

2006 Chevrolet Impala LS

2006 Driveline/Axle Wheel Drive Shafts - Impala

2006 Driveline/Axle

Wheel Drive Shafts - Impala

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Front Wheel Drive Shaft Nut	160 N.m	118 lb ft
Drive Axle Seal Clamp	174 N.m	130 lb ft

COMPONENT LOCATOR

WHEEL DRIVE SHAFTS DISASSEMBLED VIEWS

2006 Chevrolet Impala LS

2006 Driveline/Axle Wheel Drive Shafts - Impala

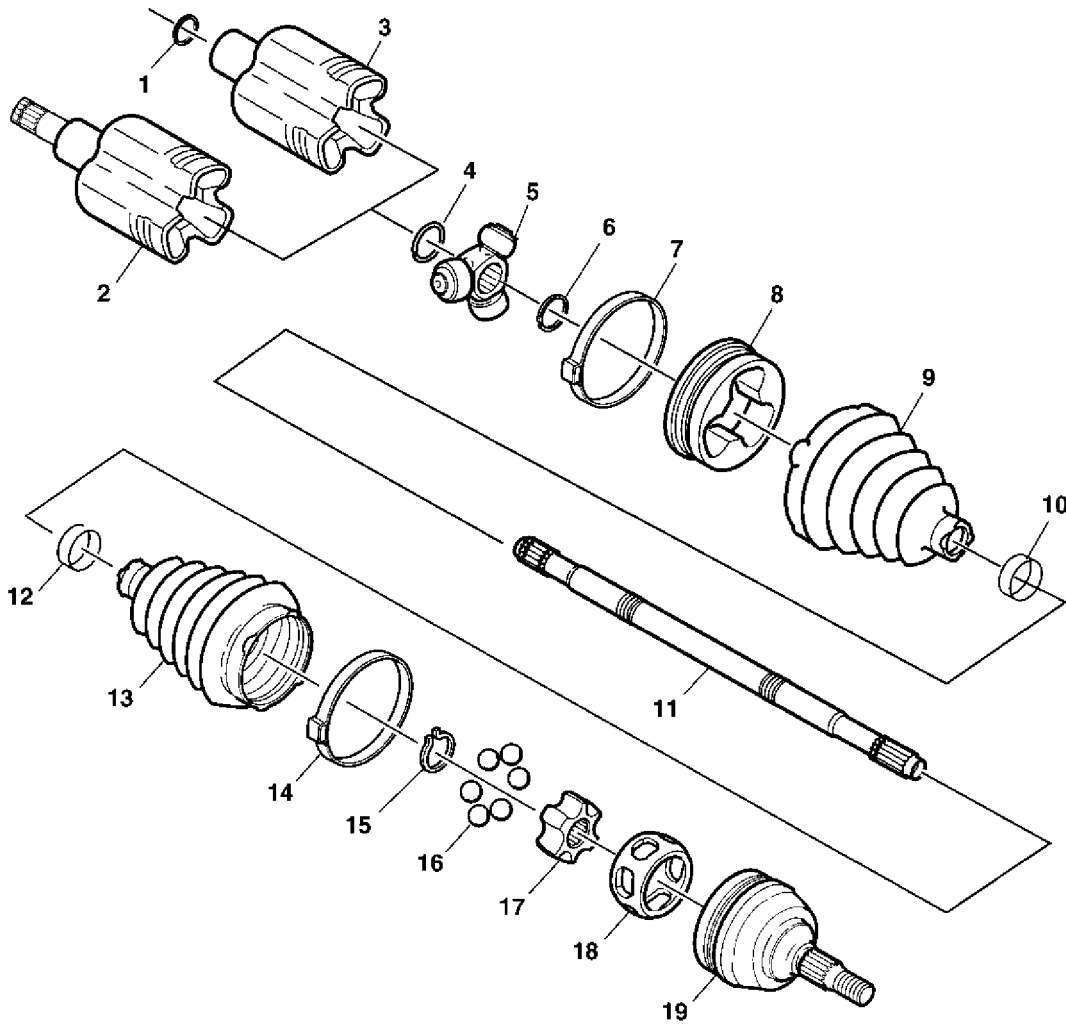


Fig. 1: Identifying Wheel Drive Shaft Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Retaining Ring
2	Housing Assembly
3	Retainer and Housing Assembly
4	Spacer Ring
5	Tripot Joint Spider Assembly
6	Spacer Ring (If Equipped)
7	Boot Retaining Clamp
8	Trilobal Tripot Bushing
9	Tripot Joint Boot

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10	Swage Ring
11	Halfshaft Bar
12	Swage Ring
13	CV Joint Boot
14	Boot Retaining Clamp
15	Race Retaining Ring
16	Chrome Alloy Ball
17	CV Joint Inner Race
18	CV Joint Cage
19	CV Joint Outer Race

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - WHEEL DRIVE SHAFTS

Begin the wheel drive shaft system diagnosis with **Diagnostic Starting Point - Vibration Diagnosis and Correction** in Vibration Diagnosis and Correction. The use of the Diagnostic Starting Point will lead to the identification of the correct procedure for diagnosing the system and where the procedure is located.

REPAIR INSTRUCTIONS

WHEEL DRIVE SHAFT REPLACEMENT

Tools Required

- **J 2619-01** Slide Hammer
- **J 29794** Axle Shaft Remover Extension
- **J 33008-A** Axle Shaft Remover
- **J 42129** Hub Spindle Remover

Removal Procedure

CAUTION: To prevent personal injury and/or component damage, do not allow the weight of the vehicle to load the front wheels, or attempt to operate the vehicle, when the wheel drive shaft(s) or wheel drive shaft nut(s) are removed. To do so may cause the inner bearing race to separate, resulting in damage to brake and suspension components and loss of vehicle control.

NOTE: Wheel drive shaft boots, seals and clamps should be protected from sharp objects any time service is performed on or near the

wheel drive shaft(s). Damage to the boot(s), the seal(s) or the clamp(s) may cause lubricant to leak from the joint and lead to increased noise and possible failure of the wheel drive shaft.

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the wheel and the tire. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the stabilizer shaft link. Refer to **Stabilizer Shaft Link Replacement** in Front Suspension.

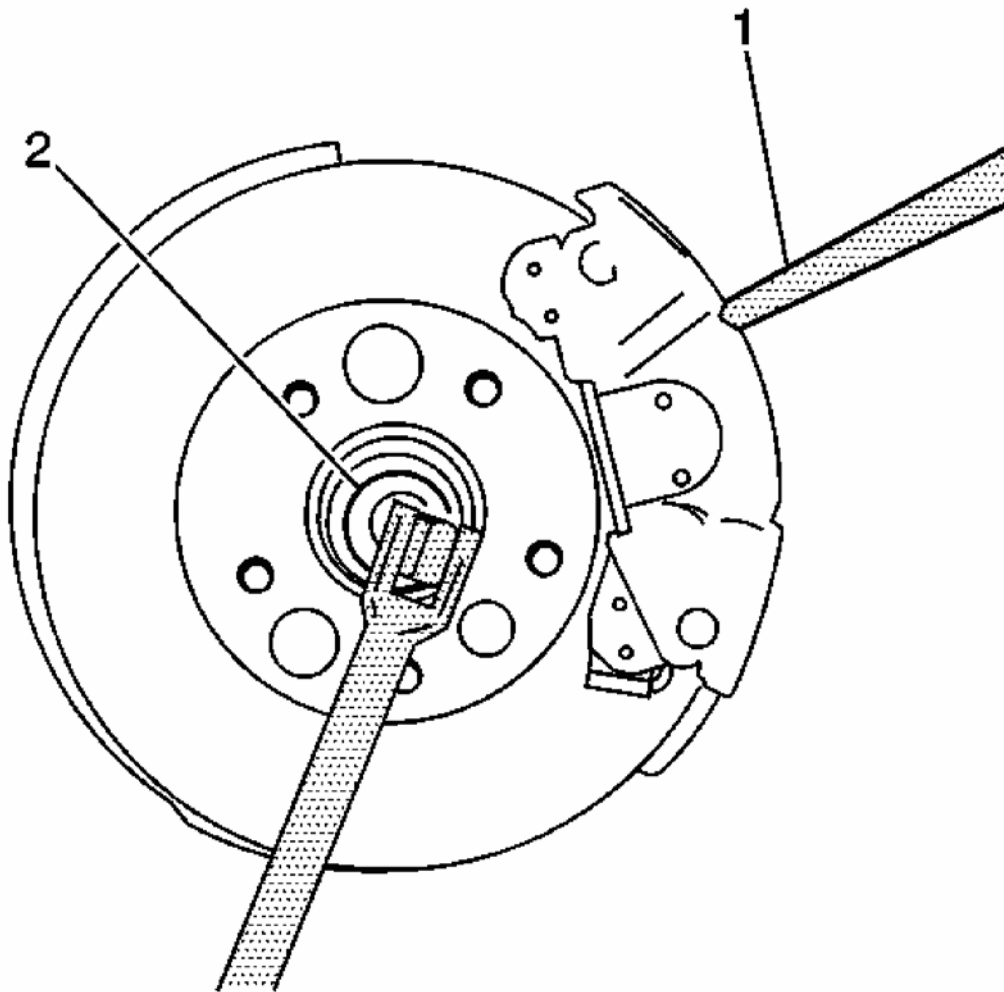


Fig. 2: Preventing Rotor Turning Using Drift Or Punch
Courtesy of GENERAL MOTORS CORP.

4. Remove the front wheel drive shaft nut (2). Insert a drift or a flat-bladed tool (1) into the caliper and the rotor to prevent the rotor from turning.
5. Disconnect the outer tie rod assembly from the steering knuckle. Refer to **Rack and Pinion Outer Tie Rod End Replacement** in Power Steering System.
6. Separate the ball joint from the steering knuckle. Refer to **Lower Ball Joint Replacement** in Front Suspension.
7. Separate the front wheel drive axle from the front wheel drive shaft bearing using the **J 42129** . The nut can be partially re-installed to protect the threads.

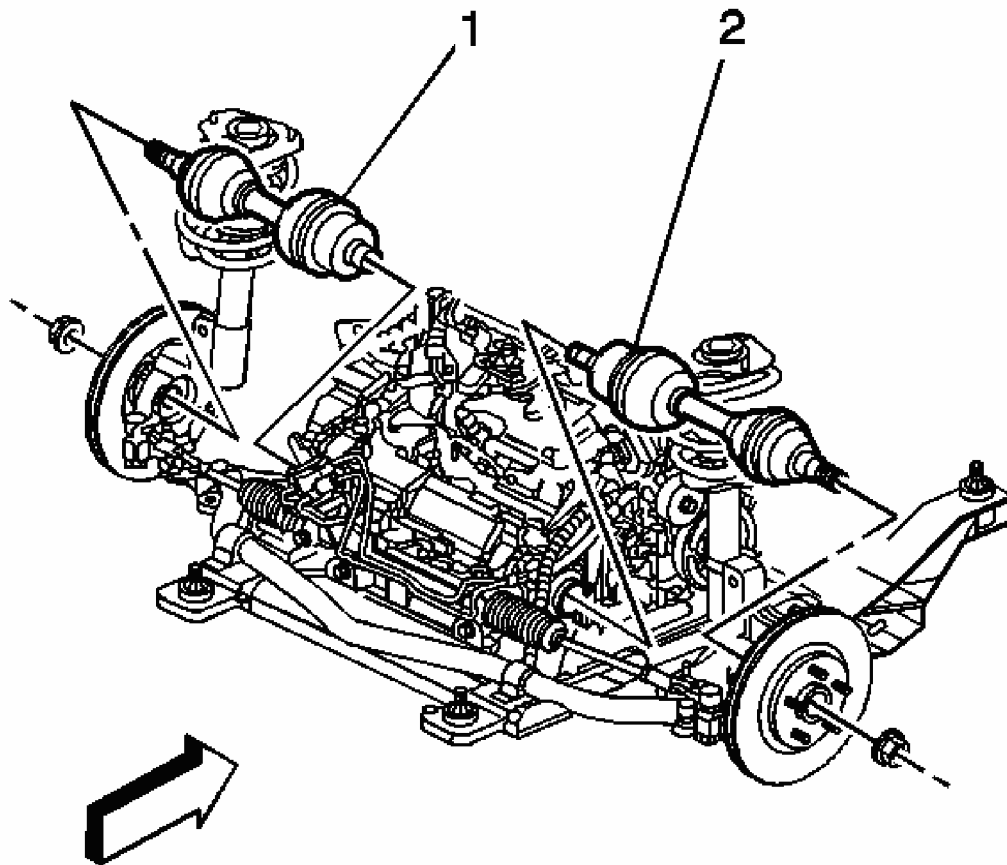


Fig. 3: Left & Right Front Wheel Drive Axles
Courtesy of GENERAL MOTORS CORP.

