



## 928 Motorsports, LLC

# Porsche 928 Engine Break-in Procedure

Your engine may have been shipped without engine block water passage drain plugs. There is one on each side of the block. Check, and install them at this time if needed.

### ENGINE PRE-OILING

**You must pre-oil the new engine before starting it for the first time. Read both of the methods below, and use the option you prefer.**

**Pre-Start Oiling – Out of car:** Pack the oil pump with NAPA Lubriplate #105 (or equivalent) white engine assembly lube before installing. Then install the oil pump, the oil pan pickup tube, and the oil pan according to manufacturers spec. Do not install the timing belt or the oil pump pulley at this time.

Install an oil filter, oil pressure sending unit, and a jumper-hose to connect the oil cooler-out line to the oil-cooler-in line.

Put *non-detergent* straight 30w motor oil into the motor at this time for the initial start. Get this from NAPA. This will allow the piston rings to seat cleanly without glazing.

Attach an electric drill to the shaft on the oil pump, and spin the pump clockwise (when viewed from the front) to bring the oil pressure up and flow it around the complete engine. You can install a temporary oil pressure gauge on the sender if you wish.

Now remove the electric drill and attach the oil pump pulley and timing belt, timing belt covers, and install the motor in the car.

**Pre-Start Oiling – In Car:** Pack the oil pump with NAPA Lubriplate #105 white engine assembly lube before installing. Then install the oil pump, the oil pan pickup tube, and the oil pan according to manufacturers spec. You may also install the timing belt and timing belt covers.

Install the engine into the car, and make all necessary hookups including clutch, transmission, radiator, ignition, *everything*.

Removing the spark plugs will make the engine spin easier for the starter motor.

Put *non-detergent* straight 30w motor oil into the motor at this time for the initial start. Get this from NAPA. This will allow the piston rings to seat cleanly without glazing.

Disconnect the coil wire from the ignition coil(s) so the car cannot start. Attach a good battery charger to the battery that can supply something between 100 and 200 Amps. With the battery charger on, crank the motor over until you see the oil pressure start to come up.

We do not recommend continuous cranking for more than 2 minutes at a time to avoid overheating the starter motor.

## ENGINE BREAK-IN PROCEDURE

Read entire break-in procedure before proceeding. It is very helpful to have an assistant in the car during the initial firing of the motor.

At the start of this process, the engine should only have non-detergent 30w motor oil in it. Have the cooling system properly filled, and additional coolant on-hand. The floor under the engine should be clean, and without foreign debris. A timing light should be attached to the engine, and the distributor should be just snug, able to be moved by hand.

After the engine starts, immediately and frequently check the gauges to confirm you have oil pressure.

**Engine with new camshafts:** Bring the engine to about 2,000 rpm for at least the first 15 minutes. Vary the engine speed between 2000 and 2500 rpm at this time. This is to provide a no-load speed to bed-in the new camshaft into the engine. After 15 minutes, proceed as follows:

**Engine without new camshafts:** Bring the engine to about 1500 rpm for the first 30 minutes, and vary the engine speed from 1500 to 2500 rpm from time to time. This is to provide an no-load speed to bed-in the rod and main bearings.

### During this 30-minute run-in, check:

- Operation of the cooling fans
- Coolant level and top off as needed
- Operation of the coolant gauge
- Oil pressure is normal or above normal
- Below the engine for drips and leaks
- Ignition timing and set to manufacturers spec

After 30 minutes, you can bring the engine down to adjust the idle if needed. The engine can be shut off and allowed to cool at this time. Again confirm the oil and coolant levels, and check for leaks. Tighten the distributor clamp. Re-check the timing belt tension and confirm it is still correct.

**First Drive:** On this first drive, we will be focused on bedding in the piston rings. A set of properly bedded piston rings will go a long way to preventing blow-by and oil consumption for the life of the engine. This can be done with new cylinder walls only, as after the cylinder walls are glazed, the piston rings will no longer be able to bed in.

To bed in a new set of pistons rings, we will perform a number of moderate-speed engine high-load accelerations and decelerations, so select a road with little enough traffic and long enough uninterrupted straights to allow you to do this safely.

Perform the following procedure 10 times in succession.

From a speed of about 20 MPH, accelerate in 3<sup>rd</sup> or 4<sup>th</sup> gear at WOT to 65 MPH or so. Use the highest gear you can and still accelerate, we do not want to bog the engine. This high load on the cylinders will force the piston rings outward very hard, where they will bed into the cylinder walls. It will also produce heat and small metal shavings.

Immediately at the end of your high load "pull", engine-brake back to 20 MPH by downshifting to a lower gear and allowing the engine to decelerate you. This will draw oil up onto the cylinder walls to cool and cleanse your piston rings.

Repeat this process 10 times, after which you can consider your piston rings bedded in. Return to the shop now and perform an oil and filter change on this engine. Take the non-detergent oil out, and install a quality motor oil with a high zinc and phosphate content. We recommend Shell Rotella-T 20w 50. The zinc and phosphate additives are important to the bearing and cam lobe life of your 928, and is missing from a lot of "clear" motor oils like Quaker State and Pennzoil.

**First 500 miles:** Vary your engine speed frequently during the first 300 miles, and try to avoid stop-and-start city traffic. This can be done without breaking the traffic laws, just use different gears, downshift, accelerate up to the speed limit, decel, run there for a little bit, change gears again, slow down, speed up, etc. Check all fluid levels frequently. Check your spark plugs – they should all be colored similarly. Your engine warranty requires a check-up by a qualified service technician at 500 miles. At this time re-check ignition timing, adjust the idle speed as needed, inspect for oil and water leaks, and check the general operation of the engine. Re-check the timing belt tension and confirm it is still correct, as the timing belt will have bedded into the sprockets a bit by now, and is likely to be a little loose.

**At 1000 miles:** Change your oil and filter again.

**Every 3000 miles:** change your oil and filter, and perform routine maintenance.

Perform routine maintenance on your vehicle on a consistent basis. Your warranty requires the below items to be performed for Basic Engine Maintenance.

- Change oil and filter every 3 months or 3,000 miles with a high-quality SG-rated oil. . ***Do not use synthetic oil for the first 7,000 miles.***
- Check fluid levels every gas fill up.
- Change air filters every 25,000 (more often in a dusty environment).
- Check all belts/hoses at 30,000-mile intervals.
- Tune-up, including spark plug replacement every 30,000 miles.

Keep all maintenance records. We recommend that you keep all receipts and accurate records for maintenance work performed on your vehicle. In order to have repairs made under warranty, we require documentation of proper vehicle maintenance as outlined in Factory Warranty and Vehicle Owner's Manual as well as the steps outlined herein.