

# USED SPARK PLUG ANALYSIS

Diagnosis of the appearance of the spark plug can be an effective method of determining the proper plug heat range for an engine and the conditions under which it operates. By inspecting the outer appearance of an engine's plugs when it is not operating properly, a determination of the possible causes of the malfunction may be shown up, and further engine problems can be solved.

The following examples can help to analyze spark plug and engine conditions.

## **NORMAL**

**APPEARANCE** : Light grey or tan deposits and slight electrode erosion.



## **CARBON FOULING**

**APPEARANCE** : Dry, soft black carbon on the insulator and electrodes.

**RESULTS** : Poor starting, misfiring, faulty acceleration.

**POSSIBLE CAUSES** : Faulty choke – over rich air-fuel mixture, delayed ignition timing, bad ignition leads, plug heat range too cold.



## **OIL FOULING**

**APPEARANCE** : Wet, oily black deposits on the insulator and electrodes.

**RESULTS** : Poor starting, misfiring.

**POSSIBLE CAUSES** : Wrong piston rings, cylinders and valve guides ;  
new or recently overhauled engines, fuel mixture oil content too high (two-stroke engines).



## **LEAD FOULING**

**APPEARANCE** : Yellow or tan cinder-like deposits or a shiny glaze coating on the insulator.

**RESULTS** : Misfiring under sudden acceleration or heavy load conditions. But no adverse effect under normal operating conditions.

**POSSIBLE CAUSES** : Use of gasoline with high-lead contents.



### OVER HEATING

- APPEARANCE** : An extremely white insulator with small black deposits and premature electrode erosion.
- RESULTS** : Loss of power at high-speed/heavy load.
- POSSIBLE CAUSES** : Plug insufficiently tightened, engine insufficiently cooled, ignition timing too advanced, plug heat range too hot, severe detonation.



### PRE-IGNITION

- APPEARANCE** : A melted or burned center and/or ground electrode, blistered insulator and aluminum or other metallic deposits on the insulator.
- RESULTS** : Loss of power then causing engine damage.
- POSSIBLE CAUSES** : Much the same as over heating. Pre-ignition takes place when combustion begins before the timed spark occurs.



### BROKEN INSULATOR

- APPEARANCE** : Insulator is cracked or split.
- RESULTS** : Misfiring
- POSSIBLE CAUSES** : Severe detonation, careless gap setting.



### MECHANICAL DAMAGE

- APPEARANCE** : Bent electrode and a broken insulator. Dents often present on the electrode.
- RESULTS** : Misfiring
- POSSIBLE CAUSES** : Plug thread reach too long for engine head, some foreign object (small bolt, nut etc.) in the combustion chamber.



### TORCHED SEAT

- APPEARANCE** : Melted in the thread and seat area of the plug housing.
- RESULTS** : Loss of power then causing engine damage.
- POSSIBLE CAUSES** : Insufficient plug tightening.

