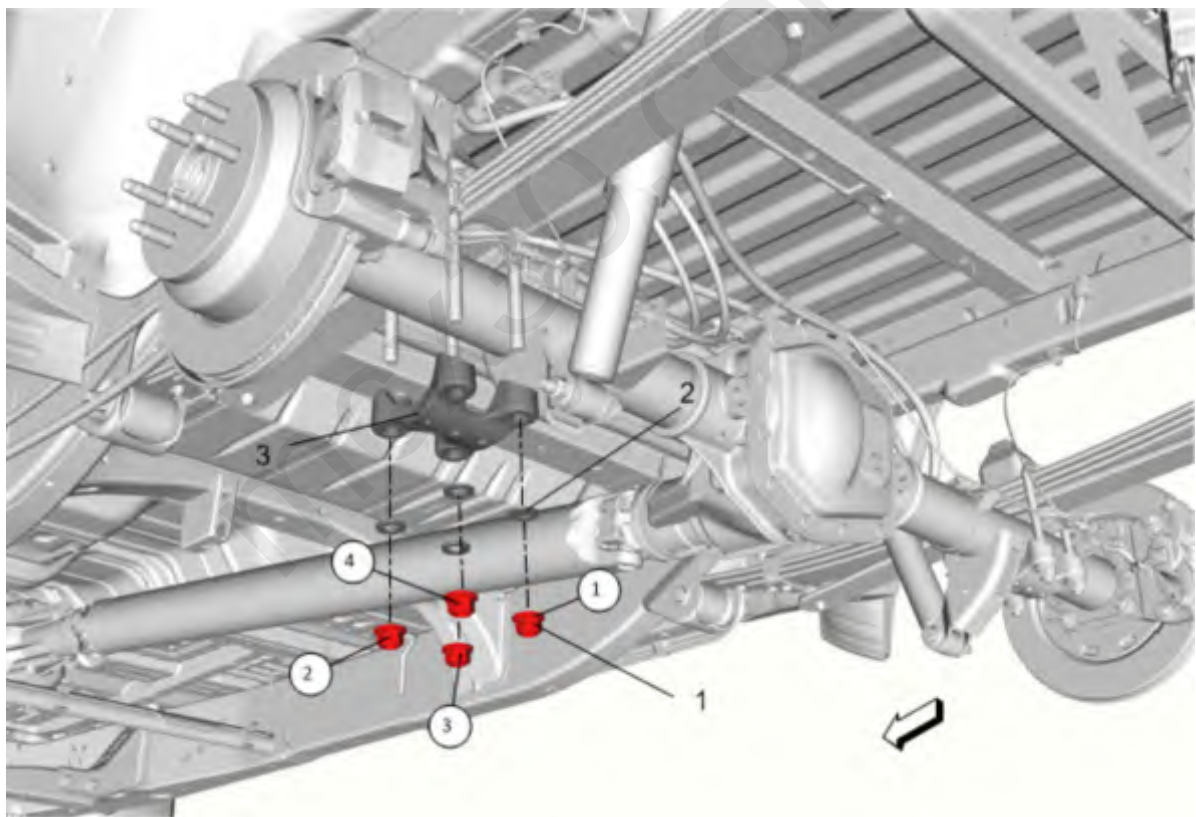


Fig. 2: Identifying Anchor Plates, U-Bolt Nuts And Washers With Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

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
6. Install the fuel tank assembly. [Fuel Tank Replacement](#)
7. Install the tires and wheels. [Tire and Wheel Removal and Installation](#)

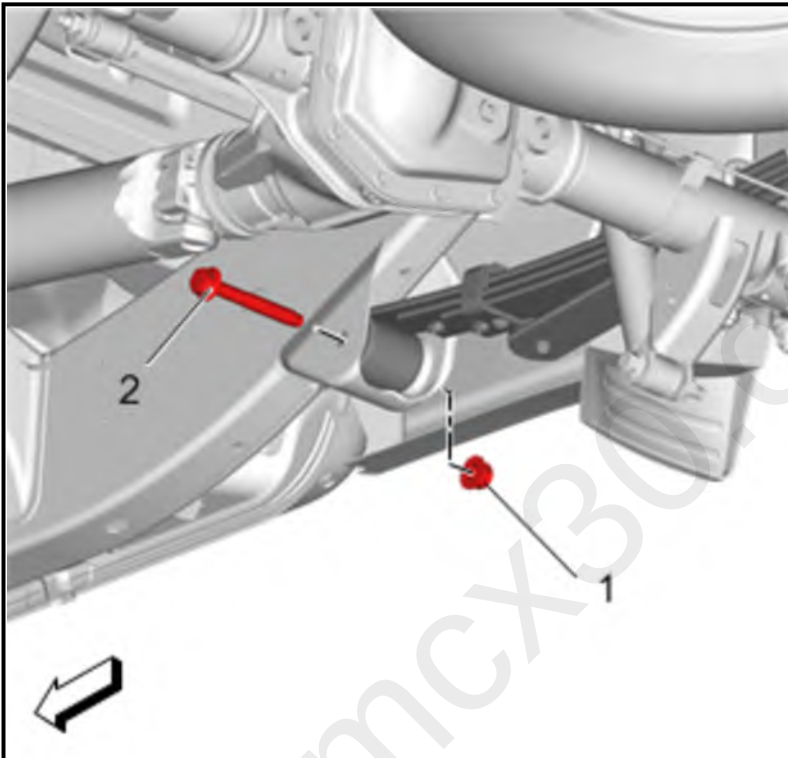
8. Remove the jack stands.

REAR LEAF SPRING REPLACEMENT (RIGHT SIDE WITHOUT ZR2)

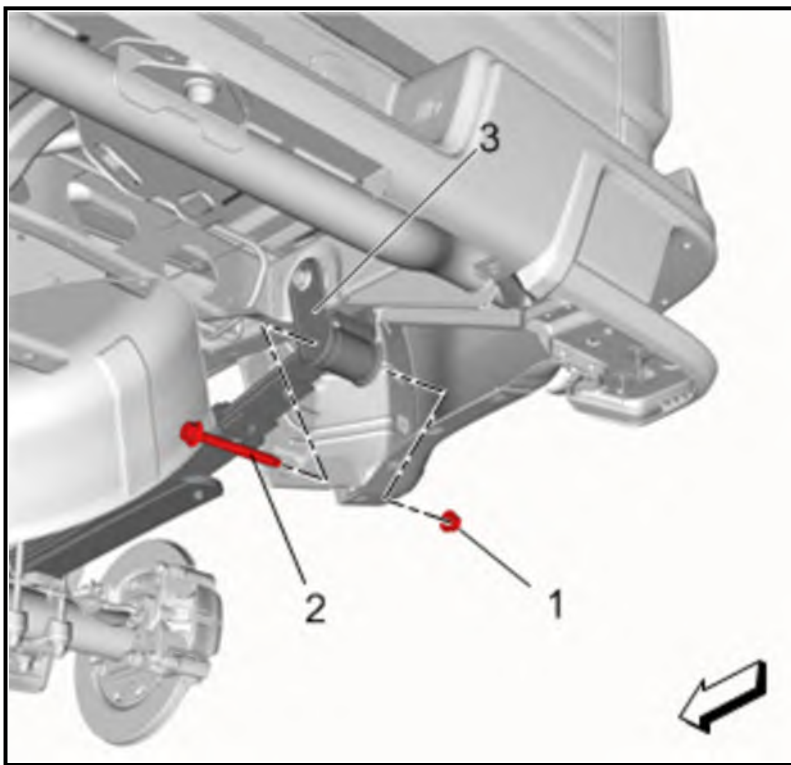
Removal Procedure

NOTE: Before replacing the rear leaf spring for a noise complaint, proper noise diagnosis must be performed and the technician should check for any available bulletins.

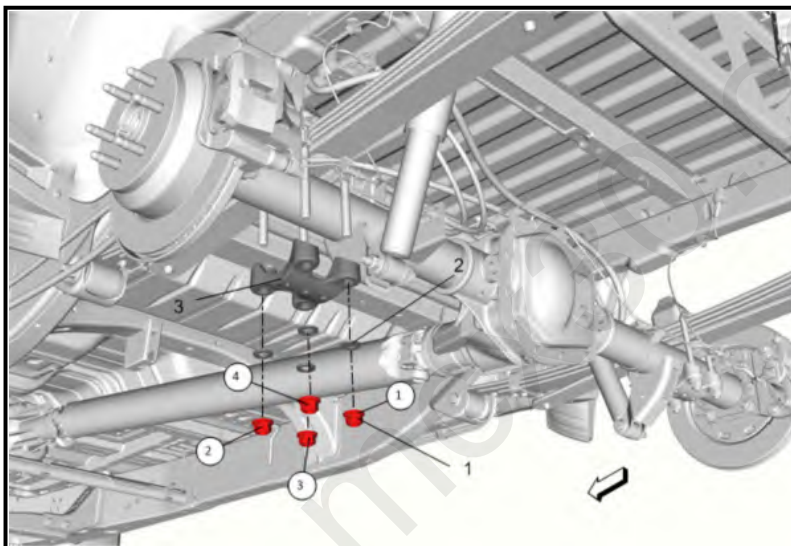
1. Remove the tires and wheels. [Tire and Wheel Removal and Installation](#)
2. Using the proper jack stands, support the rear axle assembly.
3. Using an appropriate jack, raise the exhaust system just enough to allow the front leaf spring bolt clearance for removal.
4. Remove the rear leaf spring front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



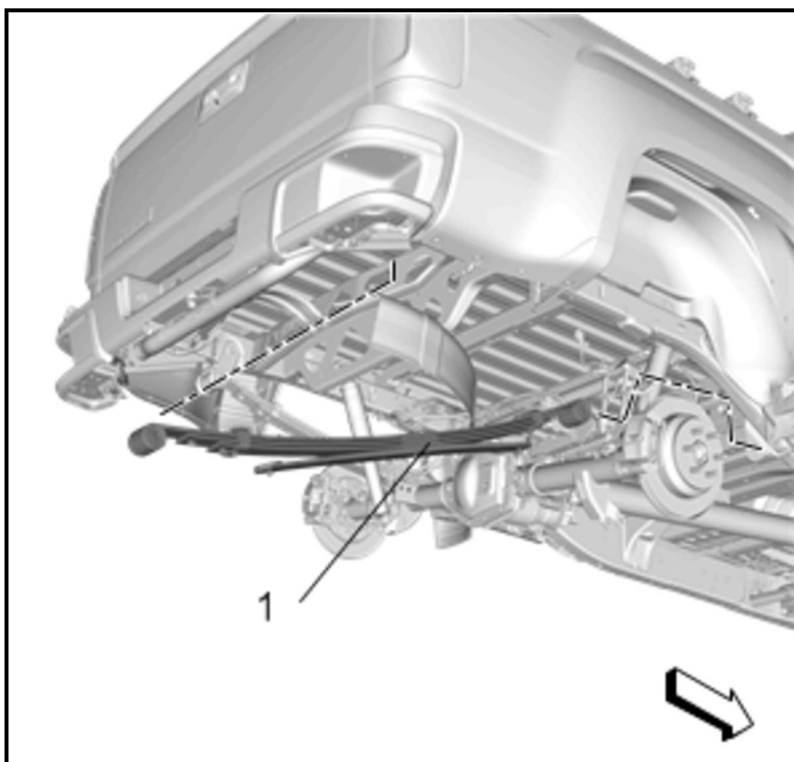
5. Remove the bottom rear spring shackle nut (1) and the bolt (2) from the shackle.



