SERVICE

SERVICE BULLETIN 2-78-5 N

BUTLER & SMITH, INC.

NORWOOD, NEW JERSEY 07648 COMPTON, CALIFORNIA 90224

Piston Ring Seating - /5, /6, /7 Models

Group 11 - Engine

Many problems may be attributed partially or wholly to improper ring seating. Blow-by of gases past the rings will cause excessive crankcase pressure, which will be manifested as excessive breather "chirping", rear seal leakage, rapid oil deterioration and oil consumption, i.e. oil being passed out the breather and burned in the right hand combustion chamber. Ring seating is also critical to proper compression, loss of which will result in lack of power and poor idling. Oil movement past the rings can cause carbon buildup on the piston crown, squish band and exhaust valve, causing preignition or "pinging" and valve sticking. Combustion heat must be transferred to the cylinder walls via the piston rings, while poor heat transfer can cause overheating and abnormal piston expansion and wear.

Breaking in New Engines

A new engine must be broken in and thoroughly cleaned using light oil, such as 10W40, or in cold weather, 20W20. This will speed up ring break-in and deburring of metals that come into contact with one another. Due to less film strength of these light oils, it is important not to over rev the engine, nor subject it to extreme loading. This means driving with small throttle openings, while keeping in the 3500 - 4500 rpm range. Light oil should not, however, be used after initial 600 miles, unless weather conditions require it.

Seating New Piston Rings

When improper sealing is suspected, examination of the piston can provide important diagnostic clues. Dry, hard carbon deposits between compression ring and nose ring usually indicate poor sealing by the compression ring. Wet, oily carbon deposits above the oil ring indicate poor oil control or piston rocking caused by excessive clearance between cylinder and piston. Wet or oily deposits above nose ring indicate excess oil movement, usually caused by excessive wear on oil ring or improper location of end gaps. Poor compression also is an indicator of poor ring seating. Use of these signs can help locate and eliminate problems. The following procedures should be followed to achieve proper ring seating.

When cleaning a piston prior to refitting new rings, care must be taken to clean all carbon from the ring lands, in order that the ring may have an adequate surface to seal against. Avoid scratching or raising the aluminum in the ring land, as this will hinder sealing and heat transfer.

Special attention must be given to proper ring end gap, which should be carefully checked whenever new rings are fitted, and to proper location of ring gaps relative to piston position. Since a horizontally opposed engine tends to have a lot of oil thrown into the cylinder, oil control is of paramount importance. To accomplish this, BMW uses an oil ring and a scraper ring, providing a total of three scraping surfaces. The end gaps of these two lower rings should be towards the top of the cylinder, on each side of the top piston thrust surface. To remove the gap of the compression ring from the hot spot near the spark plug and exhaust valve, it should be fitted at the bottom favoring the intake valve side. Care should be used to avoid placing any ring gap directly on a thrust surface of the piston.

The glaze must be broken on the cylinder wall to provide a surface for the rings to seat against. Do not use a stone hone for this as even the slight amount of material removed by a finishing hone will result in excessive piston clearances. A flex-hone should be used as it removes almost no material. The flex-hone will break the glaze and establish a proper 45° crosshatch when used properly.

After de-glazing wash the cylinder walls with soap and hot water, rinse and wipe dry with a clean cloth rag. A slight surface rust will form on the cylinder wall. This is normal and creates no problem. The cylinders and pistons should be installed back onto the motor dry (free from oil). A drop of oil should be smeared on each piston skirt.

When initially starting the re-ringed engine, start the engine and immediately bring the rpm up to 3500. Do not let the engine idle until smoke has stopped coming out of the exhaust. It is important to use a cooling fan on the motor during this process. Ride the motorcycle, maintaining 3500 - 4500 rpm, for several miles, using light oil as described above.

WARRANTY INFORMATION

This bulletin is Service Information only, not warranty authorization. Use normal warranty procedures.

Very truly yours,

BUTLER & SMITH, INC.

Gene T. Shirley

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Service Manager

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