# Service Sheet 1.2 - Rear final drive oil change (final drive)

**Estimated time:** 30-40 minutes
**Recommended interval:** Every **12,427 mi (20,000 km)** or **2 years (2 years)**, whichever comes first

## Objective

Changing the rear final drive oil is one of the most important maintenance operations on a BMW R1200 or R1250 GS and GSA LC. The final drive is a sealed mechanical assembly that transfers engine power to the rear wheel through a heavily loaded gear set. Those gears do not tolerate “close enough” lubrication.

This service has three clear goals:

- maintain a stable oil film between the gear teeth to prevent metal-to-metal contact

- remove old oil that contains wear micro-particles and magnetic residue collected during normal operation

- prevent thermal breakdown of the oil, which gradually loses its protective ability through heat cycles over time

Regular final drive oil changes protect bearings, seals, and gears, reduce the risk of overheating, and help prevent internal play from developing. It also helps prevent leaks at the oil seals, because oil that’s too old can contribute to abnormal internal pressure.

This operation is part of BMW’s maintenance schedule and helps ensure a final drive that stays reliable, quiet, and long-lasting, even under heavy use: loaded travel, two-up riding, long distance, highway runs, high temperatures, and dirt roads.

The goal is simple: maximize final drive life, avoid expensive repairs, and keep the bike’s original feel and drivetrain behavior.

## Key benefits

The advantages of regular final drive oil changes go far beyond “just replacing oil.” This service directly supports the overall health of the final drive.

### Preventing internal wear

Final drive oil gradually loads up with fine metallic particles from normal gear operation. The longer those particles circulate, the more they accelerate abrasion on gear teeth, races, and bearings. An oil change removes that contamination and keeps a clean, protective environment.

### Stable lubrication over time

Heat and mechanical cycling break down the oil's anti-wear additives. Fresh oil restores a consistent lubricating film, which is critical under the heavy contact load between the ring gear and the pinion. That reduces operating temperature and extends final drive life.

### Removing residual moisture

In off-road riding or high-humidity conditions, tiny amounts of water can enter through the vent or from thermal cycling. Even small amounts of moisture promote internal corrosion. Changing the oil puts you back on perfectly dry oil and helps prevent rust or pitting on metal surfaces.

### Monitoring internal condition

Inspecting the used oil is a simple, effective way to spot early warning signs. Abnormal metal debris, unusual color, or a burnt smell are red flags that let you intervene before a serious failure. Every oil change is also a preventive inspection.

### Following factory recommendations

BMW includes this oil change in its maintenance plan, especially after break-in and then at specific intervals. Following the schedule protects final drive function, preserves drivetrain longevity, and helps avoid expensive repairs. It's a must-do if you want the bike to stay at the level of performance BMW designed.

## Risks if neglected

If final drive oil changes are skipped, several problems can show up. Each one can have a major impact.

### Accelerated gear and bearing wear

Oil that's too old loses its protective ability. Gear contact becomes harsher, noise increases, and surface damage can become irreversible.

**Excessive final drive heat**

Degraded oil raises internal temperature. Over time, heat damages the oil seals and stresses bearings, which can lead to oil leaks.

**Internal play developing**

If lubrication isn't sufficient, parts wear unevenly and play can develop that you can sometimes feel at the rear wheel. That changes how the bike feels and handles.

**Internal corrosion**

If moisture isn't purged, the inside of the final drive can rust. Even light corrosion on gear surfaces can cause vibration, noise, and reduced mechanical efficiency.

**Final drive failure risk**

Extreme but real: if an internal bearing fails or gear teeth degrade too far, the final drive can seize. That's a serious safety risk and can lead to loss of control.

## Model compatibility

- **BMW R1200 GS and GSA LC** (K50 and K51, 2013-2018)
- **BMW R1250 GS and GSA** (K50 and K51, 2019 and up)

The R1200 LC models (liquid-cooled, starting in 2013) and the R1250 LC models (with ShiftCam technology, introduced in 2018, model year 2019 depending on market) share a very similar shaft-drive architecture. The principles and the benefits of a final drive oil change are the same for both generations.

## Required tools

- **Torx socket or Allen key** (depends on the final drive version)
  Used to remove the drain plug and or fill plug. BMW used two different configurations depending on year and version of the R1200 and R1250 LC. The tool must fit perfectly to avoid rounding the internal drive.
  Goal: clean removal and accurate torque on reassembly.