8. If necessary, remove the left front wheel drive axle (1) from the transaxle.
- If necessary, remove the right front wheel drive axle (2) from the transaxle.

Use the **J 33008-A** , the **J 29794** and the **J 2619-01** to separate the axle from the transaxle.

Installation Procedure

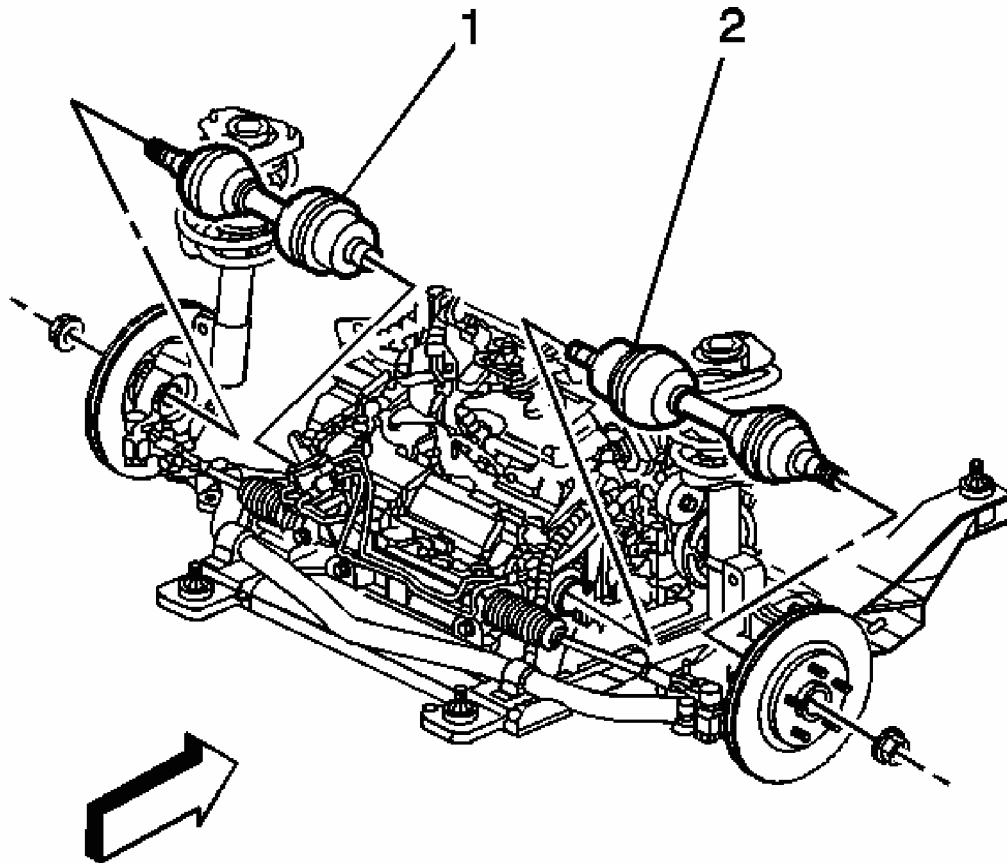


Fig. 4: Left & Right Front Wheel Drive Axles
Courtesy of GENERAL MOTORS CORP.

1. Install the front wheel drive axle (1, 2) into the transaxle.
2. Verify that the front wheel drive shaft retaining ring is properly seated:
 - Grasp the inner housing and pull the inner housing outward. Do not pull on the front wheel drive axle shaft.
 - The front wheel drive axle will remain in place when the front wheel drive shaft retaining ring is properly seated.
3. Install the front wheel drive axle into the front wheel drive shaft bearing.
4. Connect the ball joint to the steering knuckle. Refer to **Lower Ball Joint Replacement**

in Front Suspension.

5. Connect the outer tie rod assembly to the steering knuckle. Refer to **Rack and Pinion Outer Tie Rod End Replacement** in Power Steering System.

NOTE: Refer to **Fastener Notice** in **Cautions and Notices**.

6. Install a new front wheel drive shaft nut. Insert a drift or a flat-bladed tool into the caliper and the rotor to prevent the rotor from turning.

Tighten: Tighten the nut to 160 N.m (118 lb ft).

7. Install the stabilizer shaft link. Refer to **Stabilizer Shaft Link Replacement** in Front Suspension.
8. Install the wheel and the tire. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
9. Lower the vehicle.
10. Inspect the transaxle fluid level.
11. Inspect the wheel alignment. Refer to **Measuring Wheel Alignment** .

WHEEL DRIVE SHAFT INNER JOINT AND SEAL REPLACEMENT

Tools Required

- **J 8059** Snap Ring Pliers (Parallel Jaw). See **Special Tools**.
- **J 35910** Drive Axle Seal Clamp Pliers
- **J 41048** Drive Axle Swage Ring Clamp. See **Special Tools**.

Removal Procedure

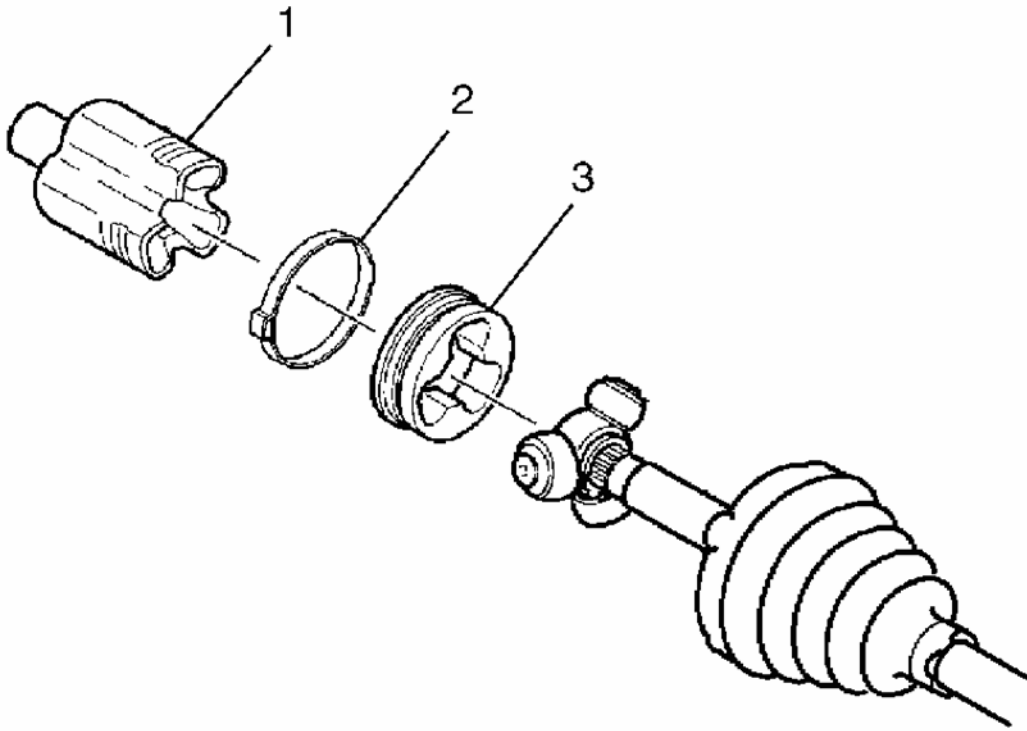


Fig. 5: Locating Wheel Drive Shaft Inner Joint Components
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not cut through the wheel drive shaft inboard seal during service. Cutting through the seal may damage the sealing surface of the housing and the tripot bushing. Damage to the sealing surface may lead to water and dirt intrusion and premature wear of the constant velocity joint.

1. Disconnect the swage ring from the halfshaft bar using a hand grinder to cut through the ring, taking care not to damage the halfshaft bar.
2. Remove the large seal retaining clamp (2) from the tripot joint with side cutters. Discard the large seal retaining clamp.
3. Separate the inboard seal from the trilobal tripot bushing (3) at the large diameter.
4. Slide the seal away from the joint along the halfshaft bar.

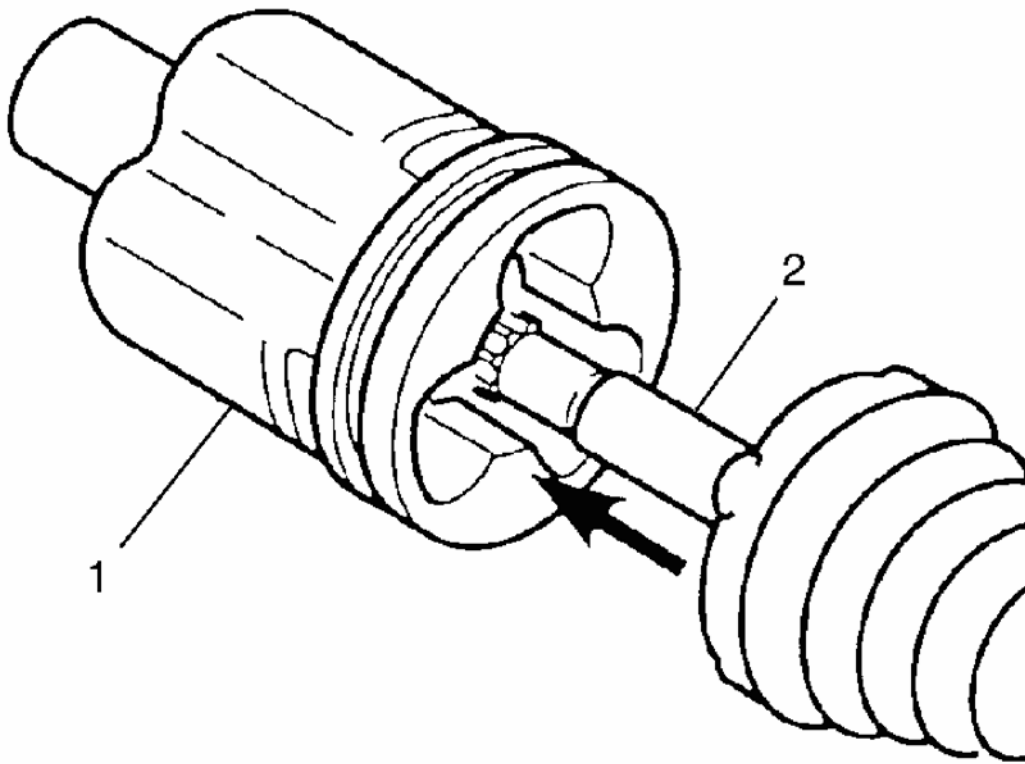


Fig. 6: View Of Housing, Tripot Joint Spider & Halfshaft Bar
Courtesy of GENERAL MOTORS CORP.