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

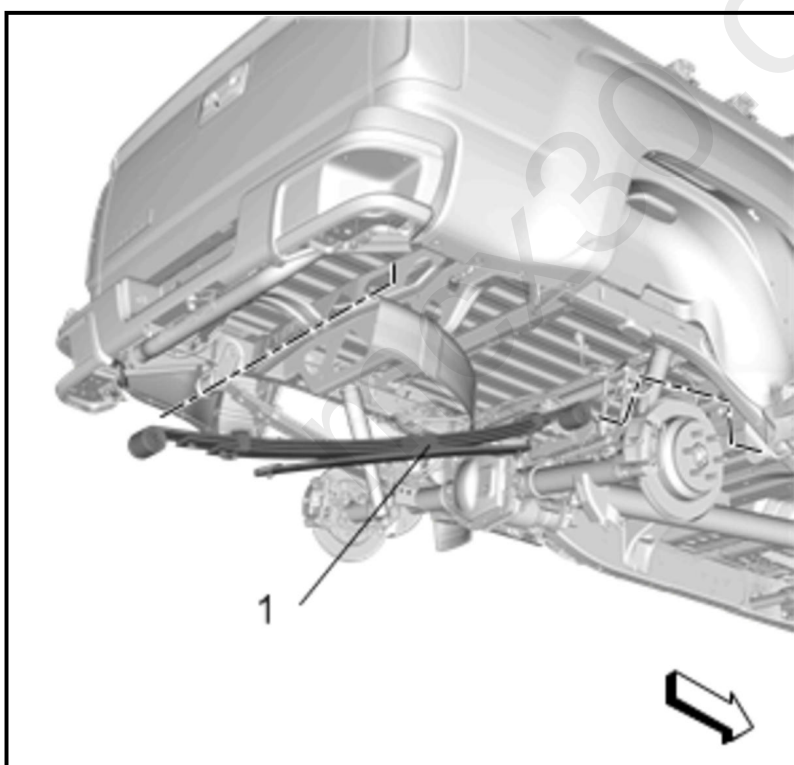


7. With the aid of an assistant, remove the rear spring assembly (1) from the vehicle.

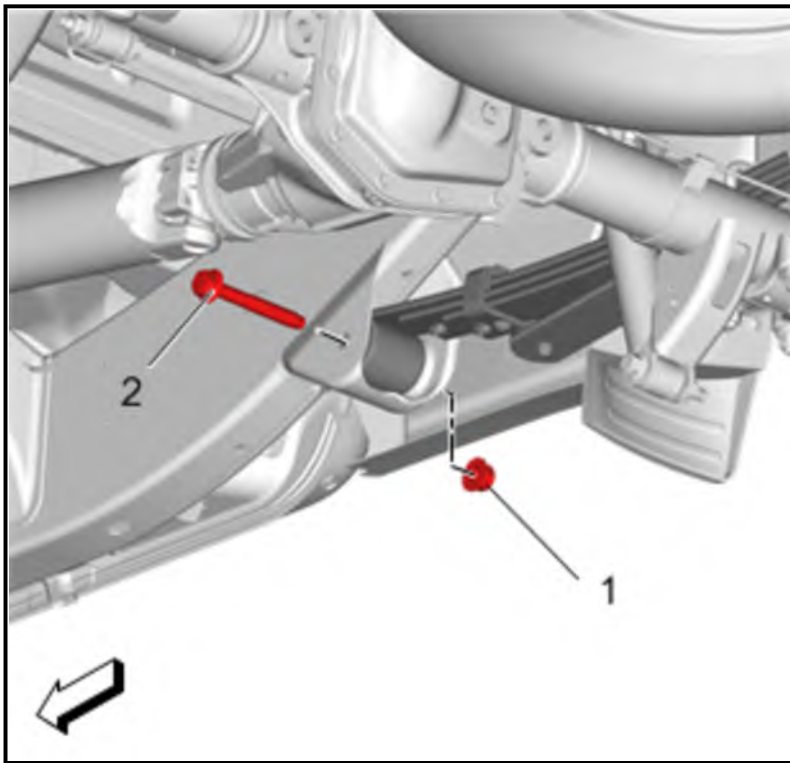


Installation Procedure

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



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

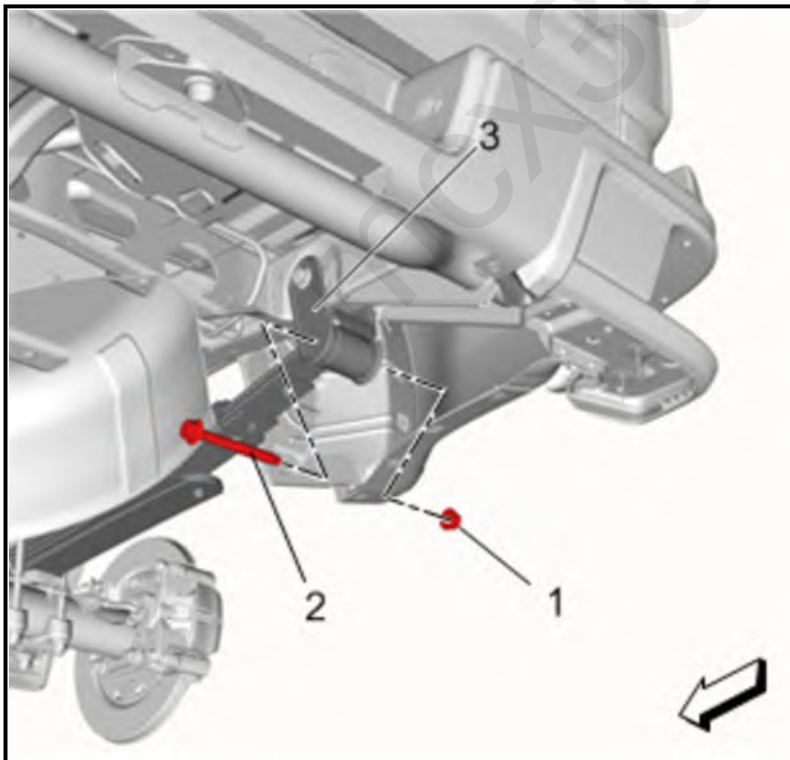


3. Remove the jack and allow the exhaust to return to its original position.

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

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

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



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

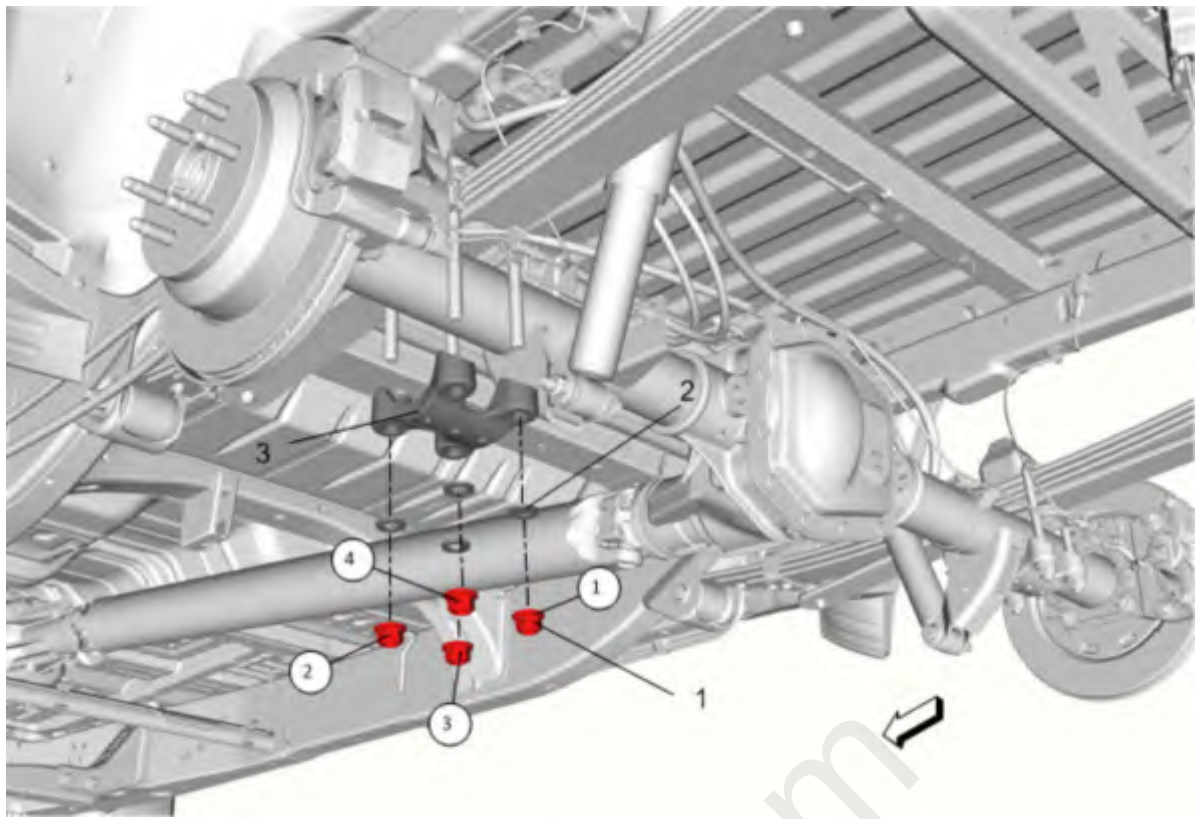


Fig. 3: Identifying Anchor Plates, U-Bolt Nuts And Washers With Tightening Sequence
 Courtesy of GENERAL MOTORS COMPANY

Tighten

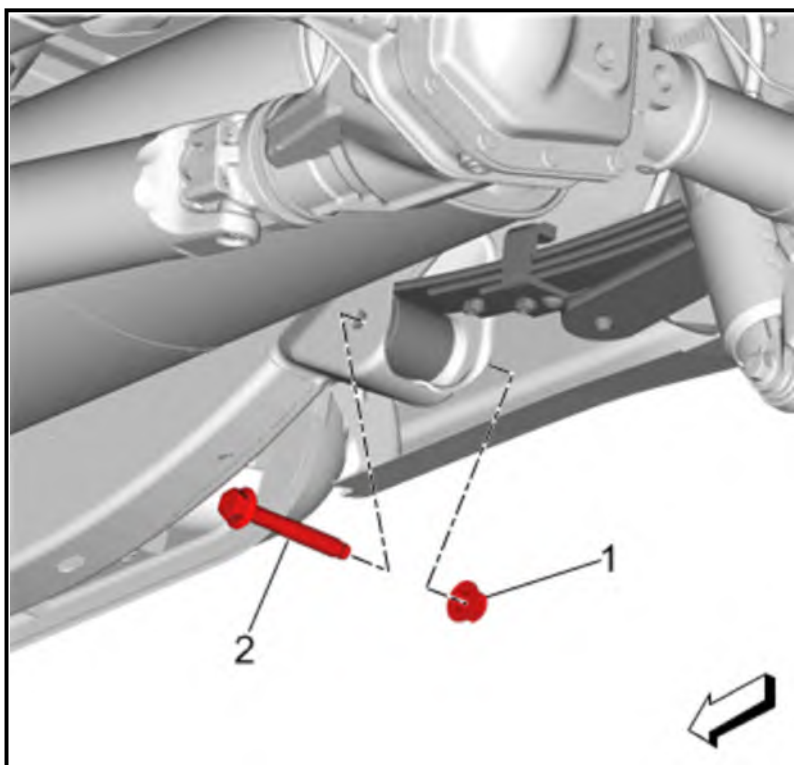
1. Tighten nuts in sequence 1, 2, 3, 4.
2. First Pass 80 N.m (59 lb ft).
3. Final Pass 125 - 135 Degrees
7. Install the tires and wheels. [Tire and Wheel Removal and Installation](#)
8. Remove the jack stands
9. Lower the vehicle.