- **Torque wrench** (range **7 to 44 ft-lb (10 to 60 Nm)**)
  Required to follow factory torque specs. The final drive runs under heavy load,

so incorrect torque can lead to leaks, housing distortion, or premature wear. A wrench in this range covers every fastener used in this procedure.

- **0.24 in (6 mm) Allen key** (only if removing the ABS sensor)
  On some final drive versions, the ABS sensor may need to be removed to make it easier to pivot the final drive. This key lets you remove it cleanly without damaging the sensor or its mount.

- **Drain pan** (capacity at least **2.1 qt (2 L)**)
  A 2-liter pan gives you comfortable margin to catch the oil cleanly, even if the first flow comes out stronger, or if extra drips fall during cleanup. It also makes it easier to inspect the used oil for color, metal, and smell.

- **Graduated pump or syringe** (at least **6.8 fl oz (200 ml)**)
  This is the cleanest, most accurate way to refill. The oil volume is small and access is tight, so a measured fill tool is mandatory to hit the correct amount without overfilling.

- **Microfiber rags**
  For wiping excess oil, cleaning the outside of the final drive, and preventing residue from getting on the wheel or brake disc.

- **Nitrile gloves and safety glasses**
  Basic safety. Gear oil has a strong odor and aggressive additives. Gloves protect your skin, and eye protection prevents accidental splashes.

## Consumables

- **R 1200 GS/GSA - Fully synthetic final drive gear oil**
  Type: hypoid gear oil 75W90, API GL-5 only.
  BMW recommended product: BMW Hypoid Gear Oil G3 75W90
  BMW part number 83 22 2 365 987.
  JASO is for engine oils, it does not apply to final drive gear oil.
  ⚠ **GL-4 oil is not allowed**. It does not protect hypoid gears correctly in this final drive.
  **R1250 GS/GSA - Final drive oil: SAE 70W-80 (per BMW Rider's Manual)**
  BMW part number 83 83222413512

- **Oil quantity**
- Volume: **6.1 fl oz (180 ml)**.
  This amount must be followed strictly.
  ⚠ Never fill "to the bottom of the fill hole" on this final drive. That can overfill

it, increase internal pressure, promote leaks, and interfere with proper seal behavior.

- **Magnetic drain plug** (optional replacement)
  BMW part number: 33 11 7 705 854.
  Purpose: the magnet captures metallic particles suspended in the oil. That helps you monitor internal wear at each oil change and reduces metal circulation inside the final drive.
  Recommended if the original plug is damaged or if you want better particle monitoring.

- **Drain plug O-ring**
  BMW part number: 33 11 7 695 219.
  Provided dimensions: **0.44 x 0.071 in (11.2 x 1.8 mm)**.
  Purpose: seals the drain plug.
  ⚠ **Replace it every time**. A reused O-ring hardens, deforms, and increases the risk of seepage or a real leak.

- **Fill plug sealing washer** (copper crush washer)
  BMW part number: 07 11 9 963 132.
  Provided dimensions: **0.47 x 0.63 in (12 x 16 mm)**, thickness **0.059 in (1.5 mm)**.
  Purpose: seals the fill plug after tightening.
  Replacement is mandatory at each service to prevent micro-leaks.

- **ABS sensor O-ring** (if the sensor is removed)
  BMW part number: 33 17 7 679 865.
  Type: O-ring.
  Replace it every time the sensor is removed to maintain sealing and protect the sensor from water or oil intrusion.
  ⚠ Do not reinstall a crushed, cracked, or marked seal.

**General sealing rule**

**Always replace the drain-side O-ring**, the **fill-side copper washer, and the ABS sensor O-ring** if the sensor is removed.
**Seals are consumables**, not lifetime parts.
Note: depending on the final drive version, seal type and plug drive type can vary. Verify by VIN.

## Equivalent consumables

- Motul Gear 300 75W90
- Castrol Syntrax Long-Life 75W-90
- Liqui Moly Hypoid Gear Oil GL-5 75W90

⚠ BMW Hypoid G2 is obsolete, it has been replaced by G3.

## Torque specs (BMW RepROM and OEM parts catalog)

**Final drive drain plug**
Torque: **15 ft-lb (20 Nm)**
This torque seals the plug while protecting the aluminum housing threads. Over-torque can crush the O-ring or damage the threads, which can lead to leaks or even housing replacement.

**Final drive fill plug**
Torque: **15 ft-lb (20 Nm)**
Same torque value to apply correct compression on the copper crush washer. Over-torque can over-crush the washer or strip the threads.