5. Remove the housing (1) from the tripot joint spider and the halfshaft bar (2).

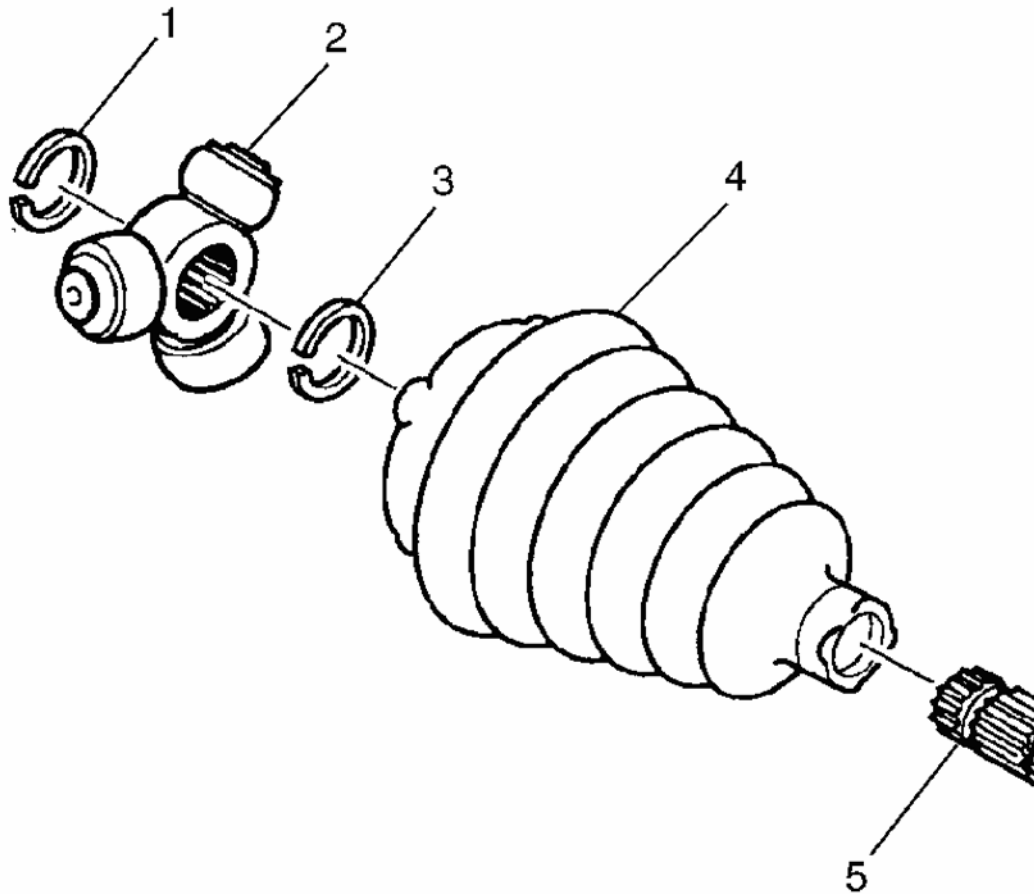


Fig. 7: View Of Spider Assembly, Rings & Tripot Boot
Courtesy of GENERAL MOTORS CORP.

6. Remove the spacer ring (1), spider assembly (2), spacer ring (3) (if equipped) using **J 8059** , and tripot boot (4). See **Special Tools**. Discard the boot and rings.
7. Clean the halfshaft bar (5). Use a wire brush in order to remove any rust in the boot mounting area (grooves).
8. Inspect the needle rollers, needle bearings, and trunnion. Check the tripot housing for unusual wear, cracks, or other damage. Replace any damaged parts with the appropriate kit.

Installation Procedure

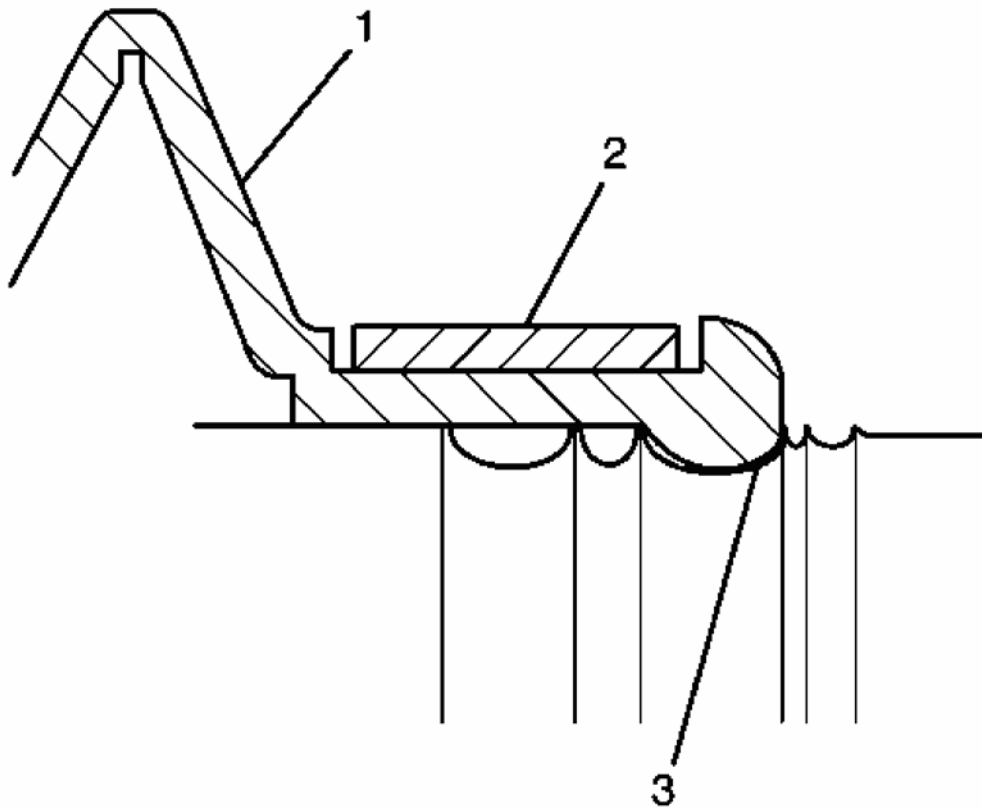


Fig. 8: Installing Seal Clamp On Neck Of Seal
Courtesy of GENERAL MOTORS CORP.

1. Place the new small swage ring (2) onto the small end of the joint seal (1). Slide the joint seal (1) and the small swage ring (2) onto the halfshaft bar.
2. Position the small end of the joint seal (1) into the joint seal groove (3) on the halfshaft bar.

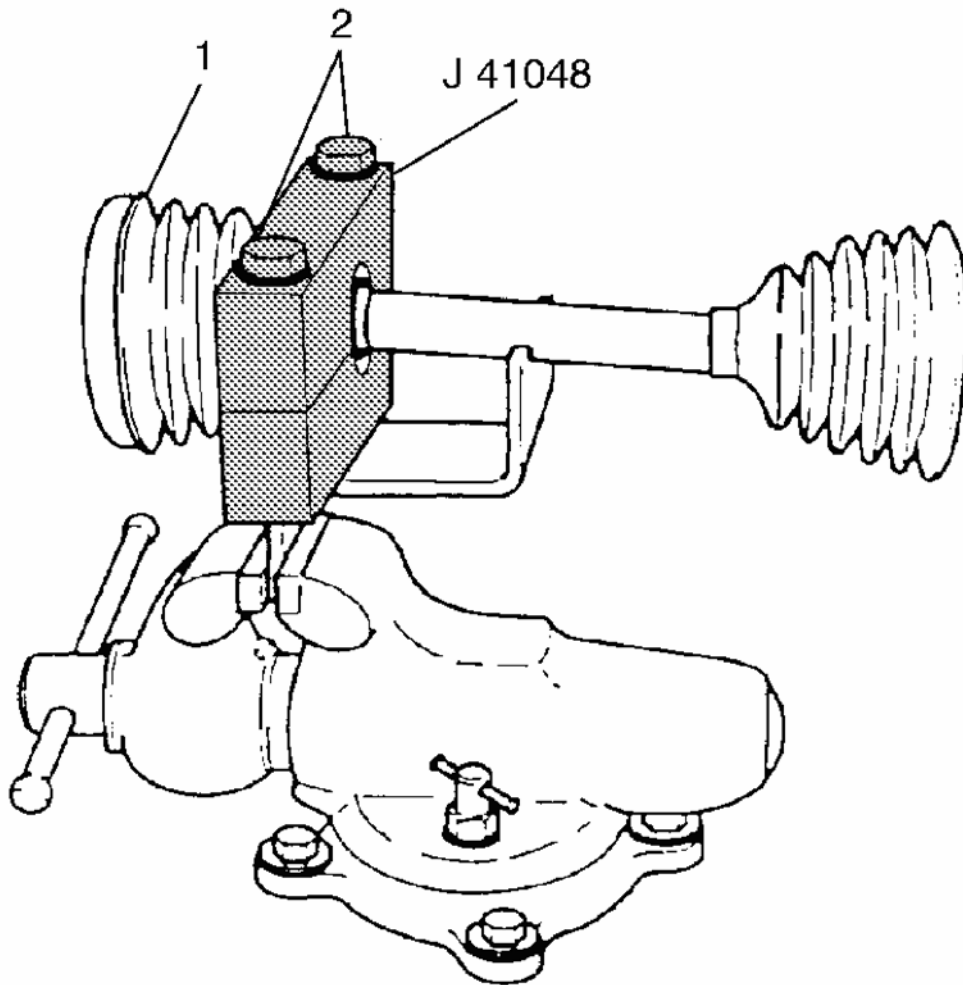


Fig. 9: Swaging Retaining Clamp Ring
Courtesy of GENERAL MOTORS CORP.

3. Mount **J 41048** in a vise and proceed as follows: See **Special Tools**.
 1. Position the inboard end (1) of the halfshaft assembly in tool **J 41048** . See **Special Tools**.
 2. Align the top of seal neck on the bottom die using the indicator.
 3. Place the top half of the **J 41048** on the lower half. See **Special Tools**.
 4. Before proceeding, ensure there are no pinch points on the halfshaft inboard seal. This could cause damage to the halfshaft inboard seal.
 5. Insert the bolts (2).
 6. Tighten the bolts by hand until snug.

NOTE: Refer to **Fastener Notice** in Cautions and

Notices.

