



Liter vs. Inch Engines, 300 Series John Deere.

300 Series Liter Engines, a basic comparison to inch engines.

Considerable interest has been shown for a better understanding of the basic and fundamental differences between the so-called LITER 300 Series engines and their predecessor, the INCH designated engines manufactured by John Deere. As the newer LITER engines have the same displacement as the previous INCH engines, a simple way of identifying the newer version with all the changes and improvements became necessary. Hence, the engine displacement was identified in metric terms instead of the cubic inch designation for displacement.

Liter designated engines came into production with the introduction of the RCP (running change program) cylinder head in 1989 and 1990, and were produced in Dubuque, Iowa and Saran, France. They are currently replaced by the Series 350, PowerTech engines. Series 350 PowerTech engines include many important upgrades that will be addressed in a future bulletin.

Many significant changes to the engine are incorporated in the new head design. Other changes are equally important, however, and all contribute to improved performance. Some of these changes compared to the "Inch" designated head are as follows:

1. Head "breathing" capability. Both intake and exhaust passages in the head have been enlarged and contoured for minimum flow restriction to improve breathing. Previous heads were known to be "air limited".
2. Valves have larger head diameters and smaller stem diameters to improve breathing, and have hardened tips (no valve stem cap required).
3. Valve seals have been adopted on both intake and exhaust valves for better oil control. The seals are affixed to the valve guide tower, which has been machined to provide a shoulder for mounting the seals. Very early production had seals on naturally aspirated engines only but this was quickly changed to include all Series 300 Liter engines.
4. The intake manifold is integral with the right side of the head. On four cylinder engines, two sweat plugs are visible on the side of the intake manifold. On six cylinder engines, three sweat plugs are used. The ports aid in clean-out during manufacture. Presence of these sweat plugs is an easy way to identify a Liter engine from an Inch engine.
5. High ring pistons have been adopted for the Liter engines. The top compression ring was raised from 15mm to 4mm from the top of the piston. This aids in cold weather starting, fuel consumption, heat rejection and low speed torque capabilities.
6. "Time-Trac" fuel injection timing systems are used with Liter engines. This electronic system enables greatly improved injection timing to match with horsepower and performance requirements of each engine. Timing marks are provided on the mounting flange of the pump and front plate of the engine. Correct alignment of these marks usually provide accurate injection timing to the engine. Timing window procedures are no longer precise enough for Liter engines.
7. New 9.5mm injectors are used on the Liter engines. A spacer and new clamping fixtures vary from previous production.
8. Rocker arm wear pad geometry has been changed on Liter engines for reduced wear pad and valve stem tip wear. Very early versions incorporated a different valve adjustment procedure eliminating the need for jam nuts. This was later changed, returning to the traditional system.
9. Late production of the four cylinder Liter engines adopted cast iron crankshafts replacing the usual forged cranks. These crankshafts incorporated undercut grooved and rolled stress reliefs in the radius area of both mains and connecting rod journals. This type of crankshaft can be ground to 0.010 in. undersize only.
10. Late production of the RCP cylinder head made additional improvements to the breathing capability of the engine by altering the swirl characteristics to enable improved performance.