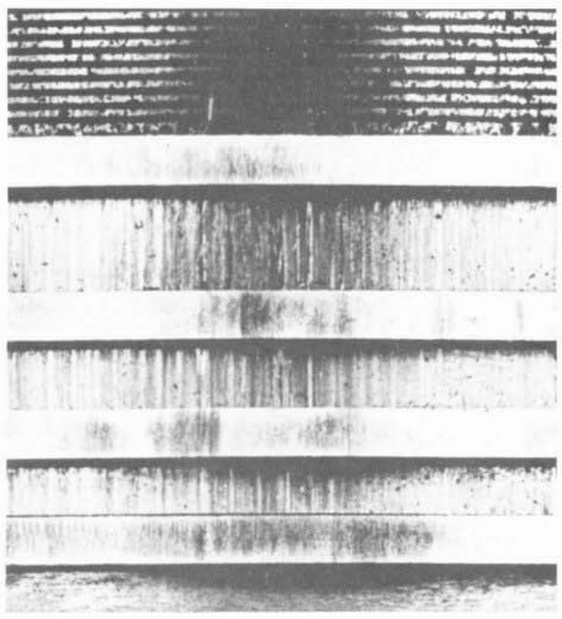
2.1.2

1



2

2 Ring Belt

2.1.2 Scuffed rings

Symptoms

The compression rings have seizure marks around their entire periphery -they are "scuffed". The cylinder bore which is also affected exhibits longitudinal marks. As a result, piston seizures may occur in the lower ring belt or upper skirt area.

Cause and Effect

These ring seizures are initiated by lack of lubricating oil on the cylinder wall, which may have various causes. The thin film of lubricating oil which,under normal operating conditions, remains on the cylinder running surface, is completely scraped off by the rings. This causes localized metal-to-metal contact, resulting in fusion points caused by friction heat and unevennesses on the running surface, and also producing cracks in the material. Damage of this kind occurs particularly during the running-in phase with the engine under heavy load, since the rings have not yet achieved their full sealing effect. The combustion gases which then blow by burn off the lubricating' oil film on the cylinder wall and can heat up the piston skirt with the result that, as a consequence of scuffed rings, piston seizures can also easily occur (see also 1.3). Overheating caused by preignition, an over-lean mixture or cooling defects (e. g. because of blocked or incorrectly adjusted spray jet nozzles) also create a high risk of ring seizure. The overheating causes the oil to carbonize in the ring grooves, thus further impeding the movement of the rings. They are no longer able to fulfill their sealing function, and the film of lubricant is destroyed.

Remedy

Ensure correct engine adjustment to avoid faulty combustion (see als 2.1.7).

From the aspect of the ring configuration, a top compression ring which is chrome-plated or, even better, molybdenum-coated creates favourable conditions for the prevention of "scuffing" of the rings. Therefore, the configurations recommended by the engine manufacturer must not be modified. High engine load during the running-in phase, such as can occur at full load at high engine speeds, or, even more dangerously, labouring under high load at Iow engine speeds, must be avoided by all means.

Cylinder walls which are too smooth are just as damaging as those which are too rough. The aim should be to achieve a peak-to-valley height of 0.6 to 1.2 tim. Crushed and smeared-over honing marks ("iron shell") should also be avoided. This leads to inadequate lubrication and, in addition, to heavy ring wear. Please observe our brochure - Honing - properly done !, no. 6903.