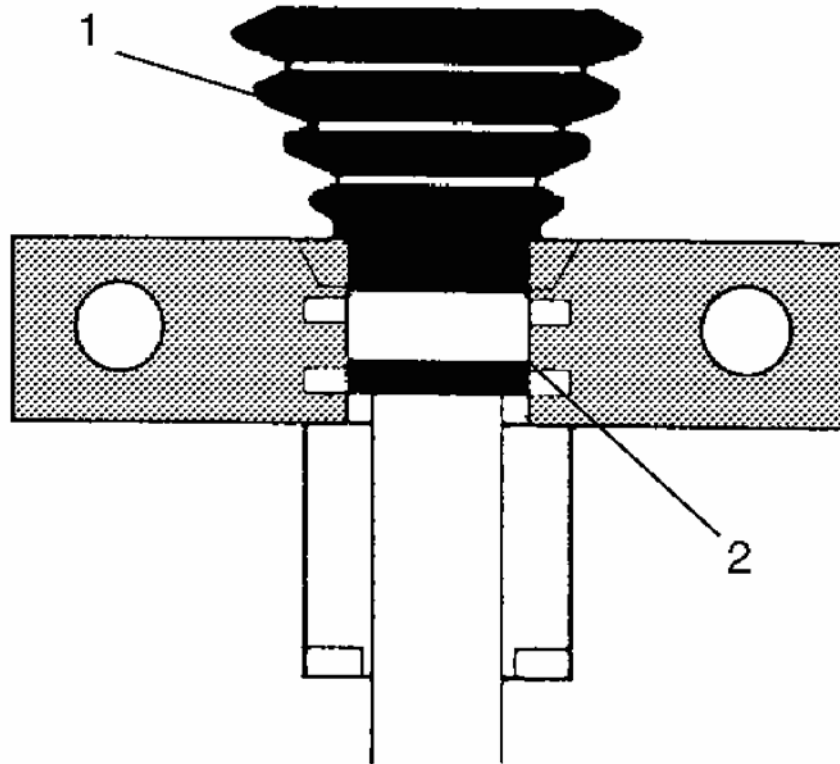


Fig. 10: Identifying Halfshaft Inboard Seal & Swage Ring
Courtesy of GENERAL MOTORS CORP.

4. Align the following items:
- The halfshaft inboard seal (1)
 - The halfshaft bar
 - The swage ring (2)

Tighten: Tighten each bolt of **J 41048** 180 degrees at a time using a ratchet wrench. See **Special Tools**. Alternate between each bolt until both sides are bottomed.

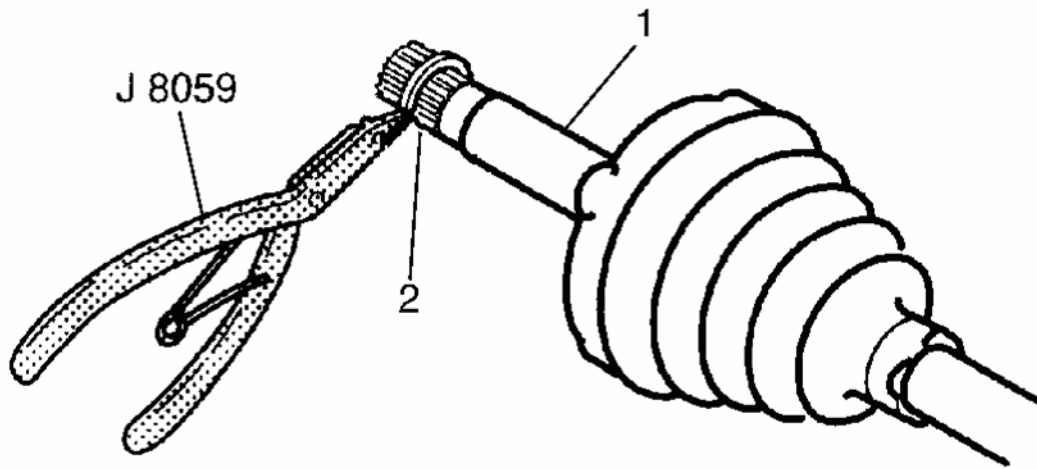


Fig. 11: Installing Spacer Ring
Courtesy of GENERAL MOTORS CORP.

5. If equipped, install the spacer ring (2) into the groove of the halfshaft bar using **J 8059** . See **Special Tools**.

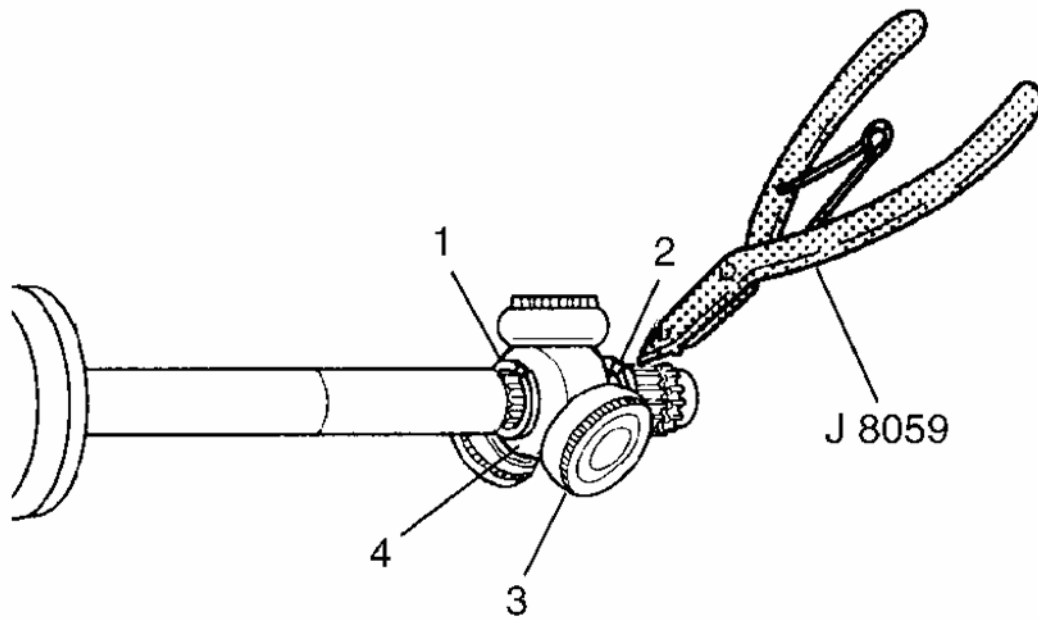


Fig. 12: Installing Spider Assembly & Spacer Rings
Courtesy of GENERAL MOTORS CORP.

6. Slide the tripot joint spider assembly (4) as far as it will go on the halfshaft bar.
7. Install the spacer ring (2) into the groove of the halfshaft bar **J 8059** . See **Special Tools**.

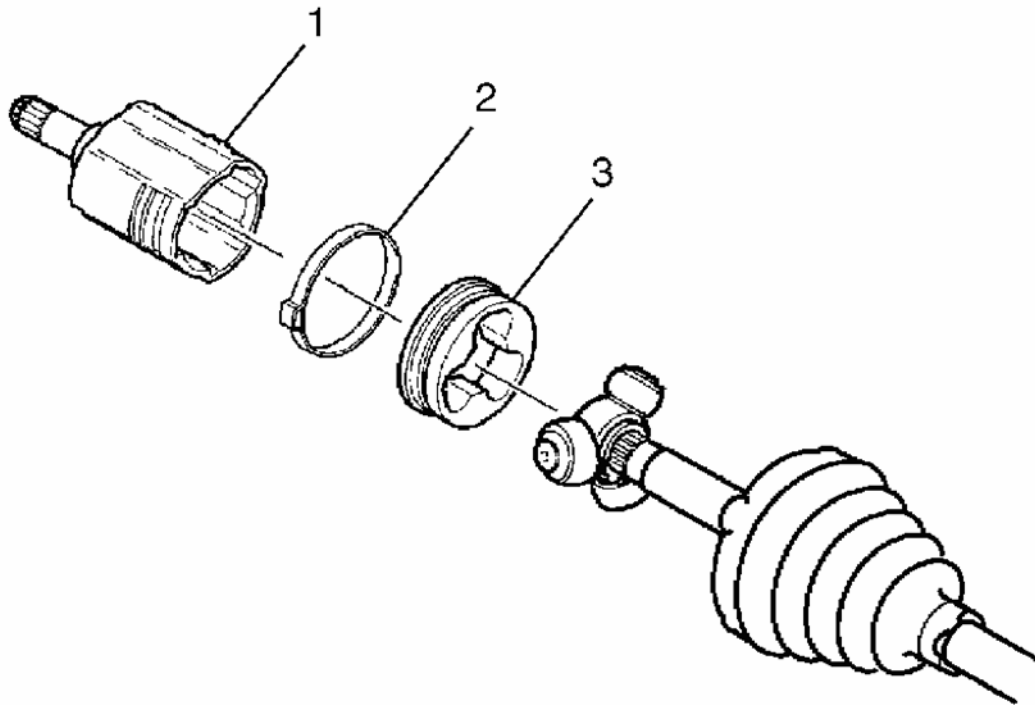


Fig. 13: Seal Retaining Clamp, Tripot Bushing & Housing
Courtesy of GENERAL MOTORS CORP.

8. Place approximately half of the grease from the service kit in the halfshaft inboard seal. Use the remainder of the grease to repack the housing.

IMPORTANT: Ensure the trilobal tripot bushing (3) is flush with the face of the housing (1).

9. Install the new trilobal tripot bushing (3) to housing (1).
10. Position the larger new seal retaining clamp (2) on the halfshaft inboard seal.
11. Slide the housing (1) over the tripot joint spider assembly on the halfshaft bar.

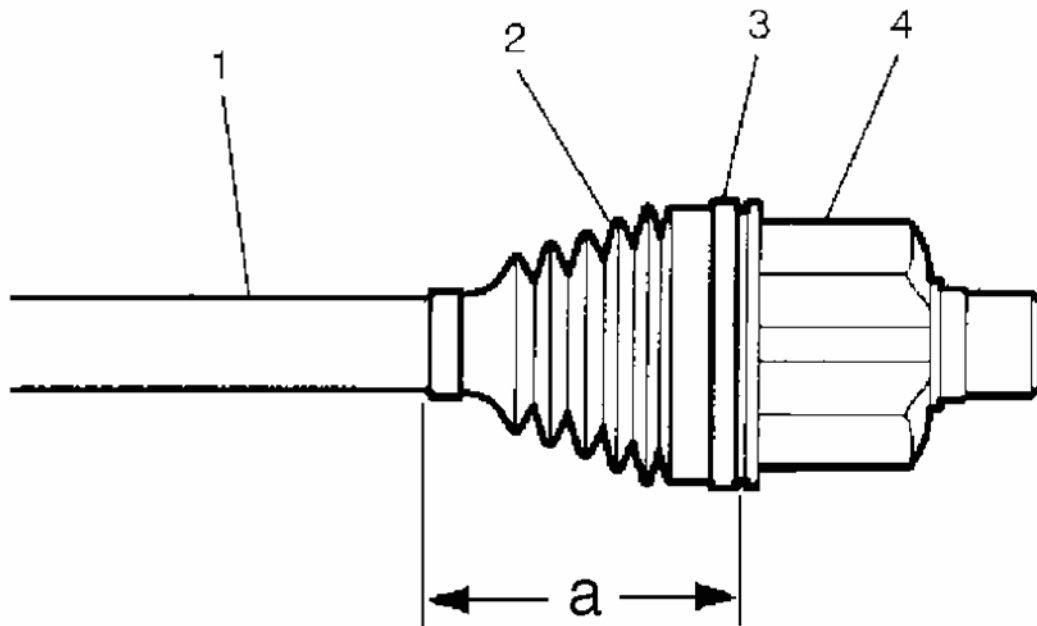


Fig. 14: Identifying Axle Shaft/CV Joint Assembly Components And Installed Boot Measurement Dimension

Courtesy of GENERAL MOTORS CORP.

12. Slide the large diameter of the halfshaft inboard seal (2), with the larger clamp (3) in place, over the outside of the trilobal tripot bushing and locate the lip of the seal in the groove.