REAR LEAF SPRING REPLACEMENT (RIGHT SIDE WITH ZR2)

Removal Procedure

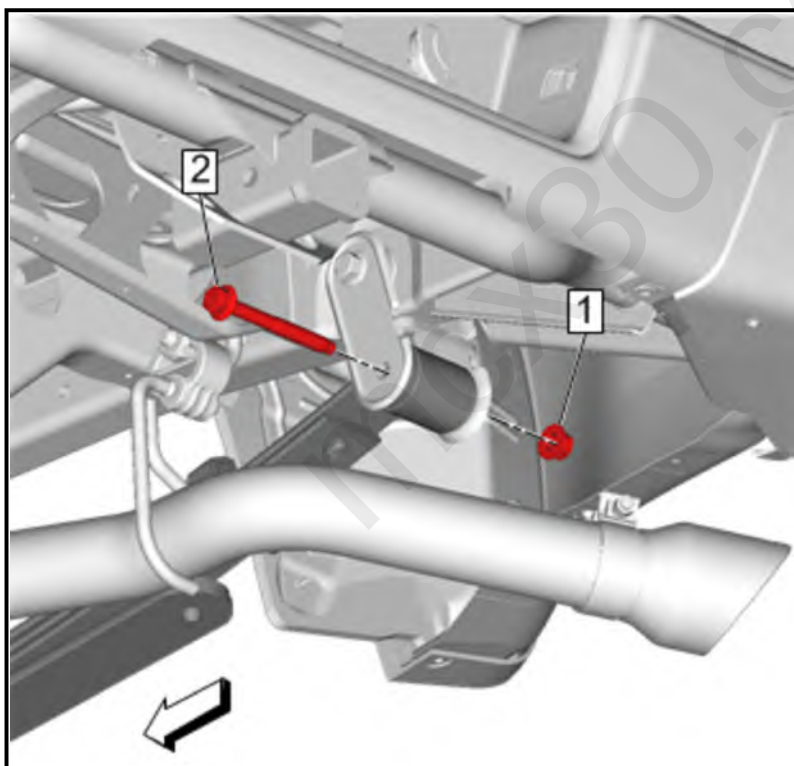
NOTE: Before replacing the rear leaf spring for a noise complaint, proper noise diagnosis must be performed and the technician should check for any available bulletins.

1. Remove the right rear tire and wheel assembly. [Tire and Wheel Removal and Installation](#)
2. Using the proper jack stands, support the rear axle assembly.
3. Using an appropriate jack, raise the exhaust system just enough to allow the front leaf spring bolt clearance for removal.
4. Rear Spring Nut (1) - Remove



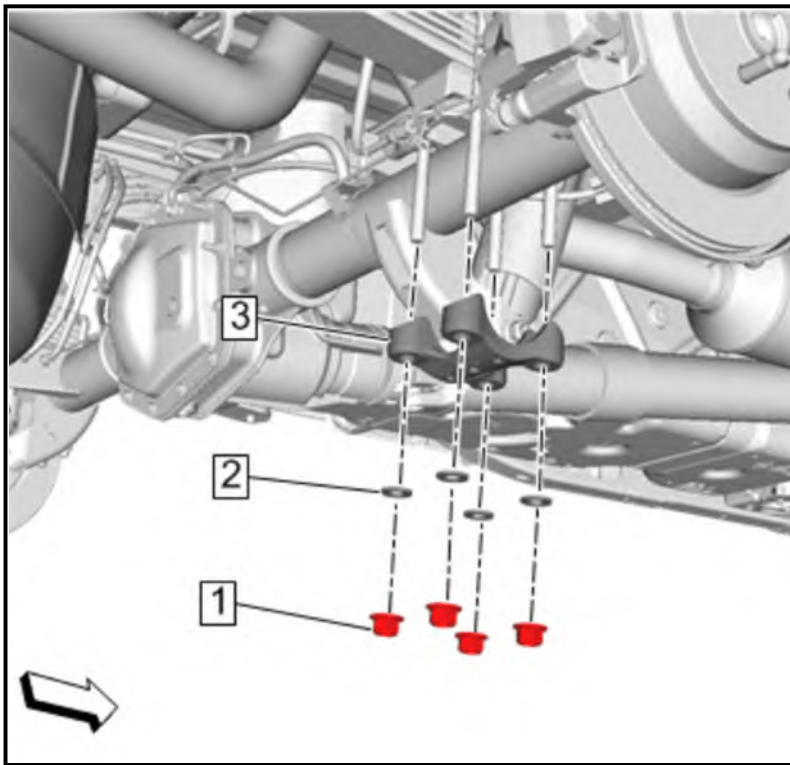
5. Rear Spring Bolt (2) - Remove

6. Rear Spring Shackle Nut (1) - Remove

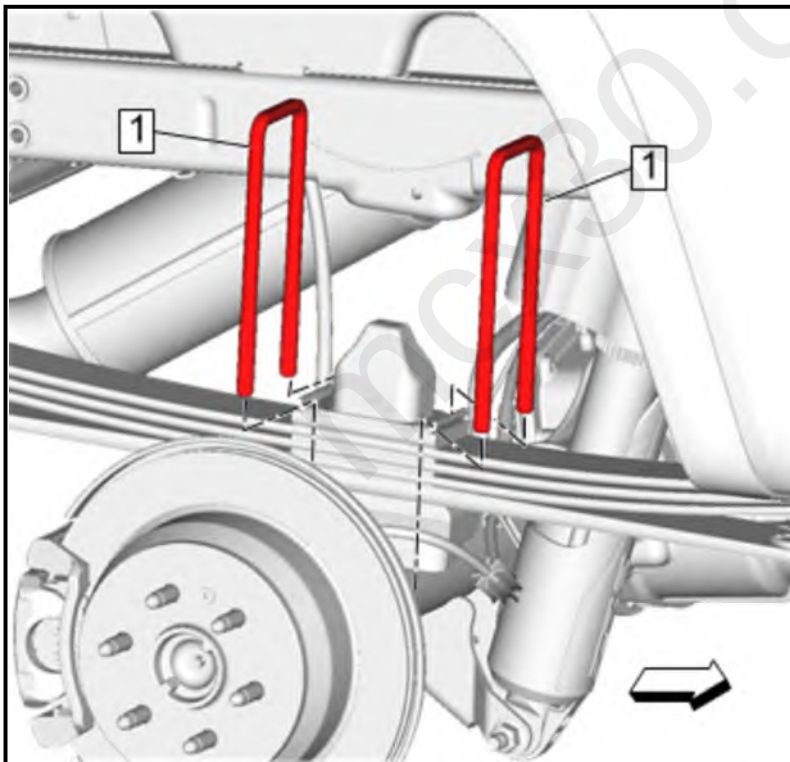


7. Rear Spring Shackle Bolt (2) - Remove

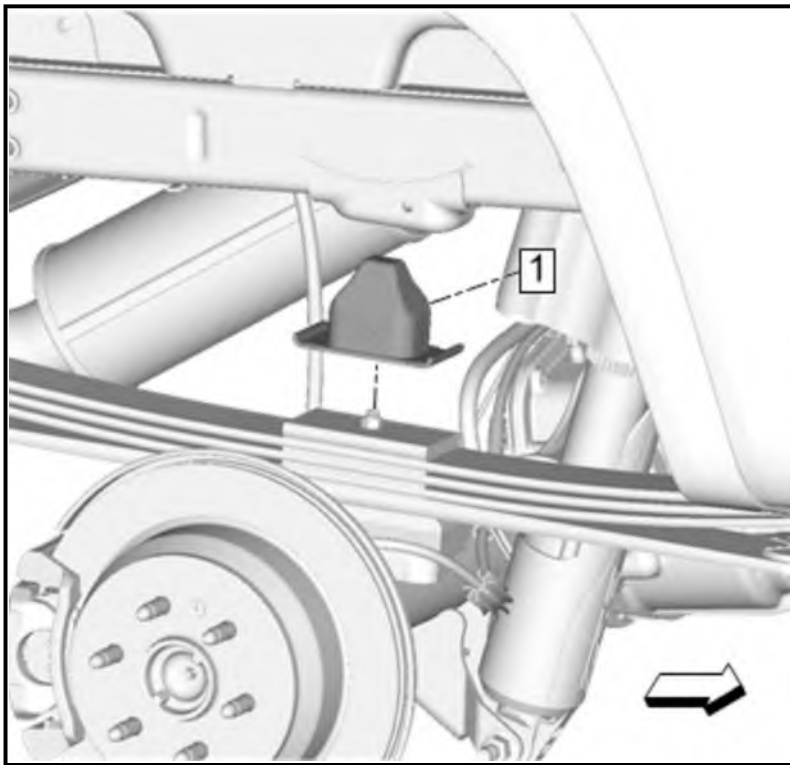
8. Rear Spring U-Bolt Nut (1) - Remove [4x]



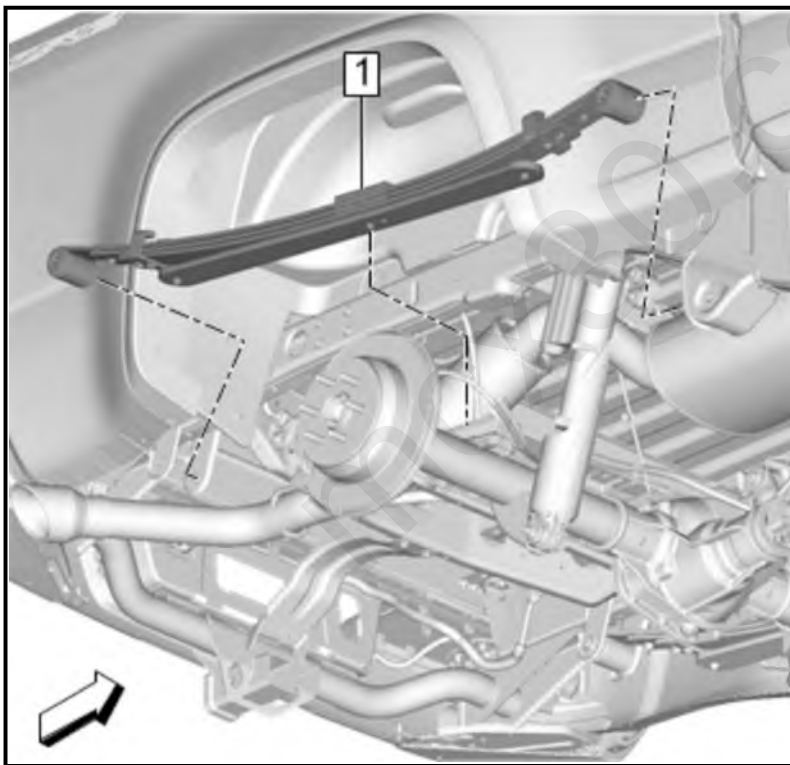
- 9. Rear Spring U-Bolt Washer (2) - Remove [4x]
- 10. Rear Spring Anchor Plate (3) - Remove
- 11. Rear Spring U-Bolt (1) - Remove [2x]



