

Fleece Performance Cummins Engine Break-In Procedure

IMPORTANT: FAILURE TO FOLLOW ENGINE BREAK-IN PROCEDURE CAN INDUCE ENGINE FAILURE AND WILL VOID ANY WARRANTY COVERAGE. FOLLOW ALL VALVE LASH PROCEDURES AND VERIFY VALVE LASH AT BREAK-IN OIL CHANGE.

FILL THE ENGINE OIL SYSTEM

DATE: INITIALS:

1. Fill the engine with petroleum-based engine oil. DO NOT use synthetic oil for the first 1,000 miles of engine operation. We recommend the following break in fluids:
 - a. Amsoil SAE-30 break-in oil (Amsoil P/N: BRKQT)
 - b. Driven Racing Break-In Diesel Motor Oil SAE15W-40
 - c. John Deere Break-In Plus SAE10W-30
2. Prime the oil filter by filling the filter with new break-in engine oil.

FIRST START AND INITIAL RUN-IN

DATE: INITIALS:

1. Install a mechanical oil pressure gauge to monitor oil pressure.
2. Crank the engine over until it starts. DO NOT use starting fluids of any kind. DO NOT rev the engine at initial startup. If oil pressure is not achieved within 10 seconds after startup, immediately shut down the engine.
3. Allow the engine to run up to 5 minutes at idle before shutting down to inspect for any leaks, check coolant level, verify engine oil level, and transmission fluid level.
4. Verify no leaks are present after initial start-up and verification of oil pressure.
5. Start and Run the engine between 1500 - 2000 rpm until the thermostat opens and coolant system flow occurs.

PISTON RING BREAK-IN

DATE: INITIALS:

1. Make sure oil temp is above 100 degrees before placing excessive load on the engine.
2. Progressively load the engine using a dyno or road test while varying rpm and load during this time. DO NOT run at low idle speed for more than 5 minutes at a time for the first 100 miles. DO NOT cruise unloaded at steady state speeds as this does not place adequate load on the engine for proper ring seating.

Excessive low load conditions will create poor ring seal causing low power, increased blowby, increased oil consumption, excessive regen/DPF plugging, lower fuel economy, and shorter engine life etc. There is only a short window for proper ring seating, so it is crucial this process is followed.

POST BREAK-IN OIL CHANGE AND CHECKS

DATE: INITIALS:

1. At 1,000 miles of operation, drain the break-in oil and replace the oil filter. Check coolant level and ensure no boost leaks are present.
2. Refill the engine and oil filter with manufacturer recommended synthetic oil.
3. At 4,000 miles, a second oil change is recommended. Refill the engine and oil filter with manufacturer recommended synthetic oil. Check coolant level and ensure no boost leaks are present. Normal oil change intervals can resume after the second oil change. We recommend every 5,000 miles or as determined by oil analysis.

VALVE LASH PROCEDURE

| | |
|-------|-----------|
| DATE: | INITIALS: |
|-------|-----------|

NOTE: To obtain accurate readings, valve lash measurement and adjustments should only be performed when the engine coolant temperature is less than 60 degrees C (140 degrees F).

STEP 1: Disconnect negative battery cables.

STEP 2: Remove cylinder head cover.

STEP 3: Using the crank shaft bearing tool [Fleece P/N FPE-CCBT), rotate crankshaft to align damper TDC mark to 12:00 o'clock position.

a. If both number 1 cylinder rocker levers are loose, continue to next step.

b. If both number one rocker levers are not loose, rotate crankshaft 360 degrees.

STEP 4: With the engine in this position, valve lash can be measured at the following rocker arms: **Intake 1-2-4 / Exhaust 1-3-5**. Measure the valve lash by inserting a feeler gauge between the rocker arm socket and crosshead. Refer to VALVE LASH LIMIT CHART for the correct specifications. If the measurement falls within the limits, adjustment/resetting is not necessary. If measurement finds the lash outside of the limits, adjustment is required.

VALVE LASH LIMIT CHART

| | INTAKE | EXHAUST |
|---------|----------------------|----------------------|
| MINIMUM | 0.152 mm (0.006 in.) | 0.381 mm (0.015 in.) |
| MAXIMUM | 0.381 mm (0.015 in.) | 0.762 mm (0.030 in.) |

NOTE: If measured valve lash falls within these specifications, no adjustment is necessary. Engine operation within these ranges has no adverse effect on performance, emissions, fuel economy or level of engine noise.

STEP 5: If adjustment is required, loosen the lock nut on the rocker arms and turn the adjusting screw until the desired lash is obtained:

-**Intake** 0.254 mm (0.010 in.)

-**Exhaust** 0.508 mm (0.020 in.) Tighten the lock nut to 24 N.m (212 in-lbs) and recheck the valve lash.

STEP 6: Using the crankshaft barring tool, rotate the crankshaft one revolution to align the damper TDC mark to the 12:00 o'clock position.

STEP 7: With the engine in this position, valve lash can be measured at the remaining rocker arms: **Intake 3-5-6 / Exhaust 2-4-6**. Use the same method as above for determining whether adjustment is necessary and adjust those that are found to be outside of the limits.

STEP 8: Install the cylinder head cover.

STEP 9: Connect the negative battery cables.