IMPORTANT: The halfshaft inboard seal must not be dimpled, stretched out or out of shape in any way. If the halfshaft inboard seal is not shaped correctly, carefully insert a thin flat blunt tool, no sharp edges, between the large seal opening and the trilobal tripot bushing in order to equalize the pressure. Shape the halfshaft inboard seal properly by hand. Remove the tool.

13. Position the joint assembly at the proper vehicle dimension.
 - For 4.6L V8 engines, dimension a = 107 mm (4.21 in).
 - For 4.0L V6 engines, dimension a = 111 mm (4.37 in).
 - For 3.8L supercharged V6 engines, dimension a = 111 mm (4.37 in).
 - For all others, dimension a = 95 mm (3.75 in).

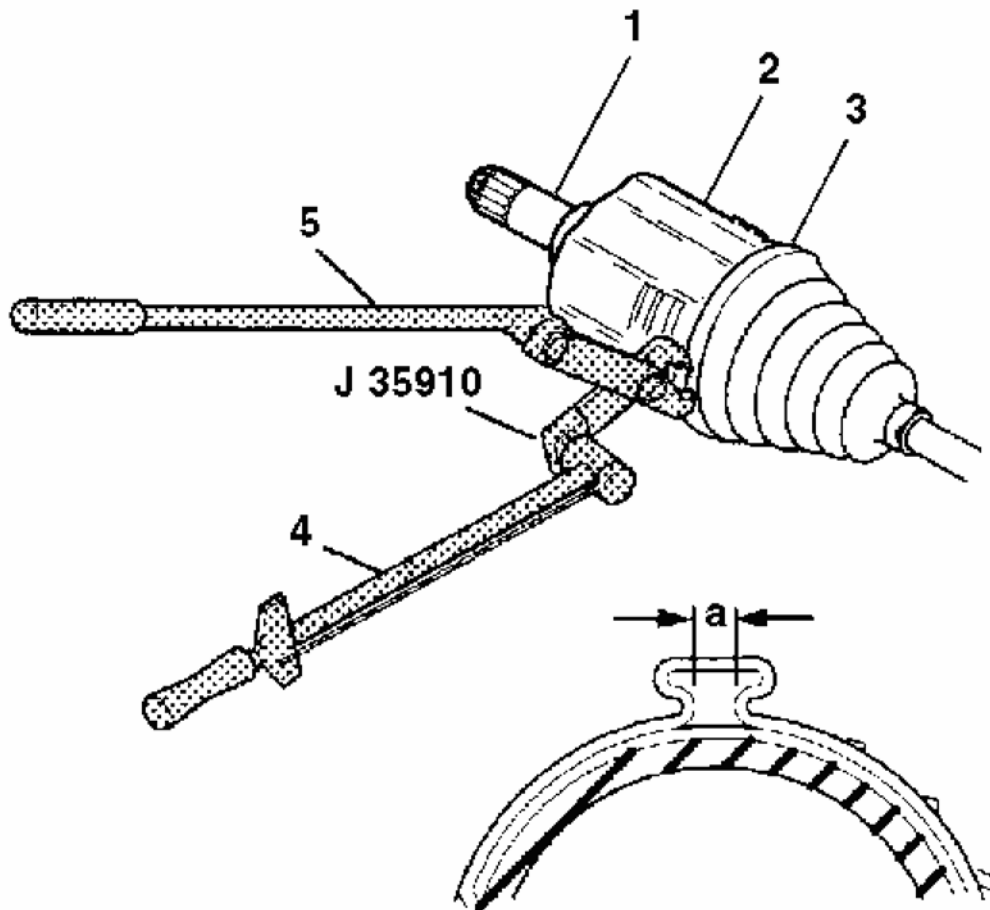


Fig. 15: Adjusting CV Joint Boot Clamp Gap Dimension
 Courtesy of GENERAL MOTORS CORP.

14. Align the following items while latching:

- The halfshaft inboard seal
- The tripot housing (2)
- The large seal retaining clamp (3)

Tighten: Crimp the seal retaining clamp with **J 35910** to 176 N.m (130 lb ft).
 Add the breaker bar (5) and the torque wrench (4) to **J 35910** if necessary.

15. Check the gap dimension (a) on the clamp ear. If gap dimension is larger than shown, continue tightening until gap dimension of 2.60 mm (0.102 in) is reached.
16. Fully stroke the joint several times to disperse the grease.

WHEEL DRIVE SHAFT OUTER JOINT AND SEAL REPLACEMENT**Tools Required**

- **J 41048** Drive Axle Swage Ring Clamp. See **Special Tools**.
- **J 8059** Snap Ring Pliers. See **Special Tools**.
- **J 35910** Drive Axle Seal Clamp Pliers

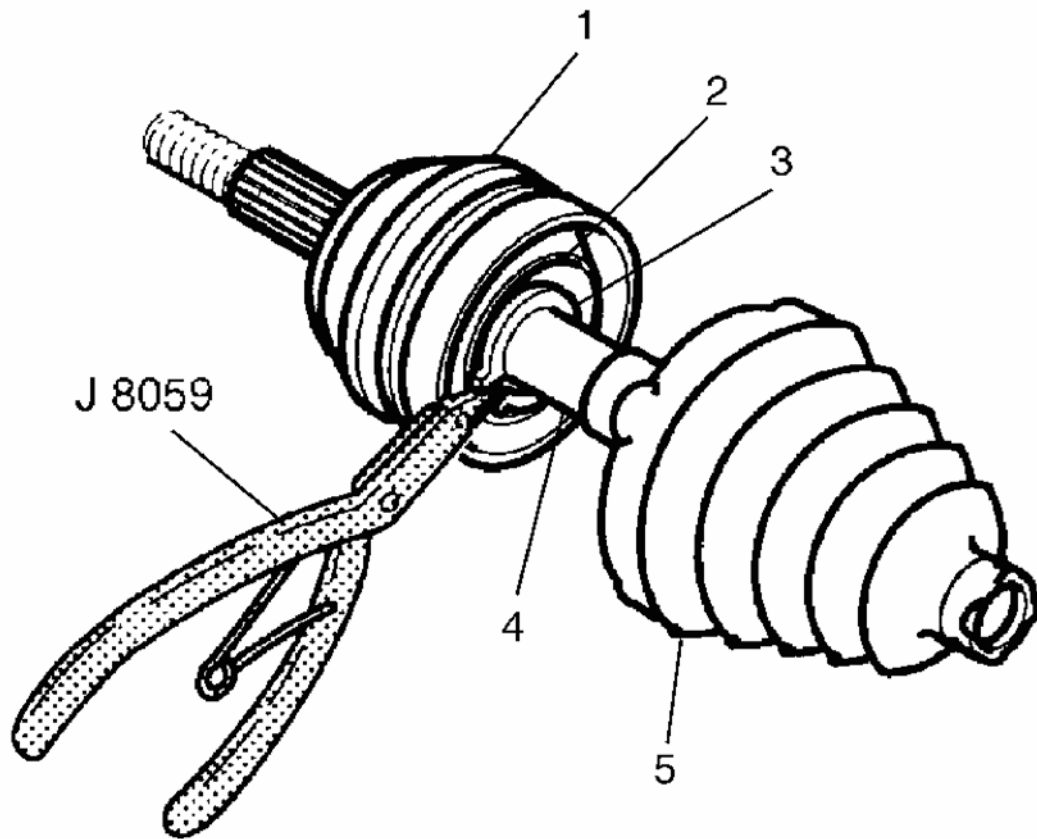
Disassembly Procedure

Fig. 16: Removing Race Retaining Ring
Courtesy of GENERAL MOTORS CORP.

1. Remove the large seal retaining clamp from the CV joint with a side cutter. Discard the seal retaining clamp.

NOTE: Do not cut through the wheel drive shaft inboard seal during service. Cutting through the seal may damage the sealing surface of the housing and the tripod bushing. Damage to the

sealing surface may lead to water and dirt intrusion and premature wear of the constant velocity joint.

2. Use a hand grinder to cut through the swage ring in order to remove the swage ring.
3. Separate the halfshaft outboard seal from CV joint outer race (1) at large diameter.
4. Slide the seal (5) away from joint along halfshaft bar (4).
5. Wipe the grease from the face of the CV joint inner race (2).
6. Spread the ears on the race retaining ring (3) with **J 8059** . See **Special Tools**.
7. Remove the CV joint assembly (1) from the halfshaft bar (4).
8. Remove the halfshaft outboard seal (5) from the halfshaft bar (4).
9. Discard the old outboard seal.

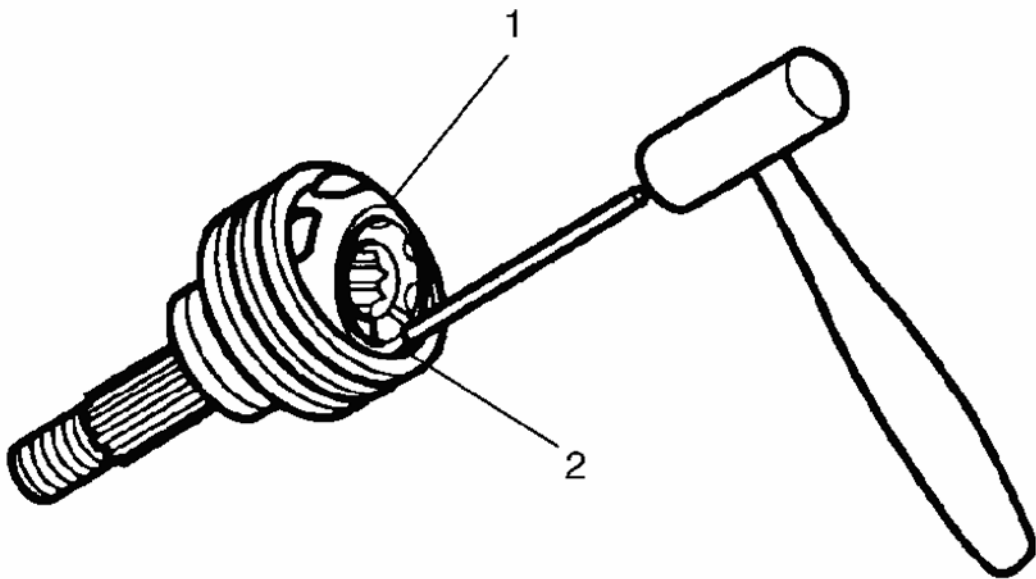


Fig. 17: Taping Gently On Brass Drift With A Hammer In Order To Tilt Cage
Courtesy of GENERAL MOTORS CORP.

10. Place a brass drift against the CV joint cage (1).
11. Tap gently on the brass drift with a hammer in order to tilt the cage (1).
12. Remove the first chrome alloy ball (2) when the CV joint cage (1) tilts.
13. Tilt the CV joint cage (1) in the opposite direction to remove the opposing chrome alloy ball (2).
14. Repeat this process to remove all 6 of the balls.

