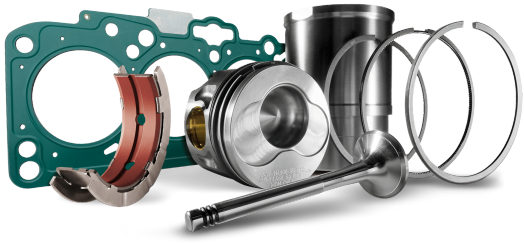

SERVICE ENGINEERING BULLETIN

SB2123.1

Taper sided (keystone wedge) piston grooves

Many diesel engines use pistons with one or more taper-sided compression ring grooves. The purpose of the design is to overcome the possibility of the rings sticking. This prevents carbon build-up by allowing the side clearance to alter as the ring moves in the groove.

The groove finish and angle is of vital importance to ensure efficient operation. The groove angle is typically 15º (Fig. 1) or 20º (Fig. 2). During overhaul, thoroughly examine the condition of the grooves before fitting new rings to a used piston.

Due to the design, groove wear may be more prevalent because of the ring movement within the groove. All ring grooves whether parallel or taper sided should be smooth, flat and have the same angle as the ring (see Fig. 3). Achieving effective gas seal is only possible by such “companion geometry”. Compression rings form a seal by the combustion gases forcing the ring against the lower face of the groove and against the cylinder wall.

Avoid the use of pistons with worn grooves as they can perform with less than optimum results. A new ring will not seat correctly in a worn groove and results in lack of combustion seal. A new ring in a worn taper groove will twist and flex and may result in the ring breaking. (see Fig. 4).

Examine the piston ring grooves closely. As a rough guide of wear limits, with a new ring in place, a 0.006” ~ 0.152 mm feeler blade should be unable to enter the groove. (see Fig. 5). Replace the piston if the gauge enters the groove, as wear is excessive.