- 12. Rear Axle Bumper (1) - Remove

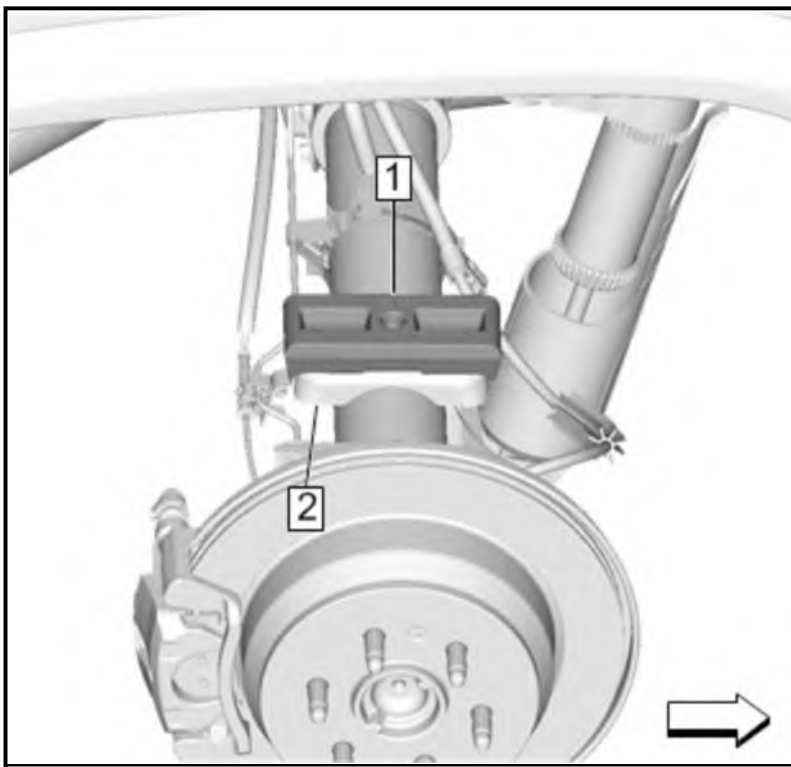


13. Rear Spring (1) - Remove

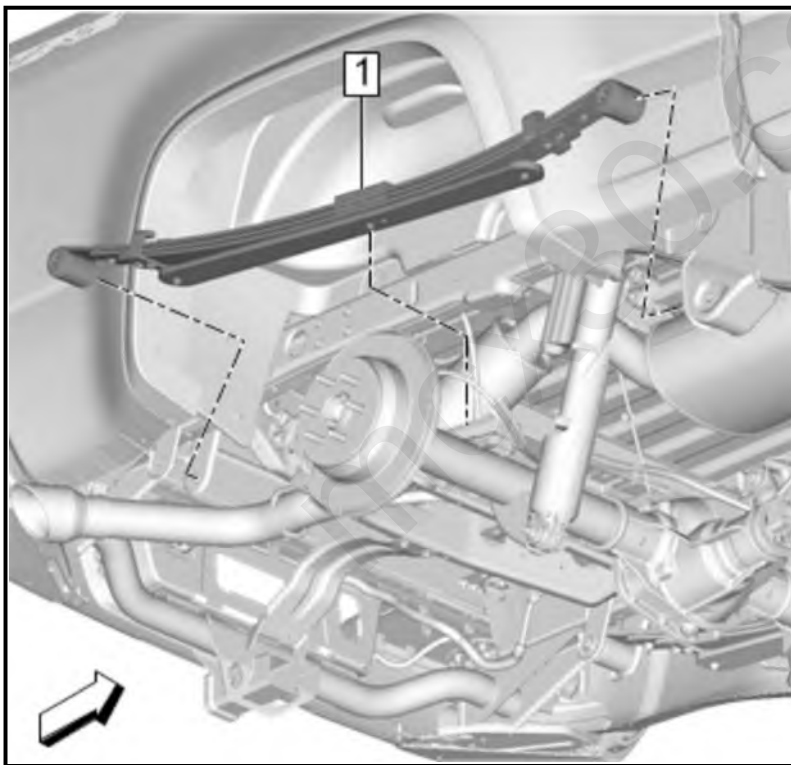


Installation Procedure

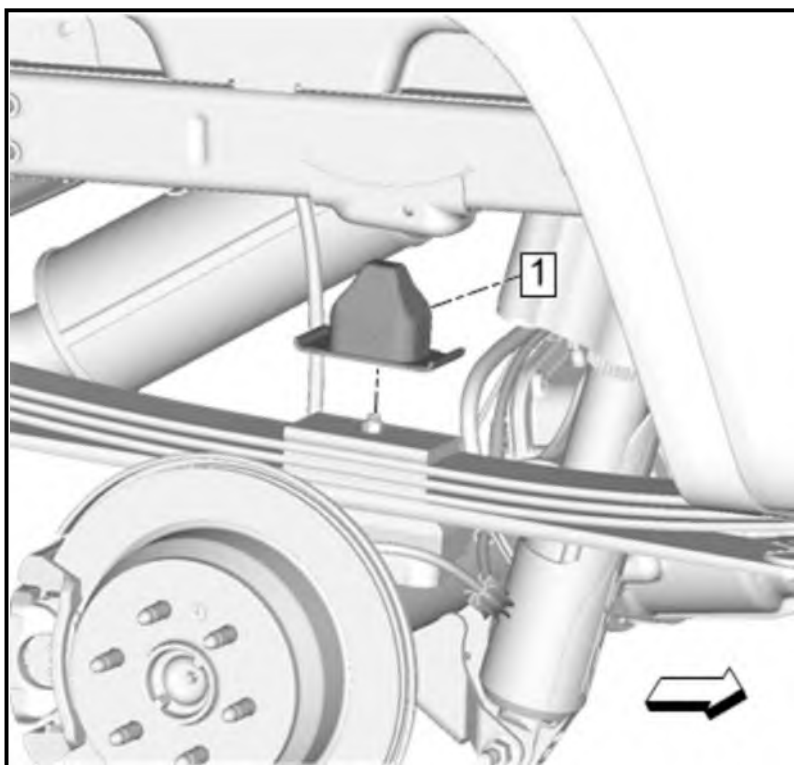
1. Verify that the Rear Spring Spacer (1) is in place and properly seated onto the Rear Axle Housing (2).



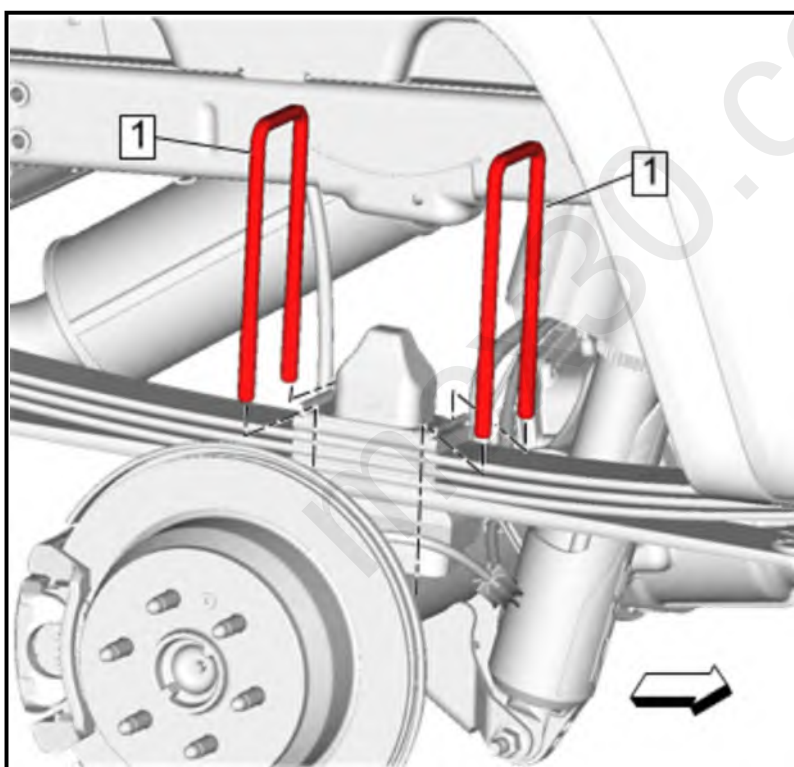
2. Rear Spring (1) - Install



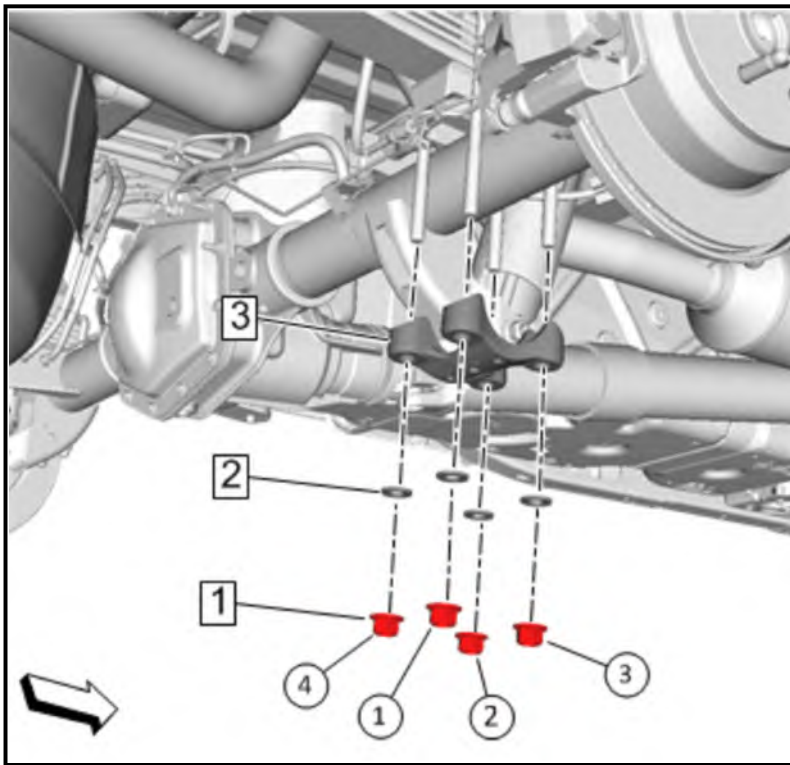
3. Rear Axle Bumper (1) - Install



4. Rear Spring U-Bolt (1) - Install [2x]



5. Rear Spring Anchor Plate (3) - Install



6. Rear Spring U-Bolt Washer (2) - Install [4x]

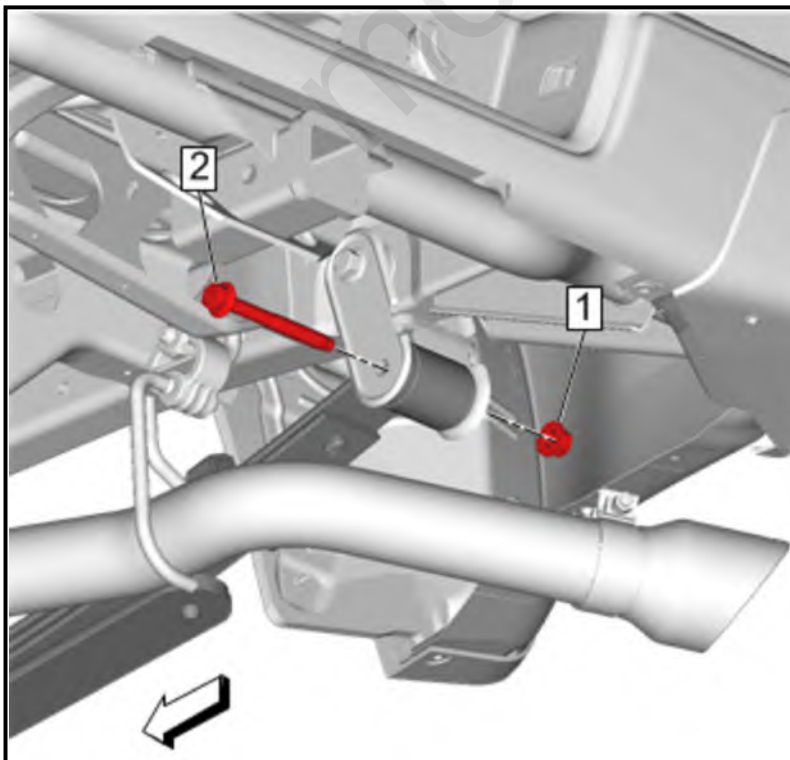
CAUTION: Refer to [Fastener Caution](#) .

7. Rear Spring U-Bolt Nut (1) - Install and tighten [4x]

Tighten

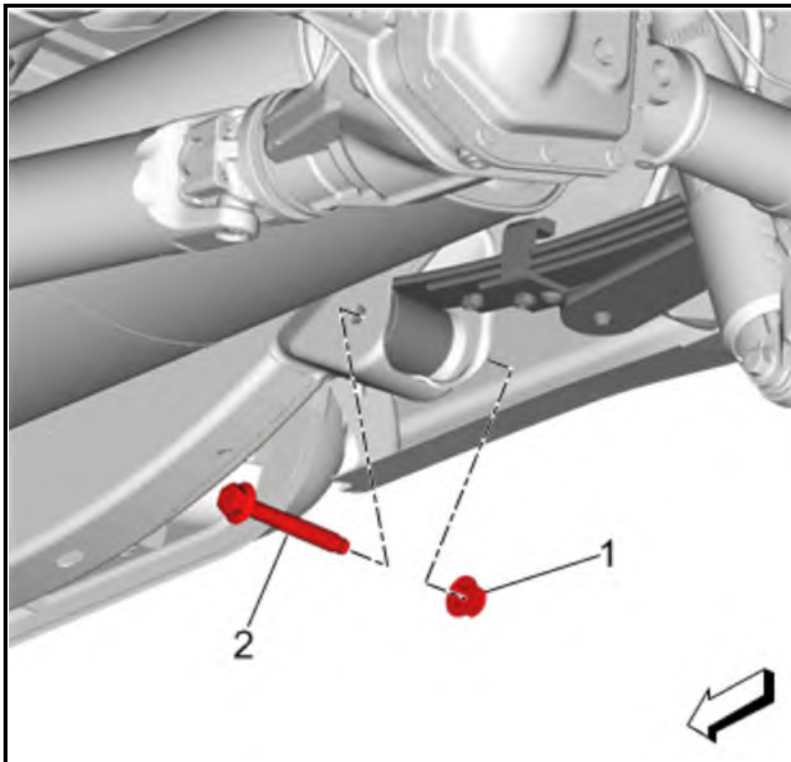
1. Tighten nuts in sequence 1, 2, 3, 4.
2. First Pass: 80 N.m (59 lb ft)
3. Final Pass: 125 - 135 Degrees

8. Rear Spring Shackle Bolt (2) - Install



9. Rear Spring Shackle Nut (1) - Install and tighten 160 N.m (118 lb ft)

10. Rear Spring Bolt (2) - Install



11. Rear Spring Nut (1) - Install and tighten 240 N.m (177 lb ft)

12. Install the right rear tire and wheel assembly. [Tire and Wheel Removal and Installation](#)

13. Remove the jack stands.

14. Lower the vehicle.

REAR LEAF SPRING REPLACEMENT (LEFT SIDE WITH ZR2)

Removal Procedure

NOTE: Before replacing the rear leaf spring for a noise complaint, proper noise diagnosis must be performed and the technician should check for any available bulletins.

