



Piston Ring Land Fractures

Excessive upward or downward forces may fracture the piston lands. Fracture faces are seldom vertical, and usually the angle of the fracture line will indicate the direction of the force that causes the fracture. Knowing the direction of the force makes it possible to identify why the fracture occurred.

Ring land fractures usually form a “V” shape or an inverted V. The force has most probably come from the apex of the V.

By thinking of the V as a wedge, it helps to understand where the force comes from. When driving the wedge in, it forces the fracture faces closer together and not apart. Therefore, the force causing the fracture must come from the opposite direction as it pushes the wedge out and apart.

Cracks or fracture lines that have a downwards pointing “V”, as in [fig. 1](#), must have the damaging force coming from below the piston. The natural forces exerted on a piston from this direction are relatively small and could not cause land fracture. The most probable cause of this type of fracture would be an assembly problem, causing the rings to touch the top of the cylinder. The extra force needed to push the piston into its cylinder would force the rings against the top of the lands and crack them. Piston ring gaps, which foul cylinder ports in two stroke engines, can also cause this type of damage.

Cracks that form an upwards pointing V, as in [fig. 2](#), indicate that the damaging force came from the crown end of the piston; some form of overload being the most common cause.

Replacing the cracked piston will not be a permanent cure without finding and correcting the cause of the cracking.

