SPARK PLUG TROUBLE TRACER CHART

Fuel Additives
- Appearance: Mottled brown or purple deposits/staining on the core and electrodes.
- Cause: Use of fuel additives.
- Effect: Misfire, rough running, cold starting problems, reduced engine efficiency.
- Remedy: Replace spark plugs and ensure that all additives used are compatible with the engine manufacturer's ignition and emission systems and added in the correct proportion.

Pre-ignition
- Appearance: Melting or partial melting of the ground electrode.
- Cause: Spark plug too hot, air/fuel mixture too lean, engine overheating, incorrect spark plug heat range.
- Effect: Carbon deposits are conductive, severe, and can create earth leakage paths.
- Remedy: Ensure that spark plug "well" is clean when installing new spark plugs.

Worn-out Spark Plug
- Appearance: Center electrode ground end similar or identical to the plug base.
- Cause: General wear (spark plugs have reached the end of their life).
- Effect: Spark plug can result in engine overheating, reduced engine performance.
- Remedy: Replace spark plugs in line with manufacturer's recommendations.

Ash Deposits
- Appearance: Light brown deposits around the center and/or ground electrode.
- Cause: Often due to excessive fuel/oil additives, incorrect fuel/ignition systems are not working efficiently.
- Effect: Ash deposits can cause the spark plug to fail, making engine noise and general engine overheating.
- Remedy: Ensure the proper heat range and check for engine wear.

Ash Deposits
- Appearance: Discoloration of the ceramic insulator near to the shell.
- Cause: Particles of ash in the spark plug will result in carbon tracking or arcing.
- Effect: Not detrimental to spark plug operation.
- Remedy: Replacement is recommended.

Overheating
- Appearance: Chilly white insulator (looks like ice, not cold) and a heat range too cold.
- Cause: Current discharge from the top electrode, indicates that the insulator is overheating.
- Effect: Engine overheating.
- Remedy: Replace the affected plug(s).

Cold/Carbon Fouling
- Appearance: Soft, black, sooty deposits on the firing end or plug base.
- Cause: Improper heat range plug, lean air/fuel mixture, spark plug too cold or repetitive short journeys.
- Effect: Carbon deposits are conductive and can create earth leakage paths, stuck plug leads or worn engine components.
- Remedy: Check fuel & ignition systems, and also that the fuel/ignition systems and engine wear.

Flash Over
- Appearance: Black burn marks (carbon tracking) running vertically down the insulator, down the spark plug boot, down the terminal of the spark plug, down the plug lead(s).
- Cause: Improper heat range plug, lean air/fuel mixture, spark plug too cold or repetitive short journeys.
- Effect: Engine overheating.
- Remedy: Replace the affected plug(s).

Detonation
- Appearance: Light contamination will cause black/grey soot on the insulator or ground electrode. Engine can crack or even break the insulator or ground electrode.
- Cause: Overhead combustion, causing premature piston/cylinder walls in the combustion chamber.
- Effect: Inoperative exhaust gas recirculation system, faulty detonation sensors, severe engine wear (excessive volumes of oil in the combustion chamber), oil fouling engine wear (excessive volumes of oil in the combustion chamber) and damage to other ignition components.
- Remedy: Replace the affected plug(s) with new plug of the same heat range.

Normal Spark Plug Wear/Operation
- Appearance: Spark plug has not been sufficiently crushed (low compression).
- Cause: Incorrect tightening of the spark plug.
- Effect: Engine noise and potential engine failure.
- Remedy: Ensure the spark plug is tightened to the manufacturer's recommended torque.

Spark Plug Tightening
- Appearance: Spark plug gasket has not been sufficiently crushed (low compression).
- Cause: Incorrect tightening of the spark plug.
- Effect: Engine noise and potential engine failure.
- Remedy: Ensure the spark plug is tightened to the manufacturer's recommended torque.