1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)

2. Remove the left rear tire and wheel assembly. [Tire and Wheel Removal and Installation](#)

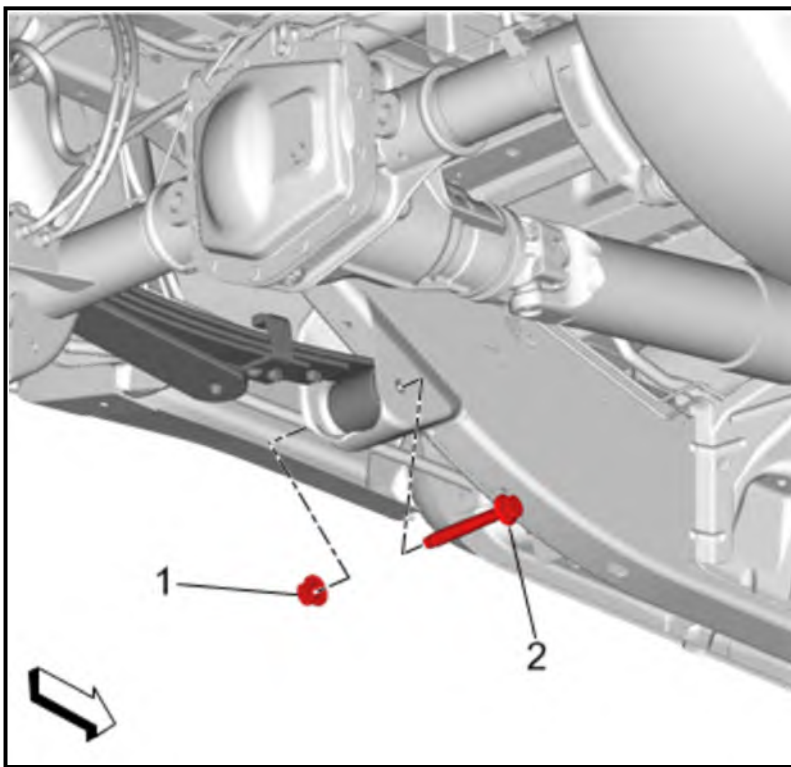
3. Partially lower the spare tire enough to access the rear spring shackle bolt.

4. Remove the fuel tank.

- For the LGZ engine, refer to [Fuel Tank Replacement](#) .
- For the LWN engine, refer to [Fuel Tank Replacement](#) .

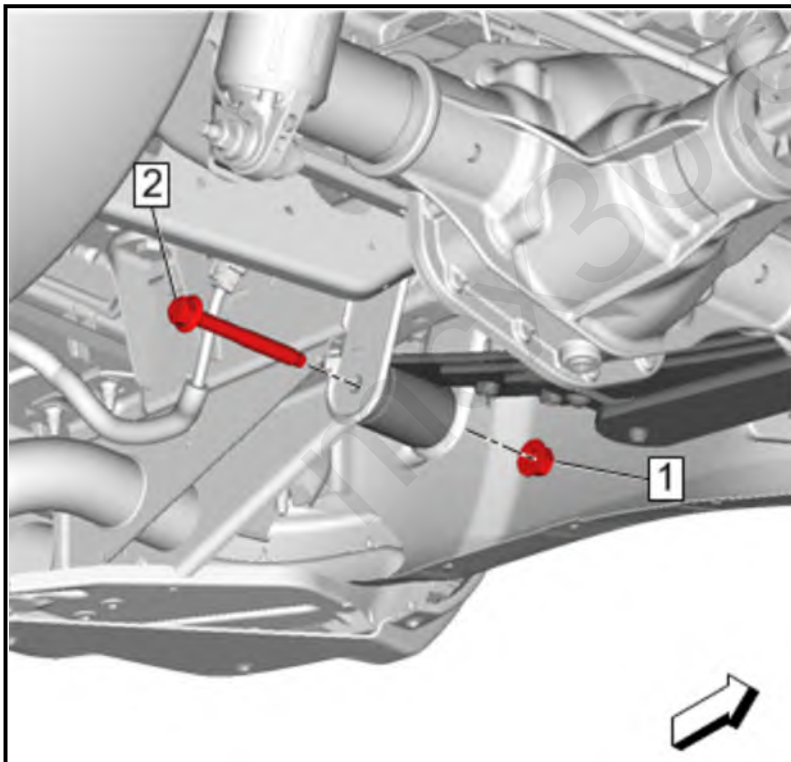
5. Using the proper jack stands, support the rear axle assembly.

6. Rear Spring Nut (1) - Remove



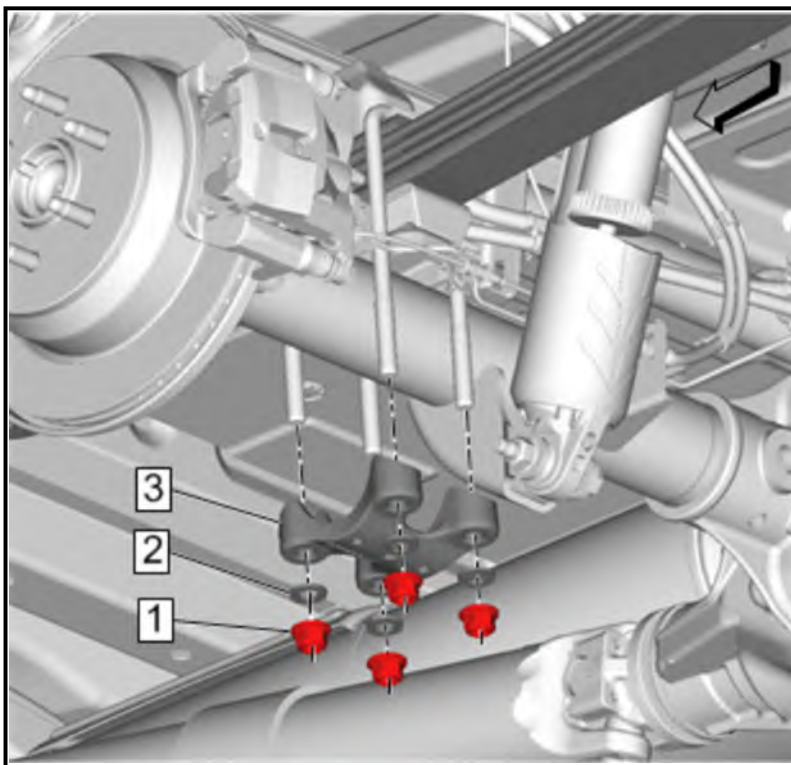
7. Rear Spring Bolt (2) - Remove

8. Rear Spring Shackle Nut (1) - Remove

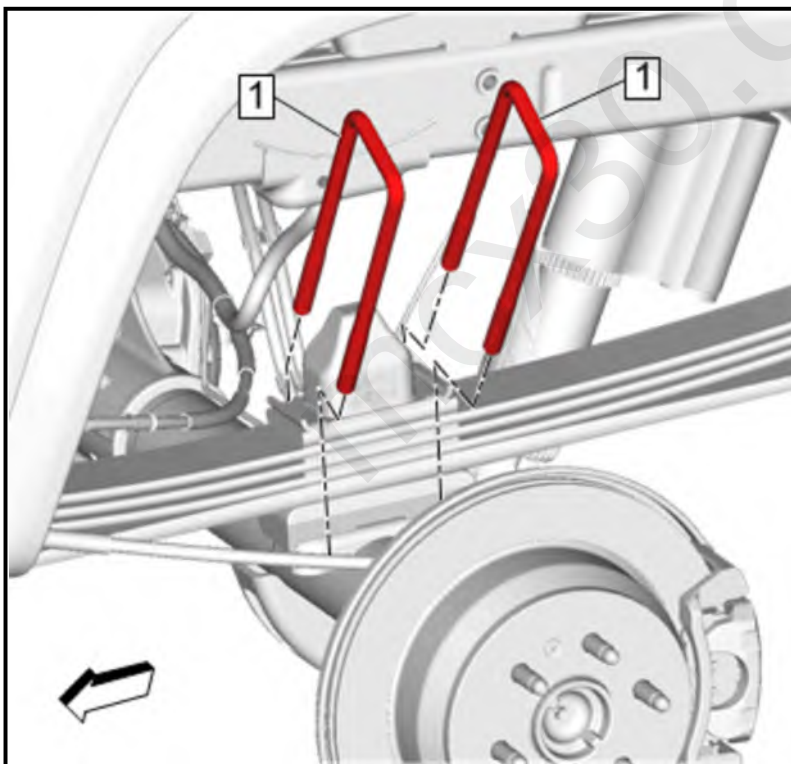


9. Rear Spring Shackle Bolt (2) - Remove

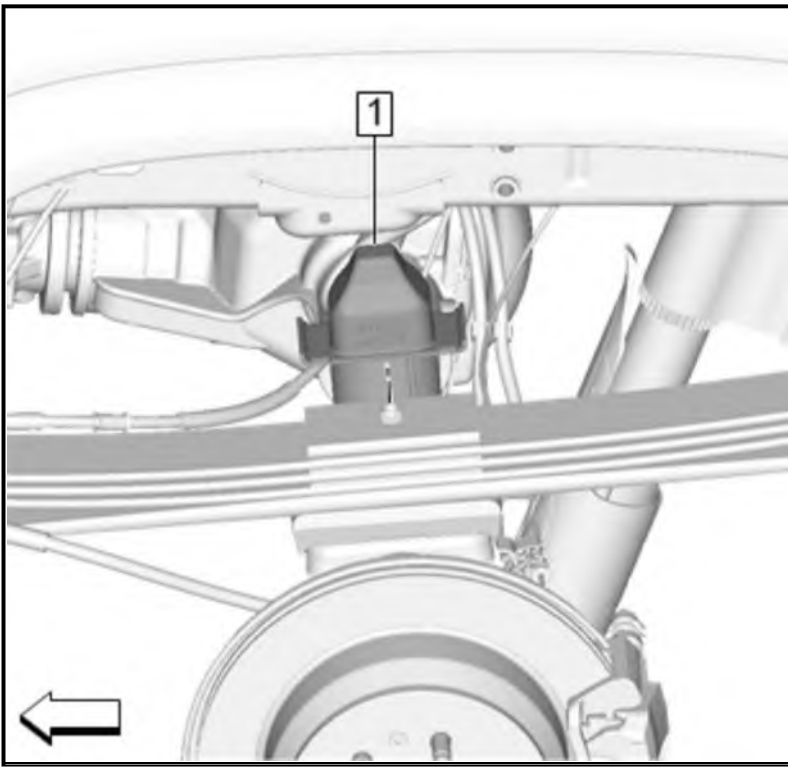
10. Rear Spring U-Bolt Nut (1) - Remove [4x]