**ABS sensor (M6 bolt, if removed)**
Torque: **71 in-lb (8 Nm)**
This low torque matters because the M6 bolt threads directly into aluminum. Too much torque can damage the threads or distort the sensor mount, which can affect ABS signal accuracy.

## Critical seal reminder

- Always replace the drain plug O-ring and the fill plug copper crush washer.

- Never reuse a crushed seal. Their job is to seal by conforming to tiny surface imperfections.

- A reused seal no longer provides uniform sealing pressure, which increases leak risk.

**Factory warning**

⚠ Always verify in the service manual for the exact model year of the bike:

- the seal type used (O-ring or copper washer, depending on version)
- the torque spec for each plug

Minor variations can exist depending on final drive generation and production year.

## Step-by-step procedure

- Ride a few miles to warm the final drive oil slightly. This thins the oil and improves drainage.
  ⚠ **Use common sense.** The housing and oil can get very hot. Never work immediately after a long highway run. Let temps come down first.

- **Put the bike on the center stand on level, stable ground.**
  The goal is to keep the bike perfectly upright so the oil drains correctly and you can work safely around the rear wheel.

- **Loosen the fill plug first** (drive type varies by final drive version, Torx or Allen, confirm before you start).
  This confirms it is not seized and it vents the housing, which helps oil drain properly from the drain plug.
  ⚠ If the fill plug is stuck, do not drain the final drive until you have freed the fill plug.

- Position the drain pan, capacity at least **2.1 qt (2 L)**, under the final drive.
  Center it under the drain plug to avoid splashing.

- **Remove the drain plug next** (drive type varies, Torx or Allen, confirm before you start). Finish unthreading by hand so you don't drop the plug into the pan.
  Let the oil drain freely.

- **Let it drip until the flow turns into scattered drops**.
  Use this time to observe oil color, smell for any burnt odor that could indicate

overheating, and check for any water contamination. Milky or foamy oil suggests water. If you see that, don't ride far and plan a deeper inspection.

- **Clean the drain plug magnet**.
  A thin metallic paste is normal, that's typical wear. **Visible chips or fragments are not**. Stop and diagnose.
  ⚠ If you find significant metal chips, stop riding and have a BMW shop diagnose the final drive.

- **Replace the drain plug O-ring every time**, BMW part number 33 11 7 695 219.
  Remove the old O-ring from the plug. Clean the O-ring seat, the plug threads, and the area around the drain opening.
  ⚠ **Do not use sealant or Teflon tape**. The O-ring alone provides the seal.

- **Reinstall the drain plug by hand until fully seated**, then torque to **15 ft-lb (20 Nm)** with a torque wrench.
  Wipe any oil around the plug immediately so leak checks are easy later.

- **Measure 6.1 fl oz (180 ml)** of API GL-5 75W90 or 70W80 gear oil using a graduated syringe or pump.
  Purge air from the syringe before injecting. Fill through the fill opening slowly to avoid trapping air pockets inside the final drive.
  ⚠ **Never fill to the edge or until it overflows**. On this final drive, the correct amount is the specified volume, not a visible level.

- **Replace the fill plug copper crush washer**
  BMW part number 07 11 9 963 132.

  Install the new washer on the clean plug before reassembly.

- **Reinstall the fill plug by hand**, then torque to **15 ft-lb (20 Nm)** with a torque wrench.
  Confirm the plug seats firmly against the washer without forcing.

- **Clean the entire area around the final drive** thoroughly, plugs, housing, swingarm, and rear wheel, using a clean rag to remove any oil traces.

## Practical tips

- Always loosen **the fill plug** before the drain plug.
  If the upper plug is seized, this prevents you from ending up with an empty final drive that you can't refill.

- Follow the oil quantity strictly: **6.1 fl oz (180 ml)**. Not more, not less.
  Overfilling increases internal pressure and can stress seals. Underfilling reduces protection and accelerates wear.

- **Use a graduated syringe or a measured pump**.
  Access to the fill plug isn't great, so a precise tool prevents spills and ensures a consistent fill amount every time.

- Use the service as a chance **to inspect the driveshaft boot**.
  Cracks, dry rubber, or splitting means risk of water, dust, or sand entering the drivetrain. Replace without delay.

- **Check for any oil traces near the wheel-side oil seal**.
  That area should be completely dry. Any seepage should be monitored, and replaced depending on severity.

- **Check for rear wheel play**, both **3 and 9 o'clock**, and **12 and 6 o'clock**.
  Any noticeable play can point to a bearing issue or final drive assembly problem. This simple test can catch abnormal wear early.