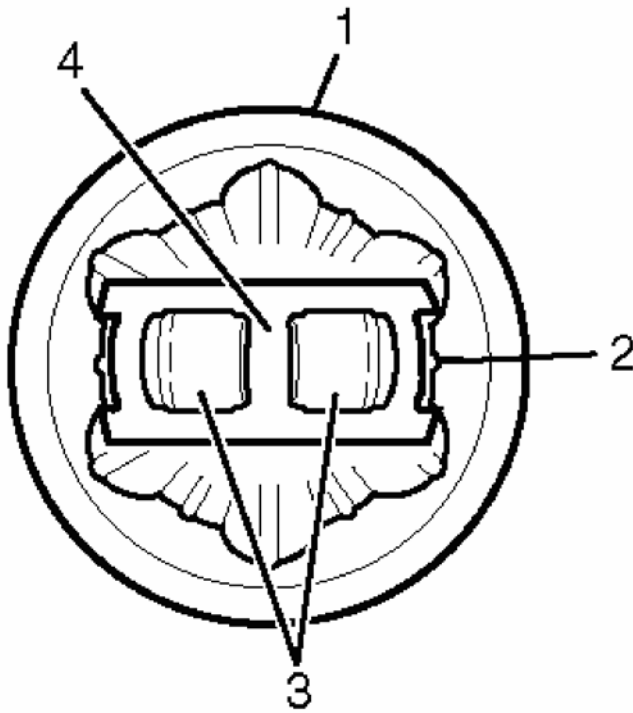


Fig. 18: View Of Outer Race, Inner Race, Cage Window & CV Joint Cage
Courtesy of GENERAL MOTORS CORP.

15. Pivot the CV joint cage (4) and the inner race 90 degrees to the center line of the outer race (2). At the same time, align the cage windows (3) with the lands of the outer race.
16. Lift out the cage (4) and the inner race.

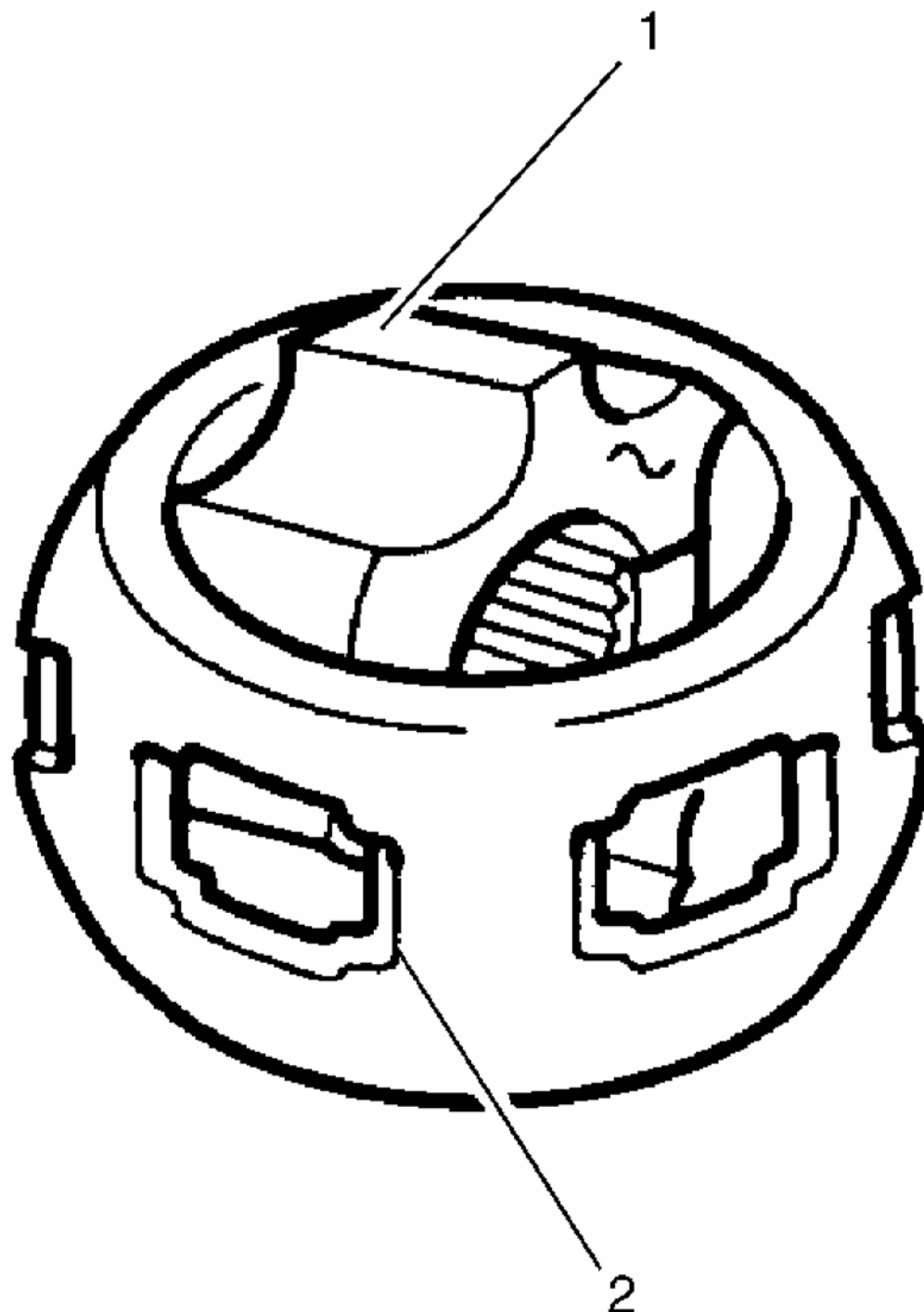


Fig. 19: View Of Inner Race & Cage
Courtesy of GENERAL MOTORS CORP.

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17. Remove the inner race (1) from the cage (2) by rotating the inner race (1) upward.
18. Clean the following items thoroughly with cleaning solvent. Remove all traces of old grease and any contaminates.
 - The inner and outer race assemblies
 - The CV joint cage
 - The chrome alloy balls
19. Dry all the parts.
20. Check the CV joint assembly for the following items:
 - Unusual wear
 - Cracks
 - Damage
21. Replace any damaged parts.
22. Clean the halfshaft bar. Use a wire brush to remove any rust in the seal mounting area (grooves).

Assembly Procedure

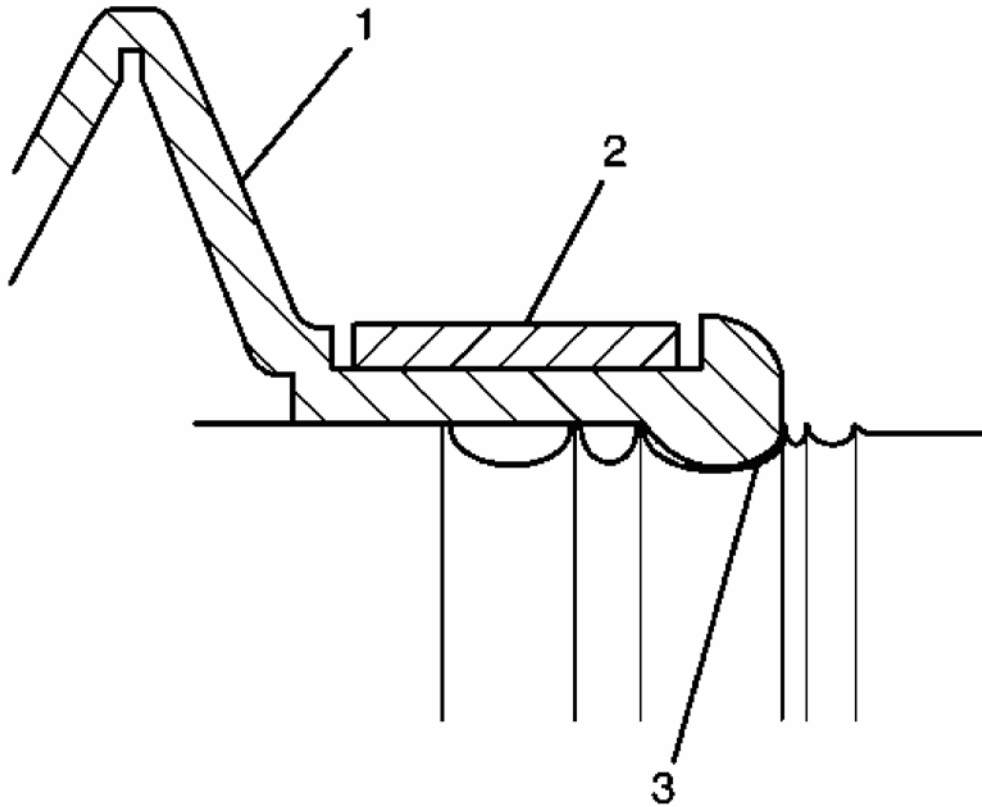


Fig. 20: Installing Seal Clamp On Neck Of Seal
Courtesy of GENERAL MOTORS CORP.

1. Install the new swage ring (2) on the neck of the outboard seal (1). Do not swage.
2. Slide the outboard seal (1) onto the halfshaft bar and position the neck of the outboard seal (1) in the seal groove on the halfshaft bar. The largest groove below the sight groove on the halfshaft bar is the seal groove (3).

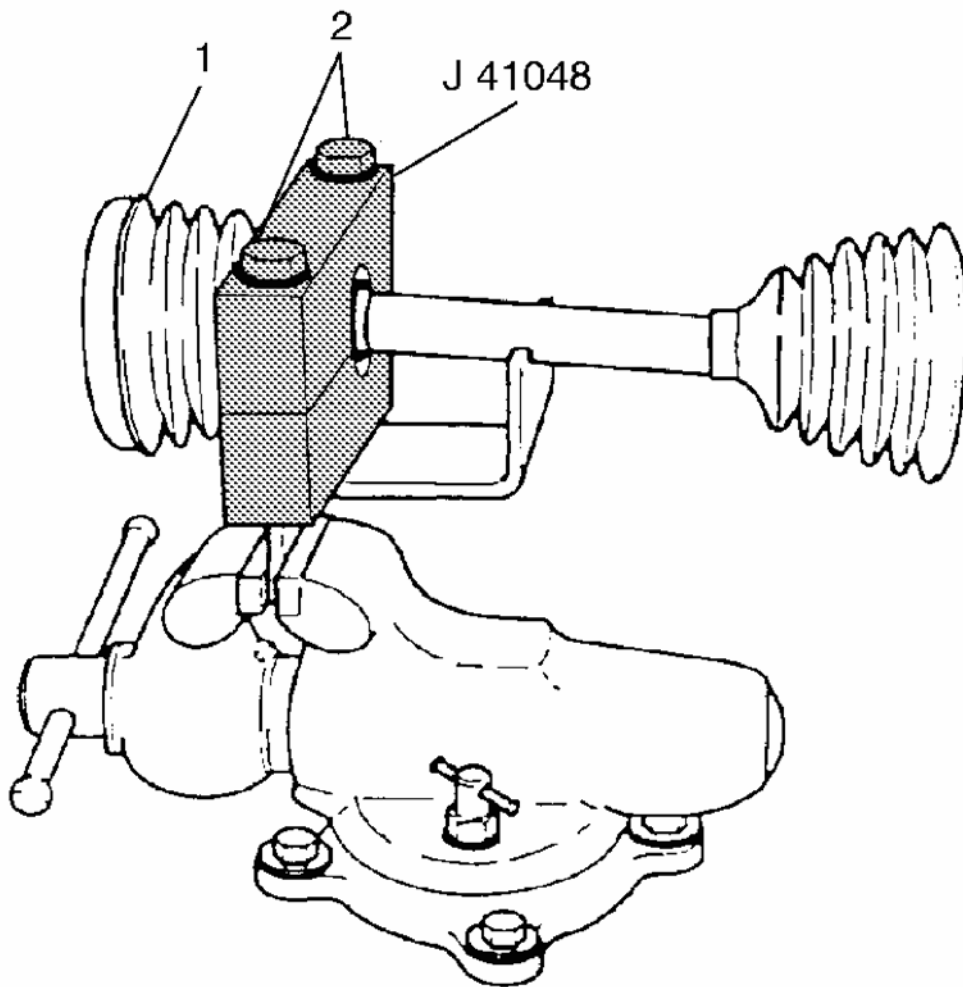


Fig. 21: Swaging Retaining Clamp Ring
Courtesy of GENERAL MOTORS CORP.

