

Piston Damage and causes



Piston Crown Damage

Seizure due to overheating (mainly piston crown)

- Overheating due to abnormal combustion
- Bent/blocked oil splash jet
- Installation of incorrect pistons
- Faults in the engine cooling system
- Restriction of clearances in the upper running surface



Impact marks

- Excessive piston protrusion
- Excessive reworking of the cylinder-head mating face
- Incorrect valve recess
- Incorrect cylinder head gasket
- Oil carbon deposits on the piston crown
- Insufficient valve clearance



Fused/melted off material

- Faulty injectors
- Incorrect quantity of injected fuel
- Incorrect injection timing
- Insufficient compression
- Ignition delay
- Oscillations in the fuel-injection lines



Cracks in the piston crown and combustion bowl

- Faulty or incorrect injector
- Incorrect injection timing
- Incorrect quantity of injected fuel
- Insufficient compression
- Deficient piston cooling
- Installation of pistons with incorrectly shaped piston recess
- Performance enhancement (e.g. chip tuning)



Piston Ring Damage

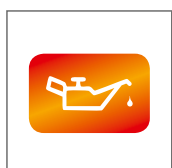
Material washout in the ring zone

- Incorrectly installed piston rings
- Fuel flooding
- Severe axial wear of piston ring grooves and piston rings
- Piston ring flutter



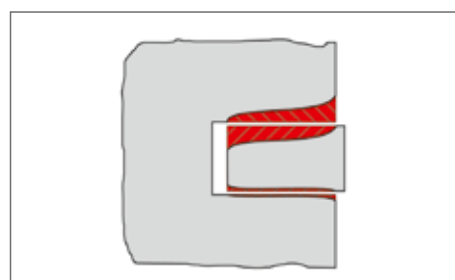
Radial wear due to fuel flooding

- Faults during the mixing stage
- Abnormal combustion
- Insufficient compression pressure
- Incorrect piston protrusion



Axial wear due to ingress of dirt

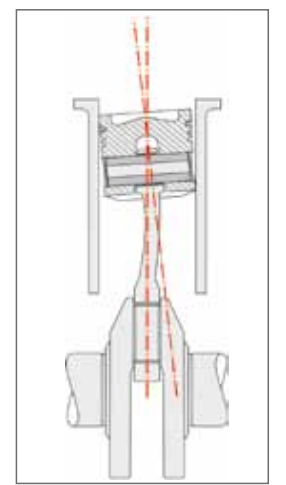
- Abrasive dirt particles due to inadequate filtration
- Particles of dirt which are not completely removed during an engine overhaul (swarf, blasting material)
- Abraded particles caused when the engine is being run in



Damage to the Piston Skirt

Asymmetric wear pattern of the piston

- Twisted/bent connecting rod
- Connecting rod small end bored at an oblique angle
- Cylinder bores not straight
- Individual cylinders not installed straight
- Excessive connecting rod bearing clearance



45° seizure

- Excessively narrow fit of the piston pin
- Seizure in the connecting rod small end (insufficient lubrication when the engine was first taken into operation)
- Incorrectly installed shrink-fit-connecting rod
- Excessive load on the engine before it reaches operating temperature



Dry-running damage

- Over-rich operation
- Abnormal combustion (misfiring) insufficient compression
- Defective cold-starting device
- Oil dilution with fuel



Damage to the Cylinder Liners

Cavitation

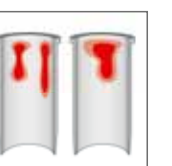
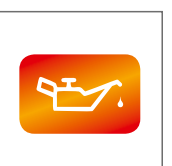
- Poor or inaccurate seating of the liner
- Use of incorrect O-rings
- Use of unsuitable coolants
- Insufficient pre-pressure in the cooling system
- Operating temperature too low/too high
- Restricted coolant flow



Shiny marks in the upper part of the cylinder

Oil carbon deposits on the piston top land due to:

- Excessive ingress of engine oil into the combustion chamber due to defective parts
- Increased emissions of blow-by gases with oil entering the intake tract
- Insufficient separation of oil mist from the blow-by gases
- Frequent idle or short journey operation



Details on this subject can be found in our brochure "Piston damage – Recognising and Rectifying".

Further information can be obtained directly from your local Motor Service partner or at www.ms-motor-service.com

Piston damage – recognising and rectifying



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KSPG AUTOMOTIVE GROUP