## Pro tips and shop tricks

- Replace the drain and fill seals every time.
  A crushed or reused seal cannot provide reliable sealing.

- Never torque a plug **without a new seal already installed.**
  Even perfect torque won't prevent a leak if the seal can't do its job.

- Always inspect the drain plug magnet.
  **Fine metallic paste** is normal. **Visible chips** are a mechanical warning that should be taken seriously.

- **Use only high-pressure API GL-5 gear oil.**
  ⚠ **GL-4 is not allowed**. It does not provide the protection hypoid gears need and will accelerate wear.

- Log the oil change date and mileage immediately in your service record.
  It keeps your intervals clear, especially if you ride a lot.

- For severe use, dust, high heat, frequent off-road, shorten the final drive oil interval to **6,214 mi (10,000 km)** to protect the drivetrain.

- Post-ride check: after a few miles, visually confirm the final drive stays perfectly dry around both plugs.

- After about **31 mi (50 km)**, do a full recheck.
  No seepage, clean area, plugs fully seated. This second check can reveal a micro-leak that only appears under heat and pressure. The area should remain completely clean and dry.

## Bonus

- Inspect the swingarm fasteners and lubricate the center stand pivot points.
- Quick visual check of the rear wheel spokes, if your bike has cross-spoke wheels.
- Quick visual check of the driveshaft boot at the transmission side, front boot.
- Clean the outside of the final drive so any future seepage is easier to spot.

## ⚠ Safety warnings

- Always wear **nitrile gloves** and **safety glasses**.
  Final drive gear oil contains aggressive additives and can irritate skin and eyes.

- ⚠ **Hot oil burn risk**
  The final drive housing and the oil heat up quickly. Handle with care, especially when loosening the drain plug.

- Do not exceed or go below **6.1 fl oz** **(180 ml)** when refilling.
  Overfill increases internal pressure and can push oil past seals. Underfill reduces gear protection.

- ⚠ **Strict torque compliance**
  Final drive threads are aluminum. Over-torque can strip them.
  Torque with a torque wrench only.

- Dispose of used oil at **an approved recycling facility**.
  Never dump it into drains or into the environment. Gear oil is highly polluting.

## Common mistakes to avoid

- **Over-torquing**
  Over-tightening aluminum-threaded parts can distort threads or the housing, leading to leaks or making it impossible to reinstall a plug correctly.

- **Reusing a used seal**
  A crushed seal cannot seal properly anymore. It almost always leads to seepage or slow oil loss.

- **Incorrect oil volume**
  Too much oil increases internal pressure and can force oil out through sensitive sealing points. Too little reduces protection and accelerates internal wear.

- **Not correcting an overfill**, oil injected above **6.1 fl oz (180 ml)**
  Too much oil increases hot internal pressure and can cause seepage or leaks at seals. If you went over the volume, remove the excess with the syringe before reinstalling the fill plug.

- **Not cleaning the area after refilling**
  Oil streaks can hide a real micro-leak or make you think it’s leaking when it’s just leftover drips. Always wipe and degrease around both plugs before your leak check. Use brake cleaner.

- **Using the wrong lubricant**
  Gear oil that doesn’t match hypoid gear requirements can cause accelerated wear of gears and bearings.

- **Forgetting to check the drain plug magnet**
  A heavy buildup of metal debris can reveal early abnormal wear that should not be ignored.

- **Handling oil that's too hot**
  High-temperature oil can splash fine droplets and cause burns.

- Bike not stable enough
  Working with a bike that isn't solidly supported can lead to loss of balance or the bike tipping.

## Conclusion

This service gives you more than fresh oil, it gives you real visibility into final drive health: oil condition, magnet debris, zero seepage, and normal behavior after a short ride. Those are the signals that tell you everything is functioning as it should.

By following a regular, structured method, you stay in control of your final drive maintenance. You know what to check, where to focus, and how to interpret what you're seeing. That understanding is what makes the long-term difference.