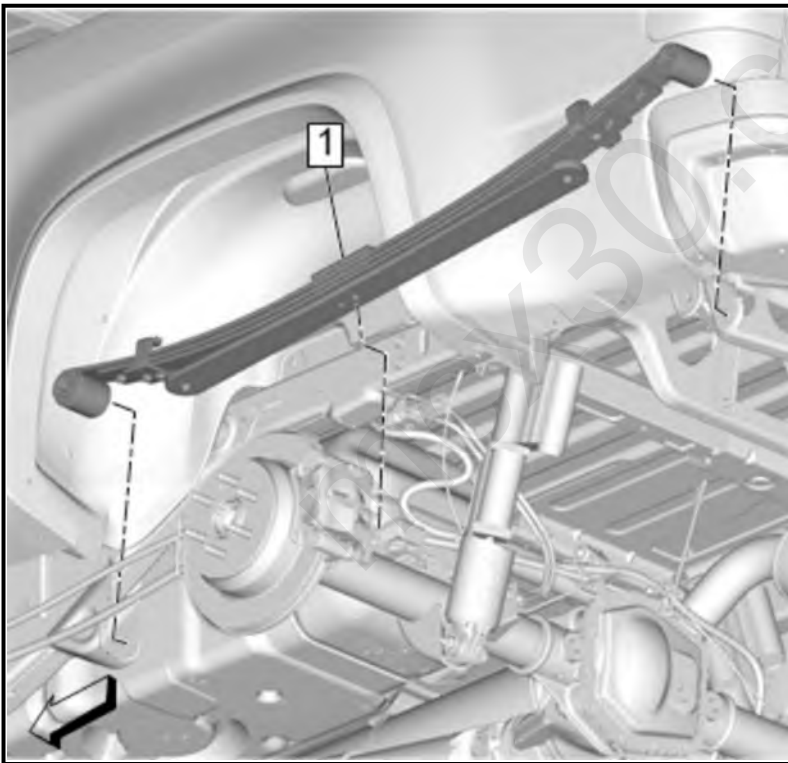
- 11. Rear Spring U-Bolt Washer (2) - Remove [4x]
- 12. Rear Spring Anchor Plate (3) - Remove
- 13. Rear Spring U-Bolt (1) - Remove [2x]



- 14. Rear Axle Bumper (1) - Remove

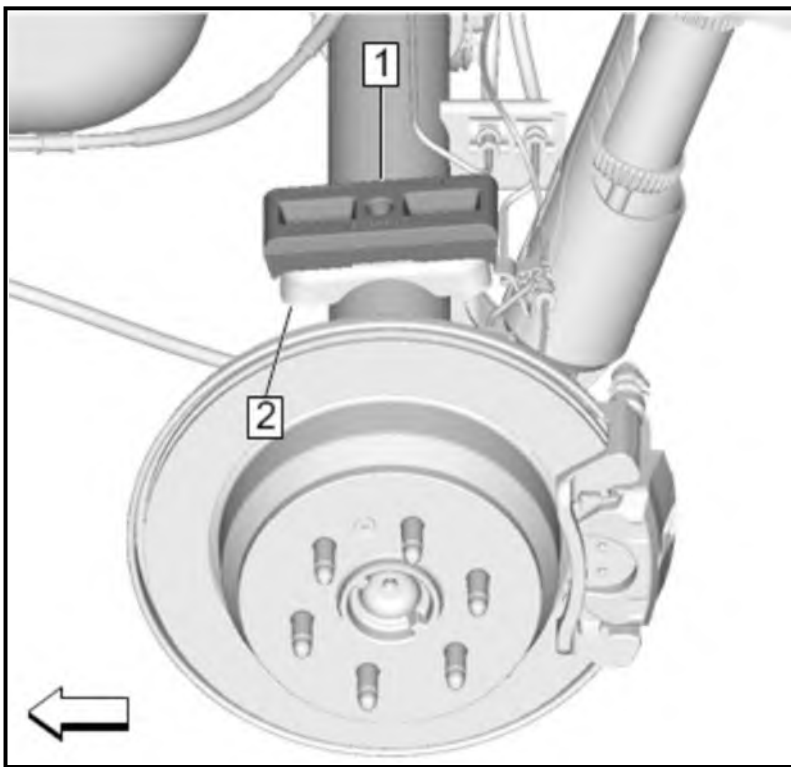


15. Rear Spring (1) - Remove

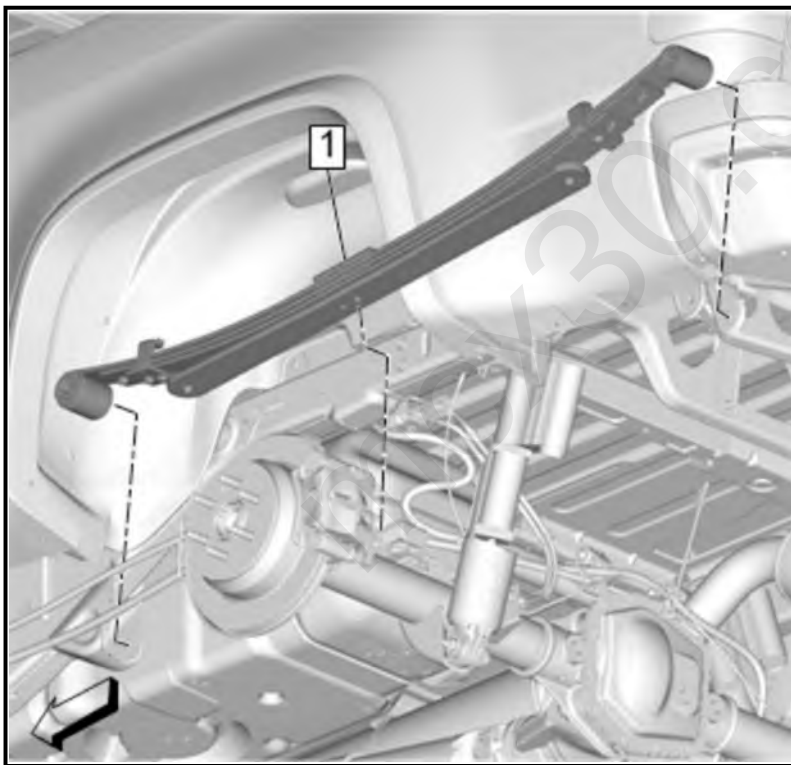


Installation Procedure

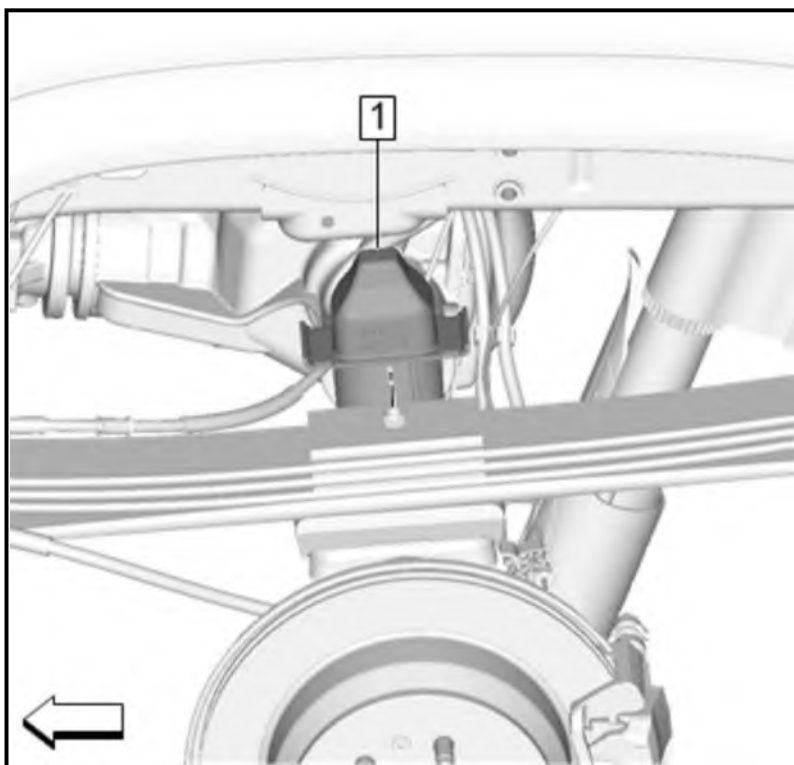
1. Ensure that the Rear Spring Spacer (1) is in place and properly seated onto the Rear Axle Housing (2).



