

TECHNICAL BULLETIN ON MILITEC-1 LUBRICATION AFTER 100,000 MILES IN A HONDA GOLDWING 1500 MOTORCYCLE

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BACKGROUND: The research was conducted on a 1989 Honda Goldwing GL 1500. Militec was first applied when the motorcycle was first used. A very systematic examination was conducted every 10,000 miles and a log of examination data was kept. The last examination was at 100,000 miles. The research was conducted by Michael J. Politte, Technical Advisor to the San Diego Touring Club. Mr. Politte is also a Master Chief Diesel Inspector for the U.S. Navy. In his spare time, he has treated a number of other motorcycles with Militec-1 and has monitored their condition as well.

Militec-1 was applied at 500 miles at which point the leak down test indicated the engine was sealed and ready to accept a more advanced lubrication package. Parasyntetic oil was used from 500 until 40,000 miles, and then a full synthetic oil was used for the remainder. The forks were serviced every 10,000 miles using one tablespoon per 325 cc's of suspension fluid. Militec-1 was also mixed into a synthetic grease and applied once to all greased parts at 10,000 miles.

COMPRESSION TEST: Prior to testing for compression, the engine is started and warmed up until the fan starts to operate (215°F). It is then shut down, the spark plugs and air filter are removed, the carburetors are placed in an open position and held there, the spark plug wires are grounded, and a Snap-On compression gauge (a screw-in type) is installed. The engine is then turned over using the starter motor and a count is made of the number of revolutions required to achieve various pressure levels until a maximum is achieved. Correcting for small changes in ambient conditions, the results show a perfectly consistent compression, with no change at all during the entire life of the engine. In a healthy engine without Militec-1, it is common to experience an increase in compression due to a build up of carbon on top of the pistons. The results showed that Militec-1 provided an extremely tight piston/cylinder seal.

VISUAL INSPECTION OF ENGINE: The top and mid quadrants of the cylinder were examined using a bore scope. Cross hatching was visible at both the top and mid quadrants. They were free of carbon and there was no hour-glassing of the cylinder. A very minute amount of carbon was noted up in the combustion dome, and a slight carbon ring was visible around the piston dome circumference. The part of the engine visible with the bore scope looked as if it were new.

LEAK-DOWN TEST: A Snap-On leak down tester was used. Air is injected into the cylinder and the leak off is measured by percentage of leak down. When the motorcycle was new and first tested, the percentage was 2.5%-3.0%. After about 500 miles, the percentage was at 1.5%-2% and has stayed close to this level ever since. There was some erratic behavior of individual cylinders from time to time which was normal, overtime the cylinders became very uniform and held close to 2% to 2.5%. For a healthy engine without Militec-1, the percentage after 100,000 miles would normally be in the 5% to 7% range.

OIL PRESSURE TEST: At this point in the inspection, the spark plugs are reinstalled and the electric oil pressure sensor is removed. A remote oil pressure gauge is installed and the motorcycle is again warmed up until the fan kicks in. The idle is set at 500 rpm. It would be expected that the oil pressure would decrease by 15 percent or more over 100,000 miles. However, with this motorcycle, every examination has shown no decrease. The oil pressure is consistent with the specifications of a brand new engine.

VISUAL INSPECTION OF FORKS: Militec-1 was used in the forks to prevent corrosion. There are no metal-to-metal friction areas for lubricity enhancement, but moisture is common and this causes corrosion. With Militec-1, there has been no corrosion. Also, the nylon and other soft materials in the forks have experienced no adverse effect from the presence of Militec-1.

INSPECTION OF GREASED AREAS: All greased areas of the motorcycle (except the right front wheel bearing) were treated with Militec-1 when the motorcycle had 10,000 miles. The right front bearing was not treated as a control, and failed at 89,000 miles, while the other wheel bearings remained in like-new condition. To apply the Militec-1 in a grease, it is hand mixed into a synthetic grease until the grease just starts losing its

consistency. It was applied to the wheel bearings, (sealed bearings are used but the seals are removed, Militec-1 is installed, and the seals reinstalled), swing arm bearings and head bearings. For the swing arm bearings, the preload torque is normally 14 ft./lbs., but with Militec-1, 20 ft./lbs. can be used with no increase in drag (with Militec-1 the drag is less at 20 ft./lbs. than without Militec-1 at 14 ft./lbs.). For the head bearings, the specified preload torque is 14 ft./lbs. for this motorcycle. Without Militec-1, increasing the preload torque to 20 ft./lbs. would increase the drag from 4 to 10 lbs. This would make the steering very stiff and nearly freeze it up. With Militec-1 at 20 ft./lbs., the drag is less than 4 lbs. Once Militec-1 was applied and the motorcycle was operated a few thousand miles, the preload torque was tested at 40 ft./lbs. and the drag remained low. For this motorcycle, the preferred preload torque was 22 ft./lbs.

The value of being able to increase the preload torque on the head and swing arm bearings is that it creates a structurally rigid suspension package which provides a more precise ride devoid of head shake and swing arm-to-frame flex. This enhances both comfort and safety. By reducing the amount of drag on the bearings, it enhances suspension responsiveness. Militec-1 allows the mechanic to set up the steering and suspension systems much better than possible without it. It actually changes the paradigm by which bearings are utilized.

Normally, the head bearings in these motorcycles suffer from static impact damage which causes deep wear marks. Metal is vibrating against metal and notches are etched into the metal at the points of contact. These "berneilling" marks become severe and the bearings often need to be replaced after about 50,000 miles. With Militec-1 there has been no evidence of berneilling over the entire life of the motorcycle and the bearings have not required replacement. There were no marks at all on the bearings after 100,000 miles.

SEALS AND GASKETS: The motorcycle was overtreated by applying Militec-1 with every oil change (intervals were typically 3,000 to 4,000 miles), rather than once every 15,000 miles. This overtreatment provided an opportunity for any detrimental effects on soft materials or other materials to be more evident. However, all seals and gaskets were found to be in excellent condition after 100,000 miles with Militec-1.

CONCLUSION: Militec-1 has kept the motorcycle in mint condition over 100,000 miles. There is no evidence of any significant wear. Militec-1 has provided complete protection for all metal-to-metal friction areas.

In addition, the motorcycle has been able to operate without increasing octane to handle the increased compression that would normally occur due to carbon buildup. Right up to 100,000 miles, 87 octane fuel was used without any detonation problems.

OTHER TESTS:

1. Effects on clutch slippage - Four motorcycles in addition to the GL 1500 were used for this test. These were as follows:

1988 BMW R100 RS
1990 Harley Davidson 883 SportsterZ
1988 Suzuki Intruder 750
1987 Kawasaki Concour

The last three motorcycles all have wet sumps. All used a ratio of 2 ounces of Militec-1 per quart of oil. The GL 1500 was also tested at 4 ounces per quart of oil.

Results: There was no sign of any slippage nor of any abnormal clutch effects in all of the motorcycles tested.

2. Motorcycle chains: In this test, a standard 530 chain was put in an oven at about 150°F for 10 to 15 minutes, the chain was wiped with Militec-1, the excess wiped off, and the chain was put in service. The motorcycle was then driven on the desert (all off-road) for 300 miles.

Results: The chain had the appearance of being fully lubricated. It did not kink, bind or become excessively noisy while dirt attraction was minimal compared to other lubricants.