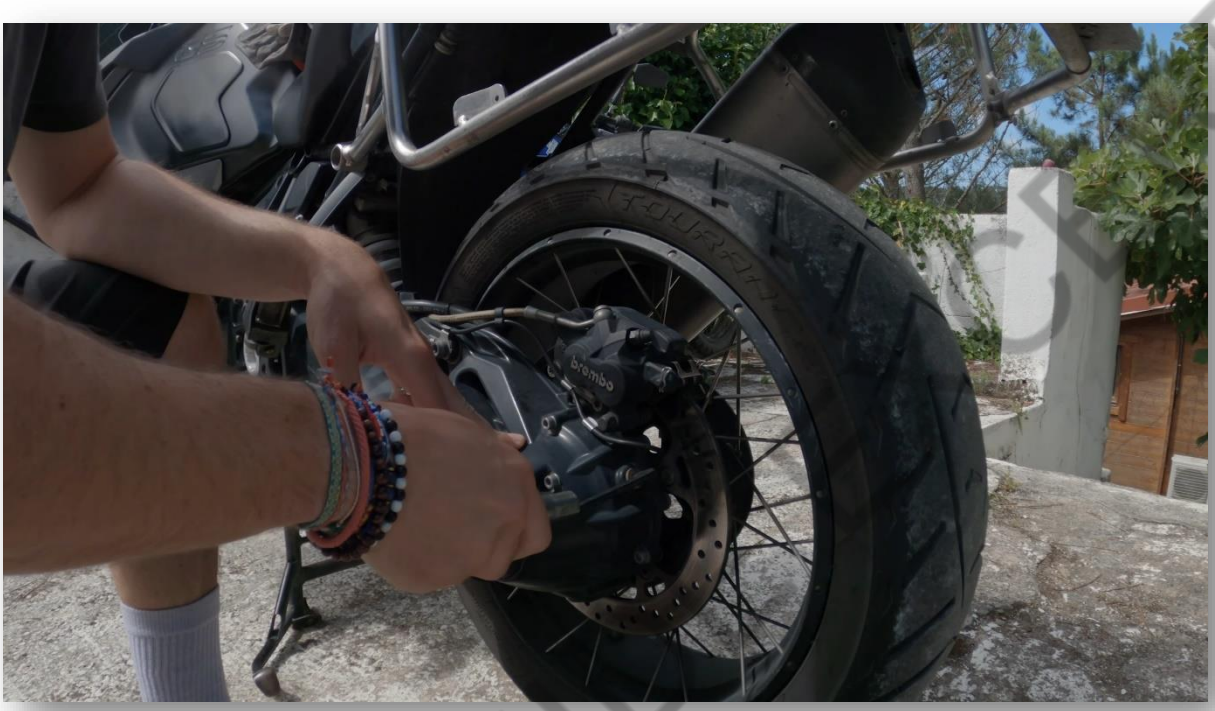
Your final drive is now serviced cleanly, and you have everything you need to monitor it over time at each inspection. This simple but critical job supports drivetrain longevity and keeps the mechanical system healthy on every ride.

## VISUAL PLAN - SERVICE SHEET 1.2 FINAL DRIVE OIL CHANGE

The final drive is the housing mounted at the end of the single-sided swingarm. BMW often calls this assembly the Paralever, and inside the housing you have the angled gear set.

Its main job is to transfer power from the driveshaft, which exits the transmission and runs inside the swingarm, to the rear wheel, while turning the drive direction by **90 degrees (90 degrees)**.


**Fill plug** (upper plug, drive type varies by final drive version, Allen or Torx)
Loosen the fill plug first.
Critical step: always break this plug loose before draining. It confirms you'll be able to refill the final drive and it helps oil drain more smoothly.




**<u>Drain plug</u>** (lower plug, drive type varies by final drive version, Allen or Torx)
**Remove the drain plug** (lower plug).
Position the drain pan directly underneath.


**Drain plug magnet inspection**

**Check the magnet**: **fine metallic paste is normal, visible chips mean something is wrong.**

Clean the magnet.

If you see chips or fragments, stop riding and diagnose.

**Drain plug O-ring replacement**

**Install a new O-ring** on the drain plug, size **0.44 x 0.071 in (11.2 x 1.8 mm)**. Always replace it every time. Torque the drain plug to **15 ft-lb (20 Nm)**.

Inject **6.1 fl oz (180 ml)** of API GL-5 75W90 gear oil through the upper fill opening.
Use a graduated syringe. Inject slowly to avoid trapping air pockets.
Never fill to the edge and never let it overflow.


**Check for leaks after reassembly**.
Both plugs torqued to **15 ft-lb (20 Nm)** and the area cleaned.
The final drive should be perfectly clean so you can spot any future seepage immediately.


**<u>Reminder</u>**: on this final drive, the **measured volume** is what matters.
Fill exactly **6.1 fl oz (180 ml)**, do not fill to a visible level.