3. The swage ring is swaged using **J 41048** by the following method: See **Special Tools**.
 1. Position the outboard end of the halfshaft assembly (1) in **J 41048** . See **Special Tools**.
 2. Align the swage ring.
 3. Place the top half of **J 41048** on the lower half of **J 41048** . See **Special Tools**.

NOTE: Refer to **Fastener Notice** in Cautions and Notices.

NOTE: Do not cut through the wheel drive shaft inboard seal during service. Cutting through the seal may damage the

sealing surface of the housing and the tripot bushing. Damage to the sealing surface may lead to water and dirt intrusion and premature wear of the constant velocity joint.

IMPORTANT: Align the following items during this procedure:

- The outboard seal (1)
- The halfshaft bar
- The swage ring

4. Insert the bolts (2) and tighten by hand until snug.

Tighten: Tighten each bolt 180 degrees at a time using a ratchet wrench. Alternate between each bolt until both sides are bottomed.

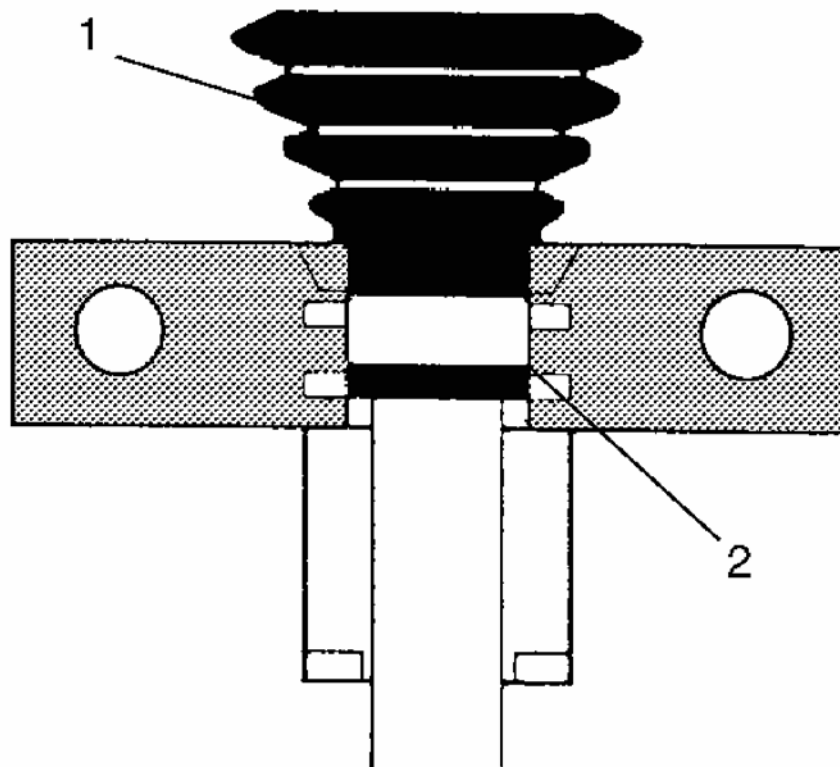


Fig. 22: Identifying Halfshaft Inboard Seal & Swage Ring
Courtesy of GENERAL MOTORS CORP.

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4. Loosen the bolts and separate the dies.
5. Check swaged ring (2) for any lip deformities. If present, place the ring (2) back into the **J 41048** making sure the ring covers the whole swaging area. See **Special Tools**. If necessary, re-swage the ring.

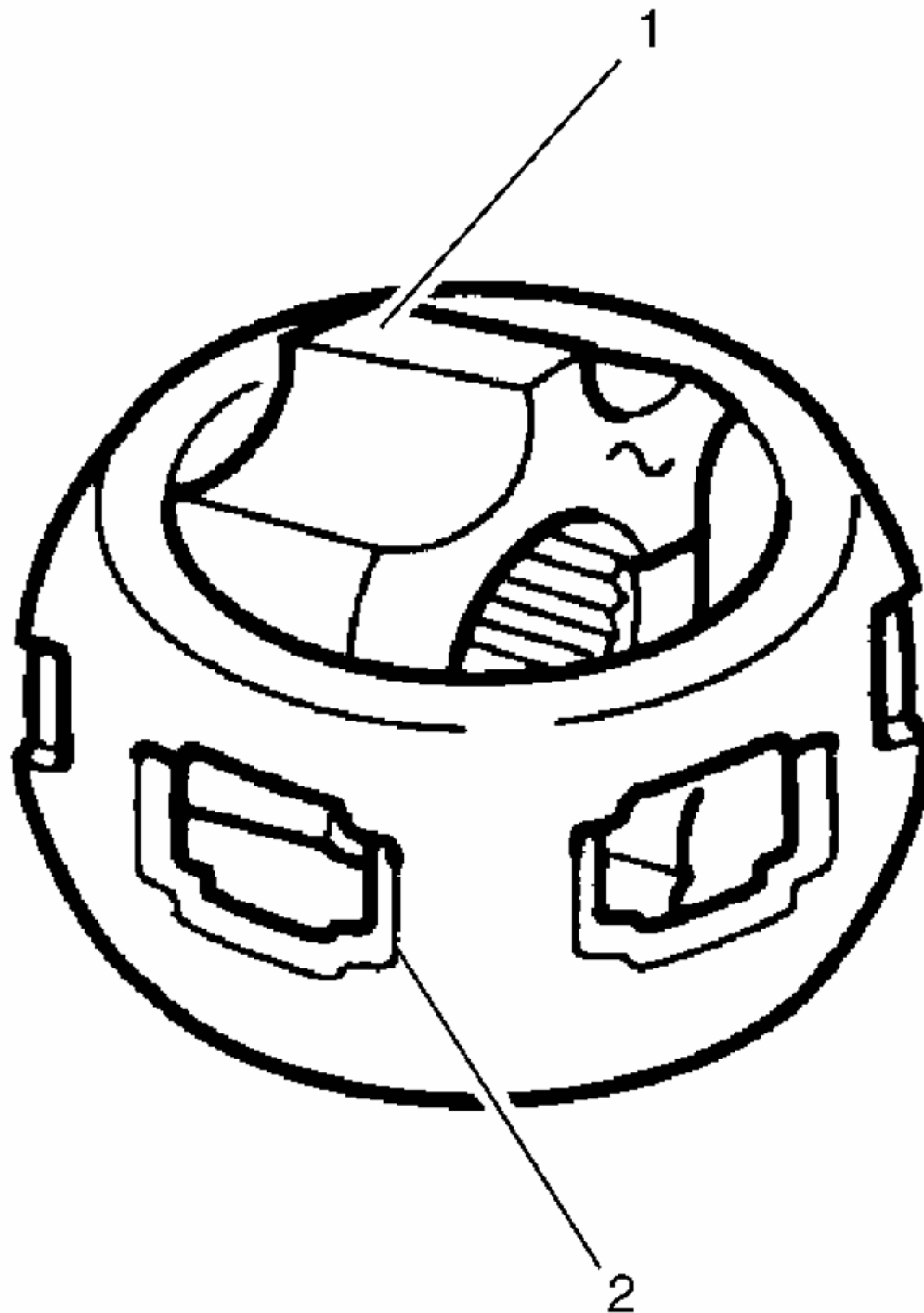


Fig. 23: View Of Inner Race & Cage
Courtesy of GENERAL MOTORS CORP.

6. Put a light coat of grease from the service kit on the ball grooves of the inner race and the outer race.
7. Hold the inner race 90 degrees to centerline of cage with the lands of the inner race (1) aligned with the windows of the cage (2) and insert the inner race into the cage.

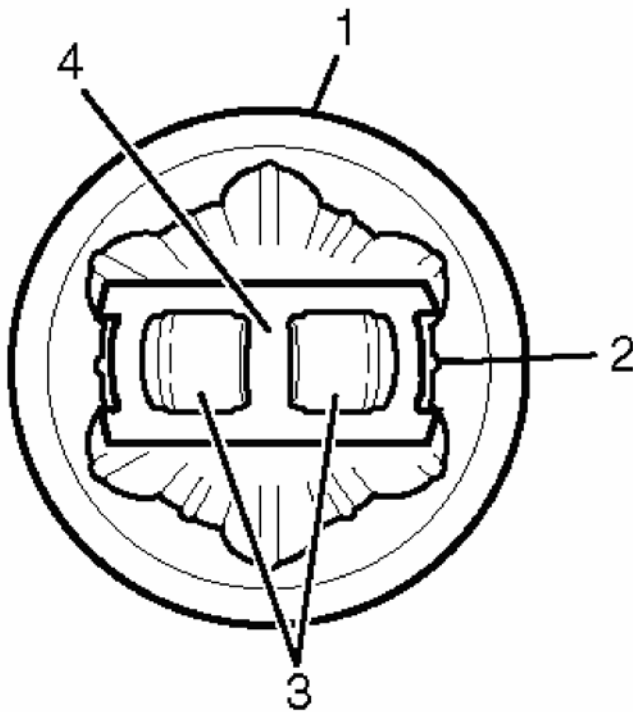


Fig. 24: View Of Outer Race, Inner Race, Cage Window & CV Joint Cage
Courtesy of GENERAL MOTORS CORP.

8. Hold the cage and the inner race 90 degrees to centerline of the outer race (1) and align the cage windows (3) with the lands of the outer race.

IMPORTANT: Be sure that the retaining ring side of the inner race faces the halfshaft bar.

9. Place the cage and the inner race into the outer race.
10. Insert the first chrome ball then tilt the cage in the opposite direction to insert the opposing ball.
11. Repeat this process until all 6 balls are in place.
12. Place approximately half the grease from the service kit inside the outboard seal and

pack the CV joint with the remaining grease.

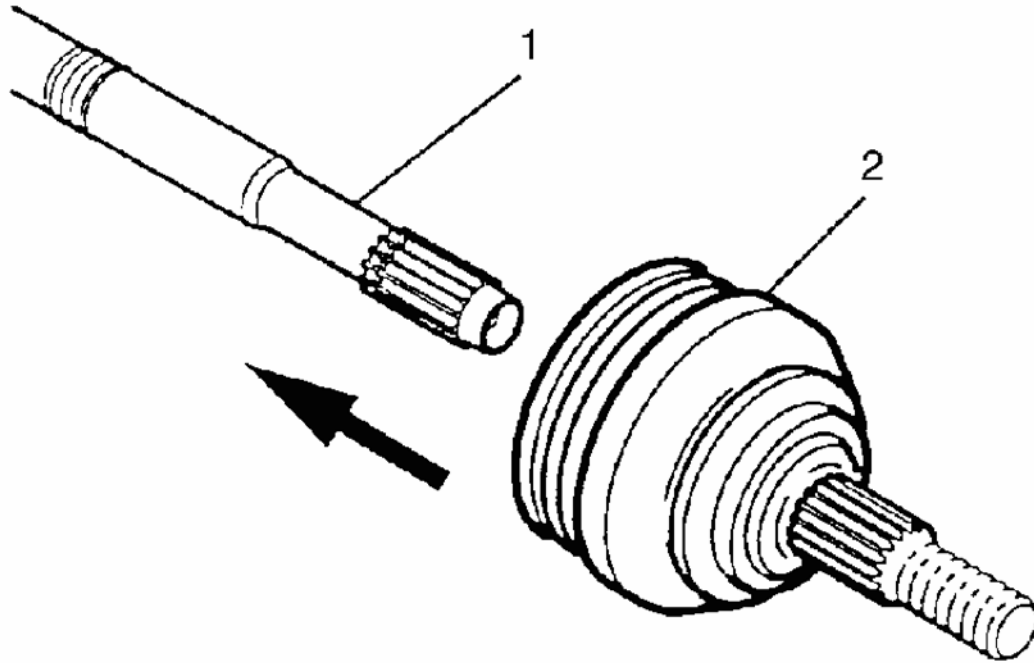


Fig. 25: Pushing CV Joint Onto Halfshaft
Courtesy of GENERAL MOTORS CORP.

