

Car electrics: ignition coil manufacturing

Plasma activation of ignition coil components



Application

In the automotive industry, quality standards regarding function and endurance are very high. Critical components for the operation of the engine must be long-life even at extreme conditions. Ignition coils, in addition, handle high voltages and therefore are highly sensitive to humidity.

Protection of the electrical components is achieved by potting, i.e. enclosure in a cup filling all gaps between cup and active parts with resin. Adherence between resin and all components is crucial. That is why plasma treatment is conducted before potting.

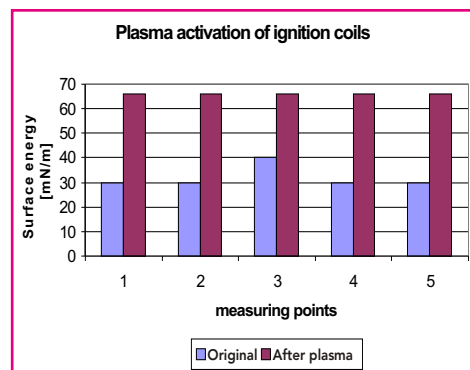


Fig. 1

Plasma process

Oxygen plasma is responsible for activation of the inner surfaces: Permanent chemical bonds are formed between some of the polymers' carbon atoms and oxygen available in plasma. The surfaces' resulting enhanced polarity is an important improvement for their wettability. Resins will flow faster and connect to their surroundings better.

Surface tension is a measure for wettability. Fig. 1 shows the increase of surface tension at five different locations representing the inner surface of the ignition coil. Activation was successful throughout the inside of the cup, irrespective of the inner volume being almost entirely filled by coils and a circuit board. Despite the small gap for the plasma to penetrate through, suitable process control can achieve this total treatment.

Systems engineering

PINK offers customized inline plasma systems for fully automated production processes.

In the industrial workflow, plasma treatment of the ignition coils is conducted between pre-heating and potting. Special devices will prevent the loaded carriers from cooling down before the potting process is started.



Plasma system V270-2G-Auto for the inline treatment of ignition coil components.

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