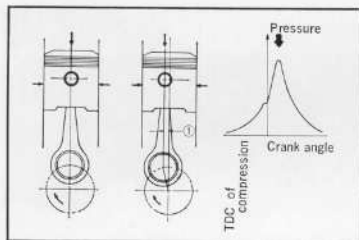




Fig. 3.44 Piston

Fig. 3.45 Cylinder offset
① Offset

The piston is an aluminum casting made from select material. (Fig. 3.44)

This material is light and suitable for high speed, in addition to having good heat conducting property to dissipate the heat rapidly. Furthermore, the coefficient of heat expansion is small, thus minimizing the warpage at elevated temperature and permitting a small piston to cylinder clearance design. The shape of the piston is an elliptical taper. The head of the piston, compared to the skirt, is exposed to higher temperature and since the expansion is greater, it is tapered smaller toward the top. The tapering of the piston also tends to lessen the piston slap when the throttle is lightly snapped without the engine being loaded.

The piston employs a three step taper. The piston pin boss area is made thicker, thereby, resulting in greater expansion at high temperature. For this reason, the diameter of the piston skirt is made smaller in the direction of the piston pin so that at the high operating temperature, the piston will expand into a true circular shape. The skirt is constantly provided with flexibility to assure that no deformation will result even from extended continuous driving.

The piston pin is offset 1 mm (0.04in) from the piston centerline in the direction of the inlet side so that when the piston approaches the top-dead-center of the compression stroke, the side load from the cylinder moves from the right side to the left. With a "O" offset, the point will move to align with top-dead-center of the compression stroke. (Fig. 3.45)

As shown in Fig. 3.45, the point of maximum combustion pressure occurs after the top-dead-center, therefore, the purpose of the offset is to move the point toward the point of weaker pressure which is before top-dead-center, and by so doing, escapes the powerful pressure movement and makes it possible to eliminate the piston slap.

The piston ring performs a vital function of assuring proper combustion and transmission of the resultant force.

The top and second ring serve as a seal for the combustion chamber, the oil control ring scrapes the excess oil from the cylinder wall to control the cylinder wall lubrication. Further, they transmit the high temperature of the piston to the cylinder wall where it is dissipated out through the cylinder cooling fins.