

PISTON FAILURE DIAGNOSTICS

This documentation can be used as a guide to identify and diagnose piston failure with 2 stroke engines.

THE PERFECT BROWN CROWN



The crown of this piston shows an ideal carbon pattern. The transfer ports of this 2 stroke engine are flowing equally and the color of the carbon pattern is chocolate brown. That indicates that this engine's carb is jetted correctly.

BURNT - OUT BLOW HOLE *(Hole on top of piston)*



This piston was overheated so badly that a hole melted through the crown and collapsed the ring grooves on the exhaust side. Normally the piston temperature is higher on the exhaust side so catastrophic problems will appear there first. There are several reasons for failure like this, here are the most common; air-leak at the magneto side of the crankshaft seal, too lean carb setting, too far advanced ignition timing, too hot of a spark plug range, too high of a compression ratio, too low octane fuel.

BLOW BY



This piston didn't fail in operation but it does show the most common problem, blow-by. The rings were worn past the maximum ring end gap spec, allowing combustion pressure to seep past the rings and down the piston skirt causing a distinct carbon pattern. It's possible that the cylinder walls cross-hatched honing pattern is partly to blame. If the cylinder walls are glazed or worn too far, even new rings won't seal properly to prevent a blow by problem. Flex-Hones is a product available at most auto parts stores. They can be used to remove oil glazing and restore cross-hatch honing marks that enable the rings to wear to the cylinder and form a good seal. If you purchase a Flex-Hone for your cylinder, the proper grit is 240 and the size should be 10% smaller than the bore diameter.

THE ASH TRASH



This piston crown has an ash color, which shows that the engine has run hot. The ash color is actually piston material that has started to flash (melt) and turned in to tiny flakes. If the engine was run any longer, it probably would've developed a hot spot and hole near the exhaust side and failed. The main causes of this problem are to lean carb jetting, too hot spark plug range, too far advanced ignition timing, too much compression for the fuels octane, or a general overheating problem.

SHATTERED SKIRT



The skirt of this piston shattered because the piston cylinder clearance was too great. When the piston is allowed to rattle in the cylinder bore, it develops stress cracks and eventually shatters.

INTAKE SIDE SEIZURE



This piston was seized on the intake side. This is very uncommon and is caused by only one thing, loss of lubrication. There are three possible causes for loss of lubrication, no pre-mix oil, separation of the fuel and pre-mix oil in the fuel tank, water passed through the air filter and washed the oil film off the piston skirt.