Piston Damage and causes

### Piston Crown Damage
- **Seizure due to overheating (mainly piston crown)**
  - Overheating due to abnormal combustion
  - Bent/shocked oil splash jet
  - Insufficient pre-pressure
  - Insufficient clearance in the top coning surface
- **Impact marks**
  - Excessive piston protrusion
  - Excessive rearward set of the cylinder head mating face
  - Incorrect main bearing size
  - Incorrect cylinder head gasket
  - Oil carbon deposits on the piston crown
  - Insufficient oil clearance
- **Fused/melted off material**
  - Faulty injection
  - Incorrect quantity of injected fuel
  - Incorrect injection timing
  - Ignition delay
  - Undesired flow of the fuel injection lines
- **Cracks in the piston crown and combustion bowl**
  - Faulty or incorrect injection
  - Incorrect injection timing
  - Insufficient pre-pressure
  - Insufficient compression
  - Defective piston coating
  - Installation of pistons with incorrectly shaped piston pin 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**
  - Absorption of dirt particles due to inadequate filtration
  - Particles of dirt which are not completely removed during an engine overhaul (e.g. blasting material)
  - Absorbed particles caused when the engine is being run or

### Damage to the Piston Skirt
- **Asymmetric wear pattern of the piston**
  - Insufficient lubrication
  - Incorrect oil supply
  - Incorrect pre-pressure in the cooling system
- **45° seizure**
  - Insufficiently narrow lift of the piston pin
  - Seizure in the connecting rod small end (insufficient lubrication when the engine was first taken into operation)
  - Incorrectly installed or incorrectly connected 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 incorrect seating of the liner
  - Insufficient separation of oil mist from the blow-by gases
  - Increased emissions of blow-by gases with insufficient pre-pressure in the cooling system
  - Insufficient oil clearance
- **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 emission 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 will be supplied directly by your local Motor Service distributor or via www.ms-motor-service.com.