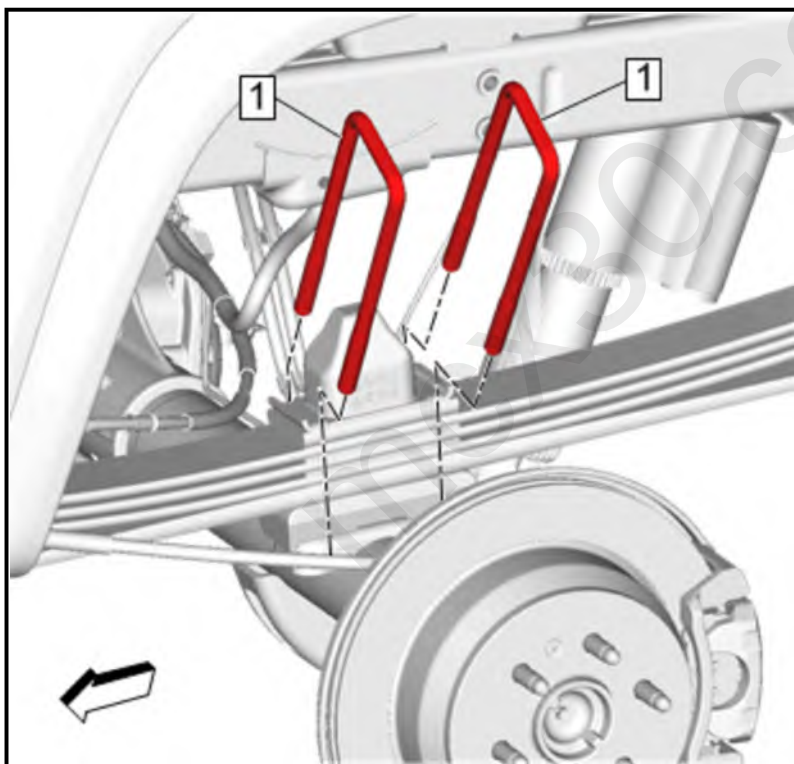
2. Rear Spring (1) - Install



3. Rear Axle Bumper (1) - Install



4. Rear Spring U-Bolt (1) - Install [2x]



5. Rear Spring Anchor Plate (3) - Install

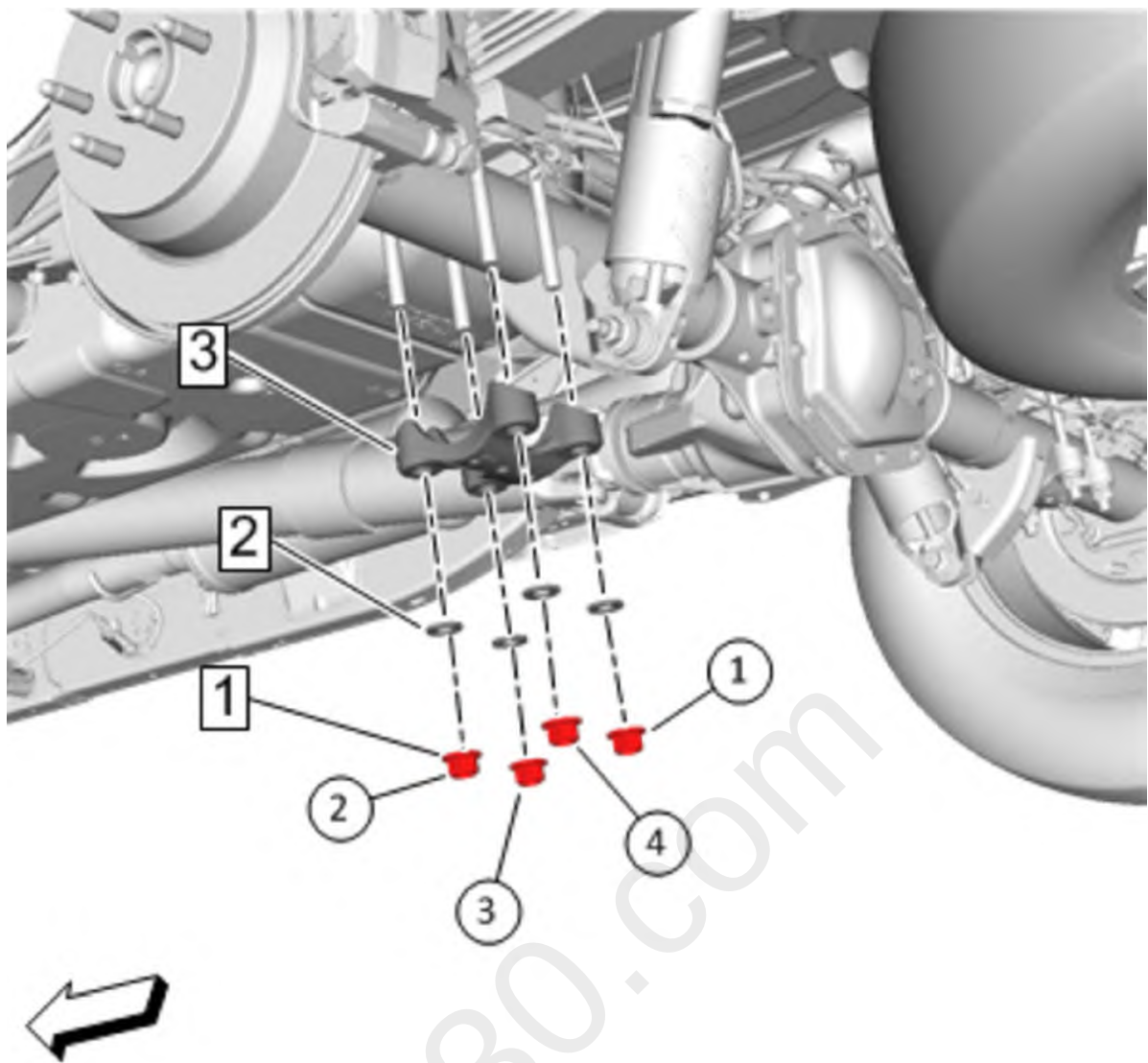


Fig. 4: Identifying Anchor Plates, U-Bolt Nuts And Washers With Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

6. Rear Spring U-Bolt Washer (2) - Install [4x]

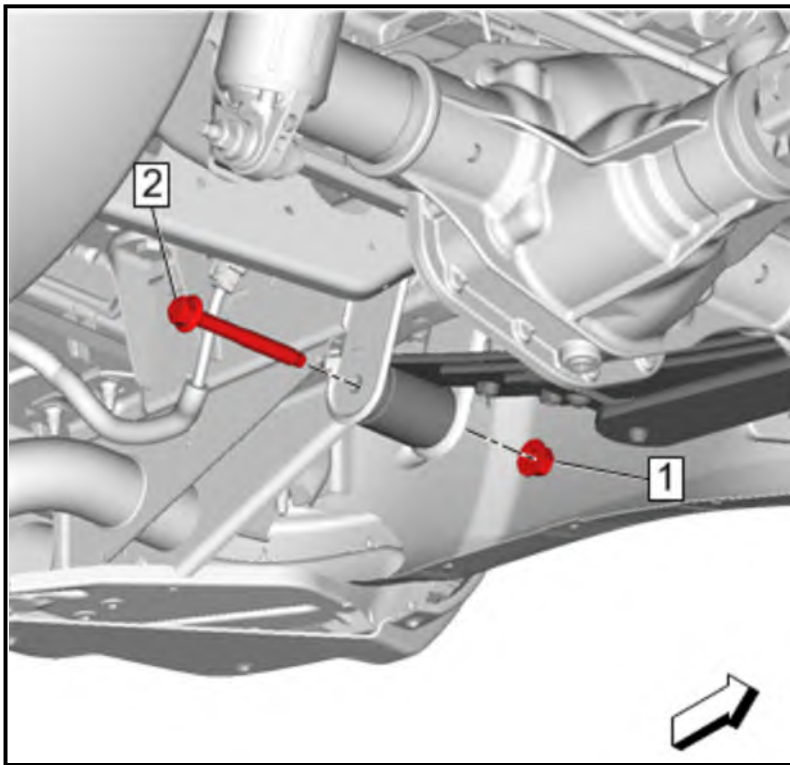
CAUTION: Refer to **Fastener Caution** .

7. Rear Spring U-Bolt Nut (1) - Install and tighten in sequence [4x]

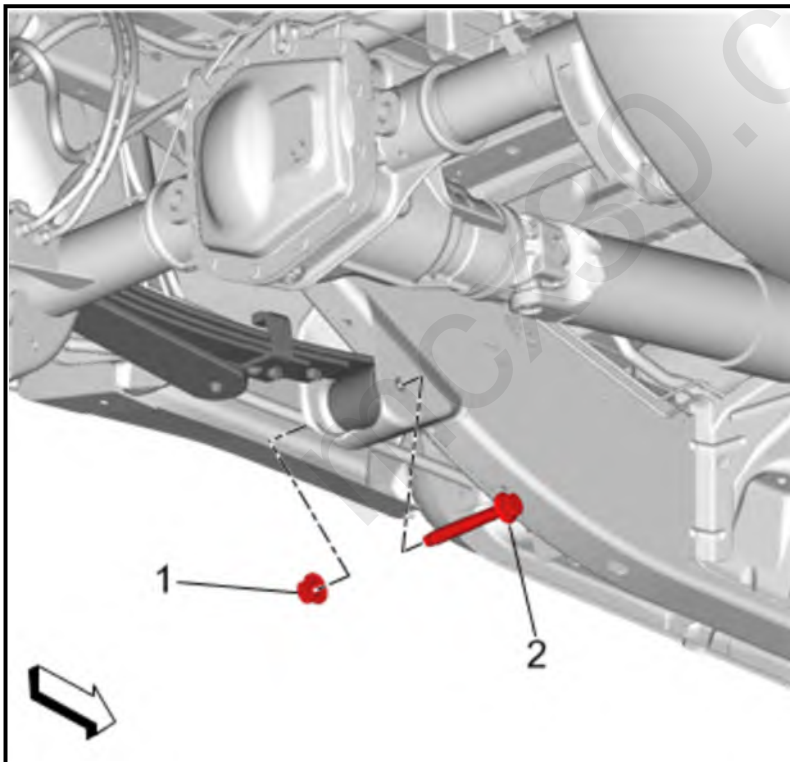
1. First Pass: 80 N.m (59 lb ft)

2. Final Pass: 125 - 135 Degrees

8. Rear Spring Shackle Bolt (2) - Install

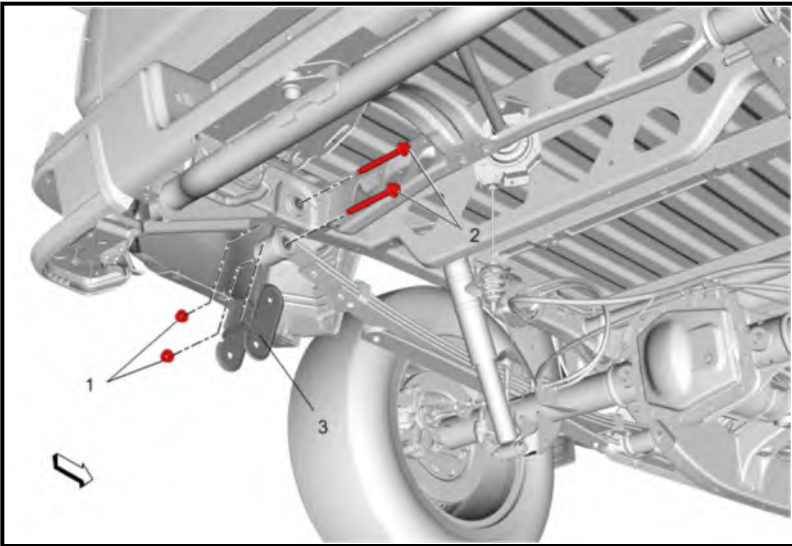


9. Rear Spring Shackle Nut (1) - Install and tighten 160 N.m (118 lb ft)
 10. Rear Spring Bolt (2) - Install



11. Rear Spring Nut (1) - Install and tighten 240 N.m (177 lb ft)
 12. Install the left rear tire and wheel assembly. [Tire and Wheel Removal and Installation](#)
 13. Install the fuel tank.
 • For the LGZ engine, refer to [Fuel Tank Replacement](#) .
 • For the LWN engine, refer to [Fuel Tank Replacement](#) .
 14. Remove the jack stands.
 15. Raise the spare tire back into position.
 16. Remove the support and lower the vehicle.

REAR SPRING SHACKLE REPLACEMENT



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

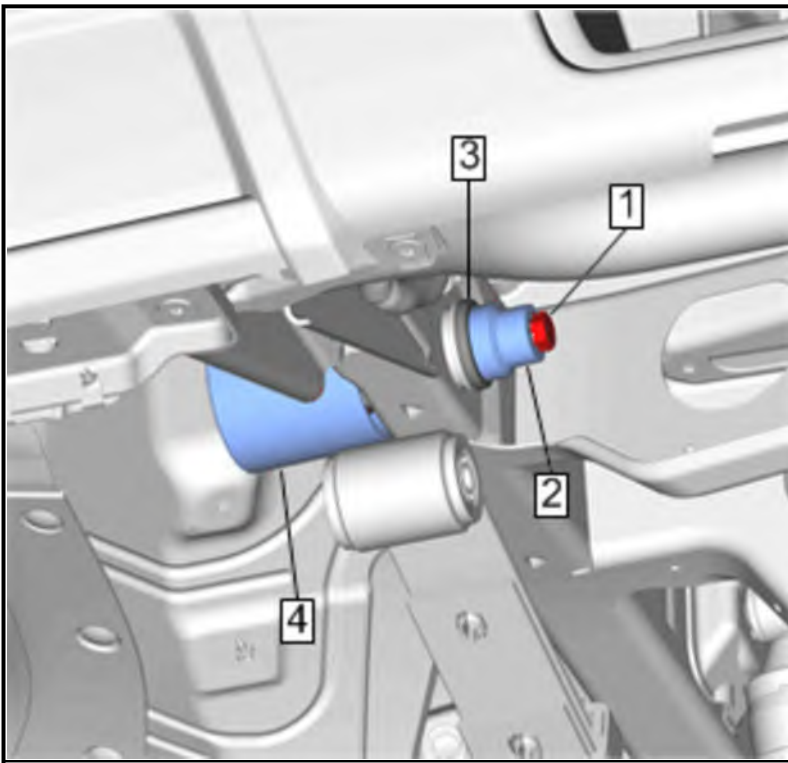
Special Tools

- J-45296 Frame Insulator Remover/Installer
- CH-21474-A Control Arm Bushing Set

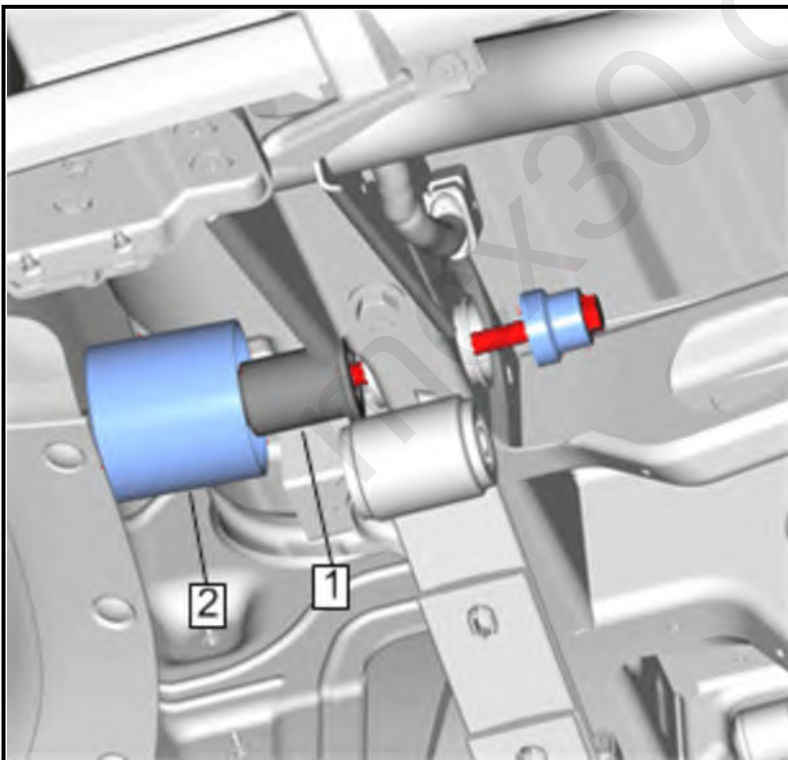
Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)
2. Support the rear axle assembly with the proper jack stand.
3. Rear Spring Shackle - Remove - [Rear Spring Shackle Replacement](#)
4. Install the bolt (1) and the bushing remover/installer (2) from the CH-21474-A Control Arm Bushing Set onto the rear spring shackle bushing (3).

