

УДК 621.43.045

Grinko D., Shorop, A., Slesaryonok E.

## **Spark Plugs**

Belarusian National Technical University  
Minsk, Republic of Belarus

Spark plugs are manufactured from ceramic insulators inside a steel shell. The threads of the shell are rolled and a seat is formed to create a gas-tight seal with the cylinder head.

Physical differences in spark plugs include the following, namely, reach. i.e. the length of the threaded part of the plug.

Heat range. The heat range of the spark plug refers to how rapidly the heat created at the tip is transferred to the cylinder head. A plug with a long ceramic insulator path will run hotter at the tip than a spark plug that has a shorter path because the heat must travel farther.

Type of seat. Some spark plugs use a gasket and others rely on a tapered seat to seal.

Resistor spark plugs. Most spark plugs include a resistor in the center electrode, to reduce electromagnetic noise or radiation from the ignition system. The closer the resistor is to the actual spark or arc, the more effective it becomes. The value of the resistor is usually between 2,500 and 7,500 ohms.

Platinum spark plugs. Platinum spark plugs have a small amount of the precious metal platinum included onto the end of the center electrode, as well as on the ground or side electrode. Platinum is a gray-white metal that does not react with oxygen and, therefore, will not erode away as can occur with conventional nickel alloy spark plug electrodes. Platinum is also used as a catalyst in catalytic converters where it is able to start a chemical reaction without itself being consumed.

Iridium spark plugs. Iridium is a white precious metal

and is the most corrosion-resistant metal known. Most iridium spark plugs use a small amount of iridium welded onto the tip of a small center electrode 0.0015 to 0.002 in. (0.4 to 0.6 mm) in diameter. The small diameter reduces the voltage required to jump the gap between the center and the side electrode, thereby reducing possible misfires. The ground or side electrode is usually tipped with platinum to help reduce electrode gap wear.

Spark plugs should be inspected when an engine performance problem occurs and should be replaced at specified intervals to ensure proper ignition system performance. Nonplatinum spark plugs have a service life of over 20,000 miles (32,000 km). Platinum-tipped original equipment spark plugs have a typical service life of 60,000 to 100,000 miles (100,000 to 160,000 km) or longer.

Used platinum-tipped spark plugs should not be regapped. Using a gapping tool can break the platinum after it has been used in an engine. Checking service information regarding the recommended type of spark plugs and the specified service procedures can be of vital importance.

Spark plugs are considered to be the windows to the inside of the combustion chamber. A thorough visual inspection performed on a regular basis can lead to the root cause of an engine performance problem. All spark plugs should be in the same condition, and the color of the center insulator should be light tan or gray. Two indications on spark plugs and their root causes in engine performance include carbon fouling and oil fouling, the latter being the worst causing worn or even broken piston rings, worn valve guides and defective or missing valve stem seals.

#### References:

1. Halderman J.D. Automotive Technology. Principles, Diagnosis, and Service. Fourth Edition. – New Jersey: Pearson Education, 2011 – P. 794-812. Date of access: 18.04.2022.