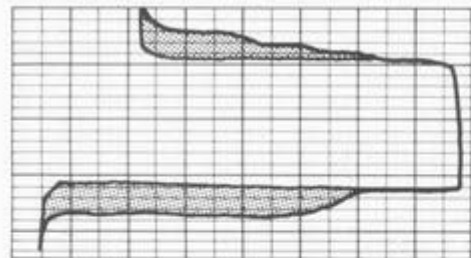
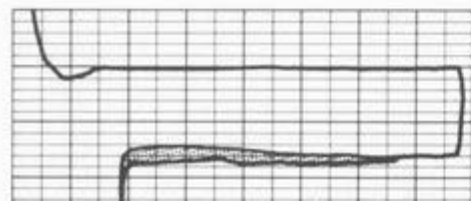
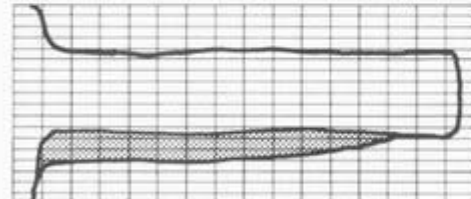
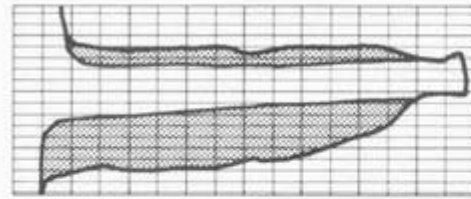


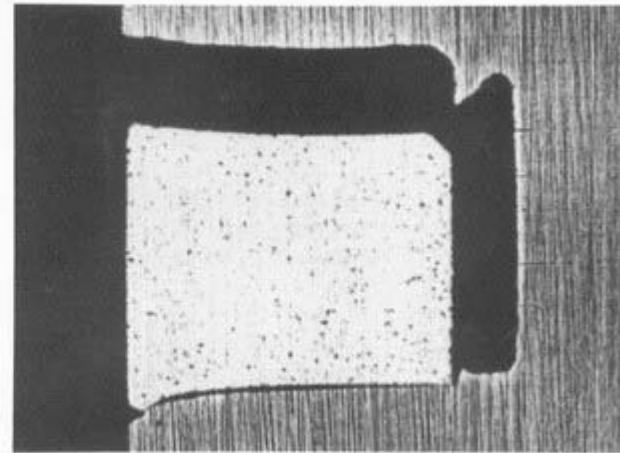
2.1.5



1



2



3

2 Ring Belt

2.1.5 Heavy wear of the ring grooves and rings

Symptoms The rings exhibit high axial clearance caused by heavy wear, particularly in the top groove. In many cases, the rings will also exhibit heavy radial wear, with an increase in closed gap to several millimetres. The recordings of the groove sides (Figure 1) show the wear. In the shaded areas, the piston material has been worn away. Usually, such pistons have been removed because of heavy oil consumption or poor engine power.

Cause and Effect In addition to normal wear after a long period of service, which does not interest us here, there are various reasons for this wear.

On the one hand it is faulty lubrication because of oil dilution which leads to heavy ring wear. The chiefly radial wear without gudgeon pin wear and heavy skirt wear is described more in detail under 2.1.7.

With simultaneous gudgeon pin wear on the other hand, an influence by dirt or foreign particles from the intake air due to filters which are damaged or have not been exchanged in time is to be assumed.

In cases where there is a sharp increase in axial wear (Figure 1) together with radial wear in the top groove, particularly in comparison with the oil control ring, it can be assumed that filter servicing has been inadequate. If, however, the oil control ring shows heavier wear compared to the top ring contaminated oil was the wear cause. A clear indication to the wear caused by dirt is provided by the matt, dull grey satin piston wear pattern (see 1.7) as well as the wear pattern on the gudgeon pin (Figure 2).

If only axial wear is present, the cause may well be an excessive combustion temperature, and hence piston temperature, combined with excessive engine speed. In this case, the inertia forces may cause the groove sides to become jolted (Figure 3). Ring flutter at excessive engine speeds may also lead to heavy groove-side wear and pounding-out. Pounded-out grooves encourage ring flutter even at low engine speeds. Wear then increases progressively.

Remedy Check for excessive fuel consumption and oil dilution (formation of small bubbles on the oil dipstick). Service the intake filter regularly. Check the intake system for leaks. Particularly in the case of oil-bath filters, check that an adequate quantity of oil is present, and reduce the servicing intervals if there is a high incidence of dust. Avoid excessive engine speeds when travelling downhill because of ring flutter.