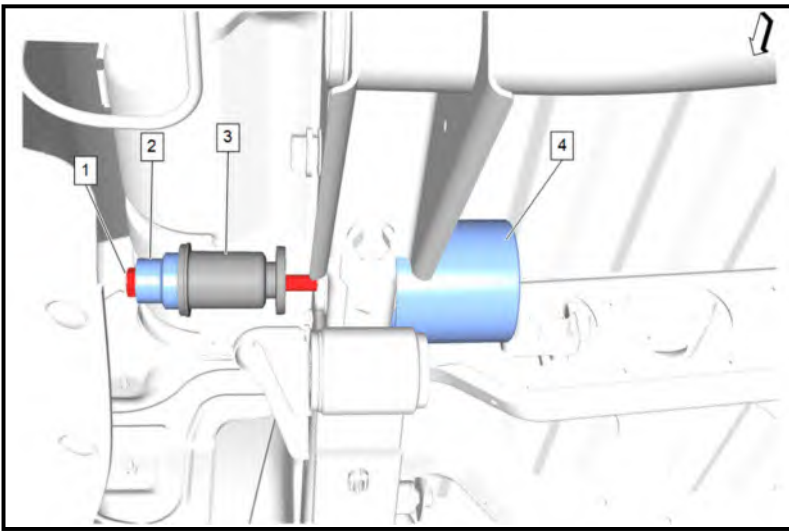


5. Install the **J-45296** Frame Insulator Remover/Installer (4).
6. Rotate the bolt clockwise to force the bushing out of the bushing sleeve.
7. Remove the rear spring shackle bushing (1) from the **J-45296** Frame Insulator Remover/Installer (2).

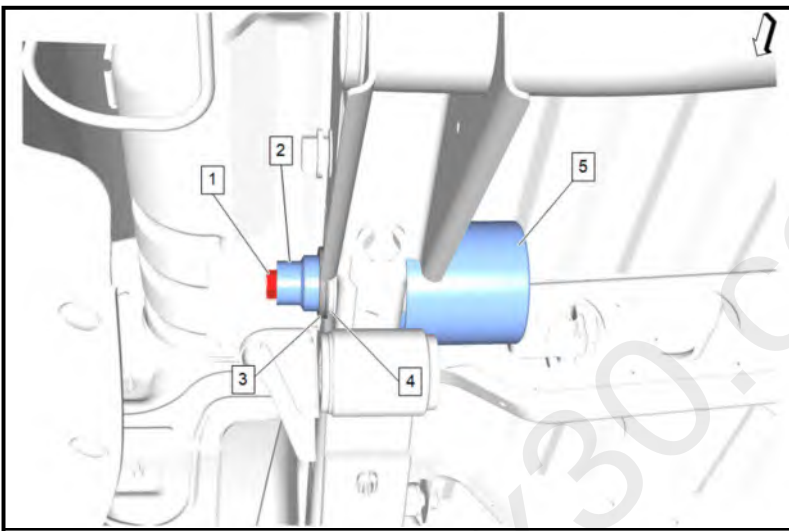


Installation Procedure

1. Position the bolt (1), the **CH-21474-A** Control Arm Bushing Set (2), the rear spring shackle bushing (3), and the **J-45296** Frame Insulator Remover/Installer (4).



2. Rotate the bolt (1) until the **CH-21474-A** Control Arm Bushing Set (2) places the rear spring shackle bushing (3), fully against the bushing sleeve (4).



3. Remove the **CH-21474-A** Control Arm Bushing Set (2).
4. Remove the **J-45296** Frame Insulator Remover/Installer (5).
5. Rear Spring Shackle - Install - [Rear Spring Shackle Replacement](#)
6. Remove the jack stand from the rear axle assembly.
7. Remove the support and lower the vehicle.

WHEEL STUD REPLACEMENT

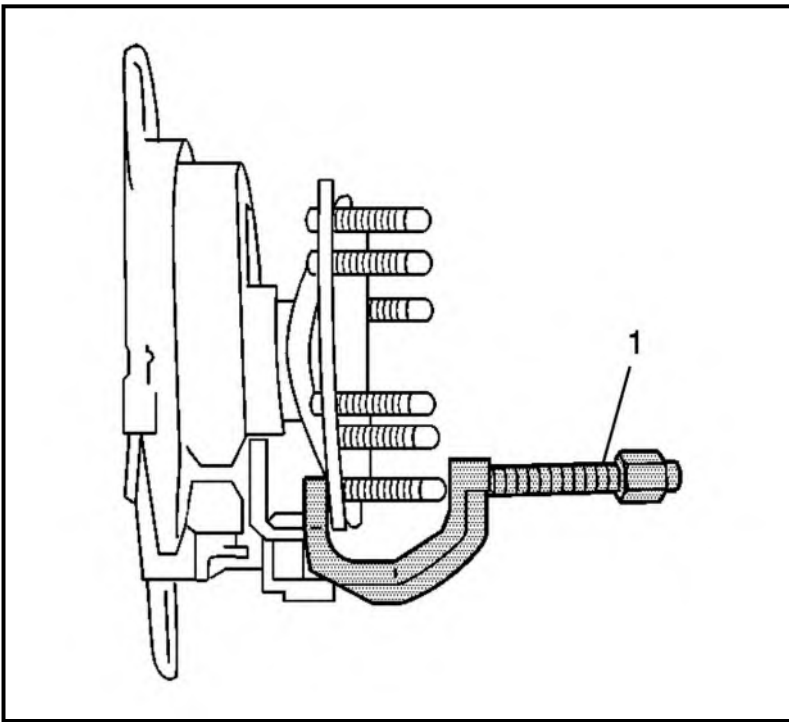
Special Tools

CH 43631 Ball Stud Remover

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

Removal Procedure

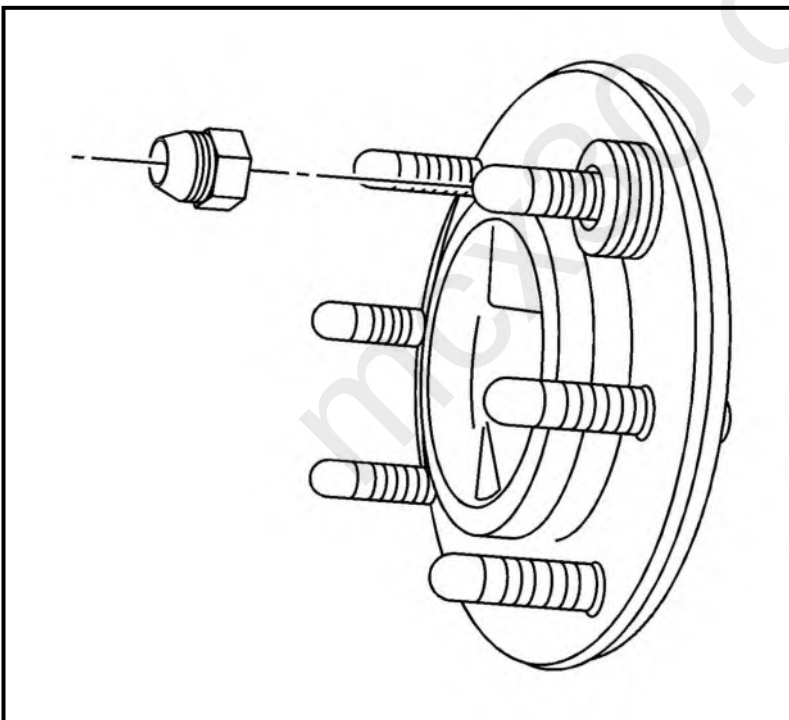
1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the tire and wheel. Refer to [Tire and Wheel Removal and Installation](#) .
3. Remove the brake rotor. Refer to [Rear Brake Rotor Replacement](#) .
4. Using the **CH 43631** remover (1), remove the wheel stud.



5. Remove the wheel stud from the hub flange.

Installation Procedure

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.

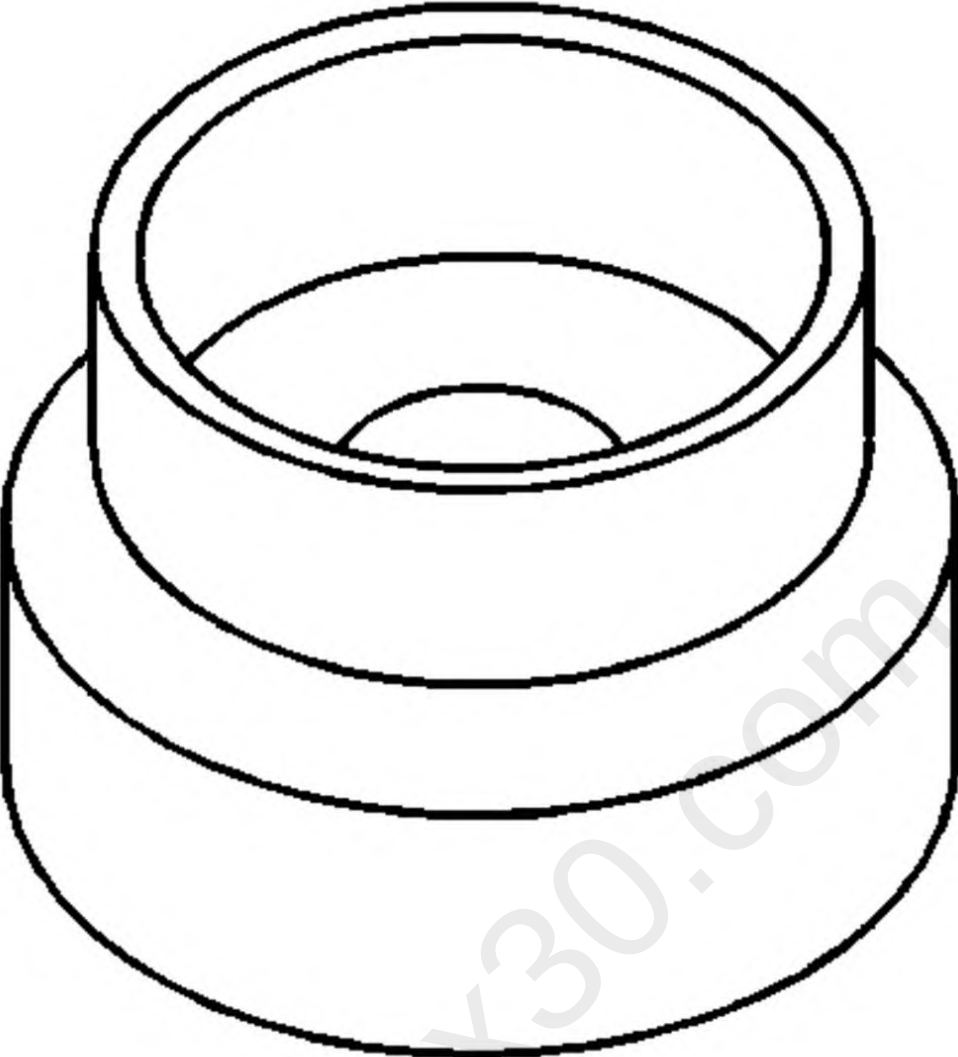
The rear axle assembly is attached to multi-leaf springs with U-bolts. The front ends of the springs are attached to the frame at the front hangers with bolts and are isolated utilizing rubber bushings. The rear ends of the springs are attached to the frame with bolts at the shackles. The shackles also 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-A J-21474-A Control Arm Bushing Set

Illustration	Tool Number/ Description
	J-45296 Frame Insulator Remover/Installer