

SB048

Checking Slipper Bearing Crush

When slipper engine bearings are fitted to the conrod or cylinder block main tunnels, the bearings protrude slightly above the parting plane of the housing on both sides. This protrusion is called bearing crush height. When the bearing cap is installed and tensioned down, the two protruding ends of the bearings push against each other, creating a force pushing the bearings into contact with the tunnel of the bearing housing. The bearing shells have a slightly larger radius than that of the tunnel they are fitted to, which gives them some spring when installing. This is present to hold the bearing in the housing during assembly. The tangs are present to locate the bearings correctly sideways. Neither spread nor tangs give the force necessary to hold the bearing hard against the housing surface or to stop the bearings from spinning in the housing - this is achieved by the crush.

Bearing crush is initially determined by the engine manufacturer and then the aftermarket bearing manufacturer. The crush must exert a minimum force of 82,740 kPa (12,000 psi) at 121° C to hold the bearing securely in place and no more than 275,790 kPa (40,000 psi) to avoid damaging the bearing or housing. Excessive crush will cause the bearing to distort and bulge inwards at the parting faces. This is called "side pinch". Insufficient bearing crush will allow the bearing to fret in its housing and interfere with the heat transfer from the bearing. This leads to overheating and distortion of the bearing surface.

Bearing crush should always be checked when building an engine. The two bearings are fitted to the housing and the nuts/bolts are tensioned to specification. One nut/bolt is then undone allowing the joint face on that side to be forced open by the bearing crush. Feeler gauge strips are then inserted between the parting faces of the housing to measure the crush. Crush is typically in the range of 0.075 - 0.128 mm (0.003" - 0.005") and a lower limit of 0.050 mm (0.002") and upper limit of 0.20 mm (0.008"). Bearings used in performance applications or specially made performance bearings should have about an extra 0.013 mm (0.0005") crush height per shell or 0.025 mm (0.001") per pair. Performance applications should be aiming at 0.128 - 0.175 mm (0.005" - 0.007") crush.

