Characteristics DENSO Spark Plugs

The insulators are made from a highly purified alumina powder, which has exceptional insulation and thermal conductivity. Another advantage of this material is its great physical strength.

The five-rib design prevents flashover and reduces voltage loss. It offers 20% more insulation than conventional plugs. This improves performance, especially in wet and damp conditions, and in plugs with a large gap operating under high voltage. The ribs are rounded to make them more resistant to breakage.

A special mixture of copper and glass powder bonds the centre electrode and insulator together for a gastight seal. This seal has high electrical and thermal conductivity, and contributes to an even heat distribution. The seal also prevents escape of hot combustion gases.

The centre electrode is made of a wear-resistant nickel-chrome binary alloy with a deeply inserted copper core. This gives the centre electrode high resistance against overheating and increases the operating range.

The gap formed by the U-groove provides extra space which is filled by the spark. This gives the flame kernel more room to expand, creating a bigger and hotter flame front. The gap operating under high voltage. The ribs provide extra space which is filled by the spark.

The gap formed by the U-groove provides extra space which is filled by the spark. This gives the flame kernel more room to expand, creating a bigger and hotter flame front. The result is a more complete combustion.

Used Spark Plug Analysis

Normal
Appearance: Light grey or fan deposits and slight electrode erosion.

Carbon fouling
Appearance: Grey, soot 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.

Lead fouling
Appearance: Yellow or tan circle-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 petrol 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 and burned centre and/or ground electrode, blistered insulator and aluminum or other metallic deposits on the insulator.
Results: Loss of power and causing engine damage.
Possible causes: Much the same as over heating. Pre-ignition takes place when combustion begins before the timed spark occurs.

Fuel-Additives Fouling
Appearance: Red ground electrode and insulator nose.
Results: Poor starting, misfiring, faulty acceleration and loss of power.
Possible causes: Use of petrol with Fr / Mn additives. Additives are used to increase the octane number (especially in Russia).

Spark Plug Torque Specification

<table>
<thead>
<tr>
<th>Thread size</th>
<th>Recommended Torque</th>
<th>Recommended Turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12</td>
<td>8–10 Nm</td>
<td>± 1</td>
</tr>
<tr>
<td>M14</td>
<td>10–15 Nm</td>
<td>± 1/2</td>
</tr>
<tr>
<td>M14 GN Type</td>
<td>15–20 Nm</td>
<td>± 1/2</td>
</tr>
<tr>
<td>Stainless steel gasket</td>
<td>20–25 Nm</td>
<td>± 1/2</td>
</tr>
<tr>
<td>M12 SS gasket</td>
<td>20–25 Nm</td>
<td>± 1/2</td>
</tr>
<tr>
<td>M14 SS gasket</td>
<td>20–25 Nm</td>
<td>± 1/2</td>
</tr>
<tr>
<td>M18 S, M, MA, MV Type</td>
<td>30–40 Nm</td>
<td>± 1/4</td>
</tr>
<tr>
<td>M14 FT, FP, F Type</td>
<td>20–30 Nm</td>
<td>± 1/16</td>
</tr>
<tr>
<td>M12 FT Type</td>
<td>30–40 Nm</td>
<td>± 1/16</td>
</tr>
<tr>
<td>M18 MT Type</td>
<td>30–40 Nm</td>
<td>± 1/16</td>
</tr>
</tbody>
</table>

Taper seat plugs

Installation torque from 20 to 30 Nm. 1/16 turn with plug wrench.

Spark plug torque specification

This table gives torque recommendations for proper spark plug installation. Improper installation may result in engine damage and poor performance. Spark plug damage due to overtightening may occur if a spark plug is tightened far beyond the recommended torque. As a result the metal shell will deform and the insulator may be loosened, causing possible damage to the spark plug and engine.

Summary:
• Spark Plugs with rotating insulator were over tightened, which is concluded from too small thickness of gasket (DENSO does not recommend using lubricants).
• To avoid such effect DENSO recommends to apply correct tightening torque.