13. Push the CV joint (2) onto the halfshaft bar (1) until the retaining ring is seated in the groove on the halfshaft bar.

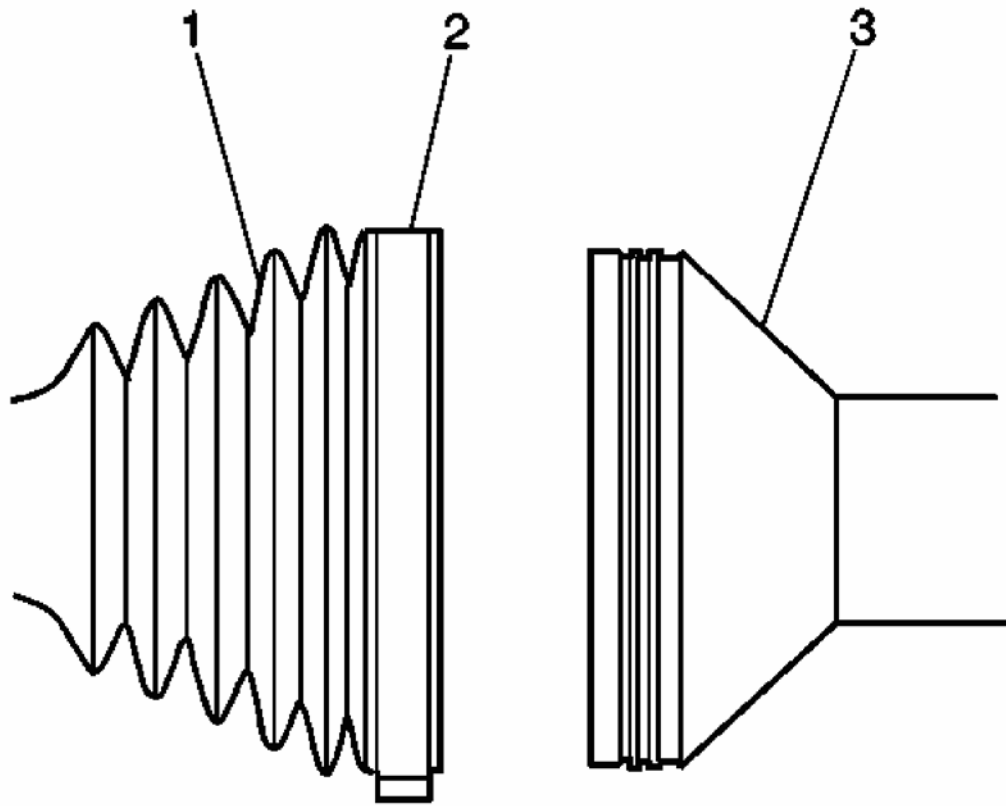


Fig. 26: View Of Boot And Large Seal Retaining Clamp
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The outboard seal (1) must not be dimpled, stretched or out of shape in any way. If the outboard seal (1) is not shaped correctly, equalize the pressure in the outboard seal (1) and shape the seal properly by hand.

14. Slide large diameter of the outboard seal (1) with the large seal retaining clamp (2) in place over the outside of the CV joint outer race (3) and locate the seal lip in the groove on the CV joint outer race.

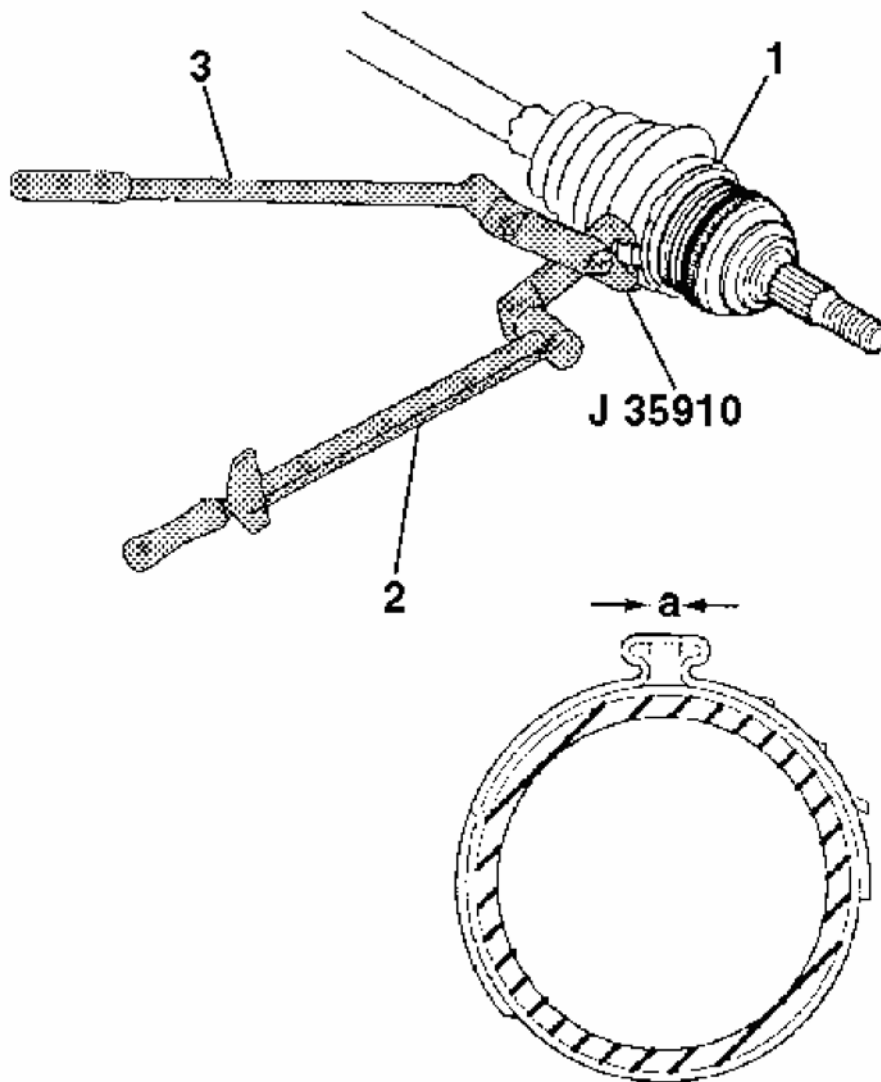


Fig. 27: Crimping Seal Retaining Clamp
Courtesy of GENERAL MOTORS CORP.

15. Crimp the seal retaining clamp (1) using J 35910 .

Tighten: Crimp the clamp (1) to 174 N.m (130 lb ft).

16. Check the gap dimension on the clamp ear. Continue tightening until the gap dimension is reached. Dimension a= 1.9 mm (5/64 in).

DESCRIPTION AND OPERATION

WHEEL DRIVE SHAFTS DESCRIPTION AND OPERATION

Front wheel drive axles are flexible assemblies.

Front wheel drive axles consist of the following components:

- A front wheel drive shaft tri-pot joint (inner joint)
- A front wheel drive shaft constant velocity joint (outer joint)
- A front wheel drive shaft

The front wheel drive shaft connects the front wheel drive shaft tri-pot joint and the front wheel drive shaft constant velocity joint.

The front wheel drive shaft tri-pot joint is completely flexible. The front wheel drive shaft tri-pot joint can move in and out.

The front wheel drive shaft constant velocity joint is flexible, but the front wheel drive shaft constant velocity joint cannot move in and out.

Boots (Seals) And Clamps

The front wheel drive shaft constant velocity joint and the front wheel drive shaft tri-pot joint boots (seals) in the front wheel drive axle are made of a thermoplastic material.

The clamps in front wheel drive axle are made of stainless steel.

The boot (seal) provides the following functions:

- Protection of the internal parts of the front wheel drive shaft constant velocity joint and the front wheel drive shaft tri-pot joint.

The boot (seal) protects the grease from the following sources of damage:

- Harmful atmospheric conditions (such as extreme temperatures or ozone gas)
- Foreign material (such as dirt or water)
- Allows angular movement and the axial movement of the front wheel drive shaft tri-pot joint.
- Allows angular movement of the front wheel drive shaft constant velocity joint.

IMPORTANT: Protect the boots (seals) from sharp tools and from the sharp edges of the surrounding components.

Any damage to the boots (seals) or the clamps will result in leakage. Leakage will allow water to leak into the front wheel drive shaft tri-pot joint and the front wheel drive shaft constant

velocity joints. Leakage will also allow grease to leak out of the front wheel drive shaft tri-pot joints and the front wheel drive shaft constant velocity joints.

Leakage may cause noisy front wheel drive axle operation and eventual failure of the internal components.

The clamps provide a leak proof connection for the front wheel drive shaft tri-pot joint and the front wheel drive shaft constant velocity joint at the following locations:

- The housing
- The front wheel drive shaft

The thermoplastic material performs well under normal conditions and normal operation. However, the material is not strong enough to withstand the following conditions:

- Abusive handling
- Damage from sharp objects (such as sharp tools or any sharp edges of the surrounding components in the vehicle).

Front Wheel Drive Shaft Tri-pot Joint (Inner Joint)

The front wheel drive shaft tri-pot joint is made with the tri-pot design without an over-extension limitation retainer.

The joint is constructed as follows for vehicles that are equipped with an automatic transmission:

- The left front wheel drive axle has a female spline. The female spline installs over a stub shaft that protrudes from the transaxle.
- The right front wheel drive axle has a male spline. The right front wheel drive axle uses barrel type snap rings in order to interlock with the transaxle gears.

Front Wheel Drive Shaft Constant Velocity Joint (Outer Joint)

The front wheel drive shaft constant velocity joint is made with the Rzeppa joint design.

The shaft end (which mates with the knuckle/hub) has a helical spline. The helical spline ensures a tight, press-type fit.

This design prevents end play between the hub bearing and the front wheel drive axle.

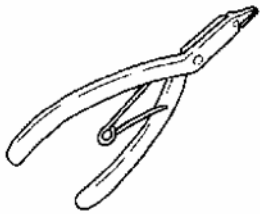
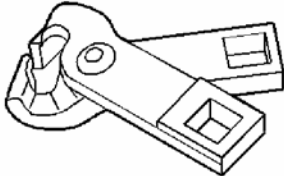
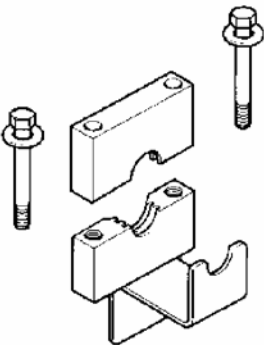
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

2006 Chevrolet Impala LS

2006 Driveline/Axle Wheel Drive Shafts - Impala

Special Tools

Illustration	Tool Number/ Description
	J 8059 Snap Ring Pliers
	J 35910 Drive Axle Seal Clamp Pliers
	J 41048 Drive Axle Swage Ring Clamp