



3



3 Piston crown

- 3.1 Burnt-through piston crown
- **Symptoms** The piston crown in Figure 1 has a hole which looks as if it was caused by a bullet. The surrounding piston crown surface is usually covered with fused-on piston or burnt through in places. 3.3.2).

Cause The position of the damage in the piston crown can be traced in the cylinder head and opposite either to the spark plug or, in the case of Diesel engines, to the injection Effect nozzle or the outlet orifice of the prechamber or swirl chamber. This should indicate that these components are responsible for the damage. The initiating factor, however, is faulty combustion. A preliminary stage before burning-through takes place is represented by the yielding of the piston crown caused by the combustion pressure acting on material weakened by overheating (see 3.3.2). Otto engine

> A spark plug with a too low thermal coefficient caused the damage of the piston shown in Figure 1. Preignitions triggered by the overheated spark plug insulator bottom resulted in local overheating of the piston material and fusing of the crown. The spark plug can also be damaged due to knocking combustion (3.7) and can then likewise trigger preignitions. Damage shown in Figure 2 mostly originates from preignitions which are the consequence of a cylinder head gasket damaged by knocking operation. Causes for knocking combustion with resulting preignition are spark advance, too lean fuel air mixture, a defective injection equipment or low-octane fuel. Preignition also leads to similar damage as a consequence of knocking operation due to combustion residues. **Diesel engine**

The damage illustrated in Figure 3 was caused by faults in the fuel injection system. Both excessive injection quantities and nozzles which drip after delivery lead to poor fuel swirling. The resulting irregularities in the progression of combustion lead to excessive localized temperature peaks which melt a hole in the piston.

Remedy In the case of Otto engines check correct adjustment of the carburetor and injection system as well as leaks in the intake system. Fit spark plugs with the correct heat rating. Check the ignition timing and ignition advance devices (centrifugal and vacuum controls). In the case of Diesel engines, replace nozzles which drip after delivery (irregular running noise) and check the injection pump. Use only fuel which has adequate anti-knock properties.

material. In Figure 2, the top land is charred away, and the ring belt is broken through

The Diesel engine piston in Figure 3 has melted away down to the piston skirt (see