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Thank you for purchasing our FKM VW Main Seal.

Installation Instructions for FKM Main Seal for Volkswagen 1200cc–1600cc Air-Cooled Engines

Part Compatibility:

FKM main seal for VW Type 1 air-cooled engines (1200cc–1600cc), including Beetle, Karmann Ghia, Bus, Type 3, and Thing (1960–1979). Fits 40HP, 1200cc, 1300cc, 1500cc, and 1600cc engines. Seal dimensions: 70mm inner diameter (ID), 90mm outer diameter (OD). Verify engine case compatibility. Part number: [Insert your part number, e.g., 113-105-245-FS].

Tools and Materials Needed:

- Clean rags and degreaser (e.g., brake cleaner)
- Curil-T sealant
- Fine file or 400-grit emery cloth (for chamfering flywheel edge)
- Bolt-up press kit (VW-specific, e.g., EMPI or equivalent)
- Engine oil
- 400-grit emery cloth (for flywheel finishing)
- Surface roughness tester (optional, for flywheel)
- Gloves and safety glasses

Safety Precautions:

- Work in a clean, well-lit area.
- Wear gloves to protect the seal and hands from sharp edges.
- Ensure the flywheel is secure during prep to avoid injury.

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Installation Steps:

1. Inspect the Case Recess:

- Visually inspect the engine case recess (where the 90mm OD seal seats) for debris, damage, or irregularities.
- Run a clean finger or rag over the recess to check for smoothness. Smooth any burrs or rough spots with 400-grit emery cloth, then clean thoroughly with degreaser and rags.
- Ensure the recess is clean and smooth for proper seal seating.

2. Chamfer the Flywheel Edge (Optional):

- Check the flywheel's sealing surface edge (where the seal's 70mm ID lip contacts) for sharpness or burrs, which can cut the FKM seal during installation.
- If needed, lightly chamfer the edge with a fine file or 400-grit emery cloth, creating a smooth ~0.5mm bevel at 15–30° to ease seal engagement.
- Clean the flywheel thoroughly to remove metal particles.

3. Prepare the FKM Seal:

- Apply a thin, even film of Curil-T sealant to the outer edge of the 90mm OD FKM seal (not the inner lip). Use a clean finger or applicator, ensuring minimal application to avoid excess squeezing out.
- Do not apply oil to the seal at this stage.

4. Install the Seal with Bolt-Up Press Kit:

- Position the FKM seal in the engine case, ensuring the double-lip faces inward (toward the engine) to prevent oil leaks.
- Using a VW-specific bolt-up press kit (e.g., EMPI or equivalent), align the kit's mandrel with the seal's 90mm outer diameter and apply steady, even pressure.
- Press until the seal is fully seated against the inside of the case recess. Stop when resistance increases, indicating the seal is bottomed out.
- Check for cuts or tears on the seal's 70mm ID lip during installation. If damaged, replace the seal to ensure a leak-free fit.

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5. Verify Proper Seating:

- Visually confirm the seal is seated against the recess, with no gaps or misalignment. Use a flashlight to inspect the seal's outer edge.
- Ensure the seal's inner lip is intact and not binding.

6. Oil the Seal and Flywheel Surface:

- Before installing the flywheel, lightly coat the seal's inner lip (race, 70mm ID) with engine oil to reduce friction and protect the lip during flywheel engagement.
- Apply a thin layer of oil to the flywheel's sealing surface (where it contacts the seal's lip) to ensure smooth operation and prevent wear.

Flywheel Surface Finishing Insights:

- **Target Roughness for FKM Seal:** For a 70mm ID, 90mm OD FKM rotary shaft seal, the flywheel's sealing surface (where the seal's lip contacts) should have a surface roughness of 0.2–0.8 $\mu\text{m Ra}$, based on industry standards for FKM seals in automotive applications. This ensures optimal sealing, minimal wear, and leak prevention for VW air-cooled engines.
- **Using 400-Grit Emery Cloth:**
 - Lightly sand the flywheel's sealing surface with 400-grit emery cloth in a circular motion to achieve $\sim 0.2\text{--}0.8 \mu\text{m Ra}$. Work evenly to avoid grooves or scratches.
 - Clean thoroughly with degreaser and rags to remove abrasive particles.
 - Check for a smooth, semi-polished finish (barely detectable texture by fingernail). Use a surface roughness tester if available for precision.
 - If too smooth ($<0.1 \mu\text{m Ra}$), oil retention may be poor; if too rough ($>1.0 \mu\text{m Ra}$), seal wear may increase.
- **Alternative Methods:** Machine shops may use a lathe with a fine cutting tool, followed by 400-grit emery or polishing, to achieve the required finish for VW flywheels.

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Tips for Success:

- The FKM seal's fluoroelastomer material resists heat (up to 200°C) and oil but is sensitive to cuts. Chamfering the flywheel edge and oiling the seal/flywheel prevent damage, aligning with your focus on reliable VW engine performance (e.g., your interest in high-quality seals, April 16, 2025).
- The bolt-up press kit ensures even pressure for seating the 90mm OD seal against the recess, critical for your seal's durability.
- For flywheel finishing, test a small area with 400-grit emery and verify smoothness before full sanding.
- VW forums like TheSamba.com, where you've sought parts like 48 IDA manifolds (March 21, 2025), offer community tips on seal installation and flywheel prep for 1200cc–1600cc engines.

Warnings:

- A sharp flywheel edge will tear the seal's 70mm ID lip, causing leaks. Chamfer if rough.
- Under-pressing (not fully seated) or over-pressing (past the recess) can cause leaks or damage. Stop when seated.
- Excess Curil-T can clog oil passages—apply sparingly.
 - Incorrect flywheel surface roughness can accelerate seal wear or cause leaks.

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