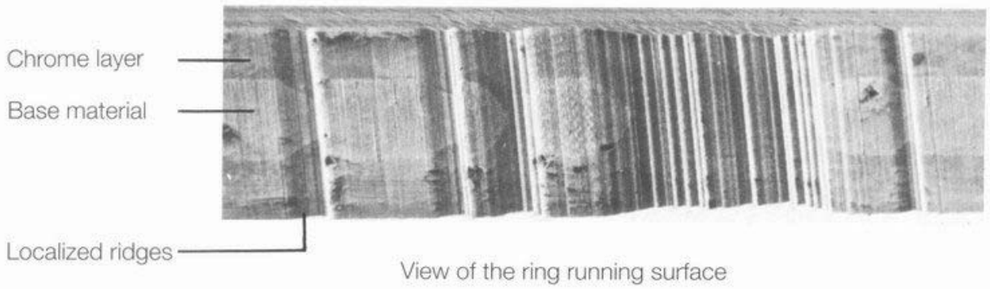
2.1.6



View of the ring running surface

2 Ring Belt

2.1.6 Ring wear on multi-piece steel-rail oil control rings

Symptoms

The chrome layer (Chromschicht) on the running surface of the steel rails is worn locally down to the base material (Grundmaterial), leaving individual ridges extending in moving direction (Figure 2.1.6, magnification 50x). If the two steel rails of the oil control ring are laid one on the other in their fitting position, it can be seen that the ridges coincide on both rails and have the same distances. View of the rail running surface (Draufsicht auf die Ring laufflache).

Cause and Effect

These localized ridges (Erhebungen) are produced by grooves in the cylinder surface. The high contact pressures, both radial and axial, on the groove sides mean that, because of their design, the steel rails cannot rotate as easily as normal oil control rings. Above grooves in the cylinder surface there is practically no wear of the chrome layer, i.e. small chrome ridges are gradually left over which then completely prevent the rings from rotating.'

Grooves in the cylinder surface can be produced in various ways. If the cylinders are inadequately bored, grooves from previous use can remain, or cylinders installed in dirty condition can acquire grooves when put into service. Grooves can also be caused by scuffed rings. Lack of lubricating oil leads to ring seizures. Whilst seizure marks on the rings disappear as the result of normal wear after lubrication conditions are corrected, the marks in the cylinder remain. The steel rails of the oil control rings then run over these, thereby acquiring the characteristic ridges, which result in increased oil consumption.

Remedy

Take care to achieve cleanliness during assembly. In the case of heavily worn or damaged cylinders, bore out to the next but one oversize. Never subject the engine to full load when cold and avoid both high engine speeds and "labouring" at low engine speeds.