

FIELD TEST RESULTS AND COMPARISONS- BOSCH 7301 VERSUS CATERPILLAR 194-8518 AND CHAMPION KB77WPCC

REFERENCE #1: Samples from CDM Resource Management. Contact- Russ Wilson

Caterpillar G3606- 1775 horsepower
Unit 271
40 lbs Suction
50 lbs discharge
Continuous run engine at 90%
Installed on 3/26/2007 at 14773 hours
Removed on 6/26/2007- total run hours- 2240

The engine had zero reports of detonation during the entire test and no service calls had to be performed. Russ Wilson put in his notes, the engine ran extremely well and it's the best set of plugs he has ever seen. This was on an offshore platform in the Gulf of Mexico. CDM has issued a purchase order to switch all 385 of their engines to the Bosch plug.

The engine tested beside it was a brand new Caterpillar G3606, the same configuration, with Caterpillar 194-8518 plugs. Unit 271 had a PM, the Bosch plugs were installed and the engines started at the same time. All 6 Caterpillar plugs failed before 700 hours and had to be replaced. The new Caterpillar engine was on the third set of plugs when Unit 271 was shut down to remove the Bosch plugs at our requested 2000 hour runtime.

After evaluation and x-ray analysis of the returned plugs by Bosch it is evident the plugs could have run considerably longer. Cylinder # 5 showed indications of overheating yet the spark plug in that cylinder had no additional wear or fatigue compared to the other plugs.

REFERENCE #2: XTO Energy, Trinidad Colorado. Contact- John Marszal

Caterpillar G3516- 1400 RPM, 1265HP, (EIS) Electronic Ignition System
Caterpillar G3606- 1775 HP

XTO has 14 of these engines in this specific application and had only been getting 1000 to 1400 hours maximum runtime with the Caterpillar 194-8518 plug. They installed a full set of the Bosch 7301 plugs on March 16th. John did not have a single detonation reading or service call at 1000 hours. They removed the plugs for inspection and reinstalled them. They removed them again at 2000 hours to do the same. The plugs were still running perfect and were reinstalled. To date the engine has over 3000 hours runtime and the plugs are still running. John called Premium Power to say he has never had these results and wants to run the plugs to see how far they will go.

After the successful results XTO has also installed a set in a Caterpillar G3606 in the same location. Their normal runtime and PM for this engine is 2000 hours. The Bosch set is approaching that time frame now and the plugs are still running perfect. XTO has issued a purchase order for a set of plugs for all 21 engines at this location and a recommendation has been placed with their national purchasing manager to switch all engines to the Bosch plug upon availability.

REFERENCE #3: Red Cedar Gathering- Bondad Colorado. Contact- Shawn Rants

Several tests were run at several locations. Plugs were removed at various time intervals to ascertain wear. In all these tests, both Bosch7301 and Caterpillar 194-8518 or Bosch 7301 and Champion KB77WPCC were installed in the engines together to compare results.

G3606-1775 HP- Red Cedar unit Outlaw #1. Installed on 3/8/07- removed 4/14/07 at 888 hours. 2 of the Champion plugs in the test failed and all plugs were removed for inspection.

G3606 with ADEM 111 electronic ignition system- 1775 HP. Red Cedar Unit Outlaw #2.

Installed on 3/8/07. Removed on 5/3/07 at 1488 hours. The Champion plugs were showing detonation readings on the ADEM 111 reports and the Bosch plugs ran flawlessly. Upon x-raying the returned Bosch samples there was virtually no visible wear difference between the plugs that ran 888 hours on Outlaw #1 versus the plugs run to 1488 hours on Outlaw #2.

G3606 with ADEM 111- 1775 HP. Red Cedar unit Outlaw #4.

Installed 3/16/07. Removed 7/12/2007. 2832 hours. Champion plugs were changed at 1980 hours and Bosch plugs were still in great working condition showing no misfiring or detonation.

G3606- 1775 HP. Red Cedar unit Outlaw #6.

Installed 3/8/07. Removed 6/7/2007- 2208 hours. Bosch plugs ran through the test in perfect condition.

Additional tests were run at:

Duke Energy in Roggen Colorado on a G3612 Caterpillar.

6 separate tests at Canadian Natural Resources in northern Canada. All Bosch plugs ran to completion of tests at 2000 hours

6 separate tests at Talisman Energy in northern Canada. All Bosch plugs ran to completion of tests at 2000 hours

There is another current test still running at a CO2 plant at Michigan Pipeline. This application is a G3516 with CO2 levels of 16 to 20%. The customer has never had a set of Caterpillar or Champion plugs make it to 1500 hours. They currently have 1200 hours on the test and all Bosch plugs are still running perfect.

To date not a single Bosch plug has failed in any test.

We have also conducted testing of the Bosch 7330 combustion sensor for all G3600 Caterpillar applications, reference Caterpillar part number 159-3219. Testing on this plug has been flawless as well and it is being offered at a considerable cost savings over Caterpillar.