

Tips & Technology

For Bosch business partners

Current topics for successful workshops No. 74/2014

Diesel injection



BOSCH

Invented for life

Advice on glow plug replacement

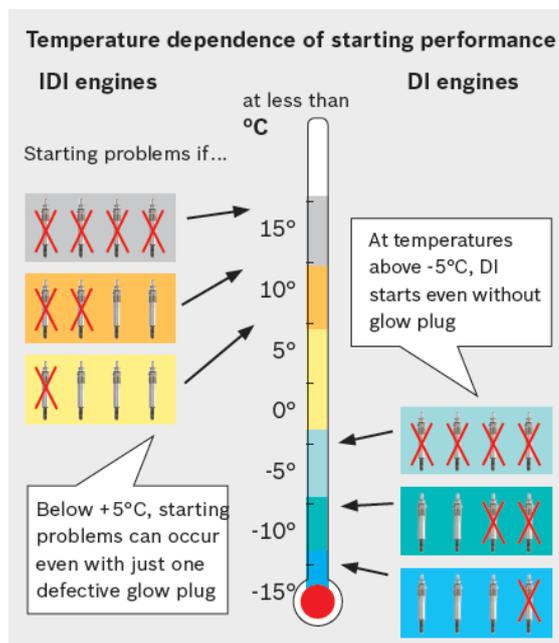
The service life of a glow plug differs depending on the type. In our experience, this tends to be 80 000 km on average for Bosch Duraterm® and the same lifetime as an engine in the case of ceramic plugs. This is the case under normal conditions. And it is precisely these conditions which are of crucial relevance to the service life of a glow plug because of the variety of factors involved.

For example:

- Use in IDI (indirect diesel injection), DI (direct diesel injection) or DI low-compression engines
- Use in certain engines with high soot formation tendency
- Mileage
- Servicing
- Spray setting

Glow plug replacement: When?

Customers do not immediately recognize the need to replace one or more glow plugs. If the engine does not start immediately, the customer will try again. At the latest when the weather turns cold it may already be too late (refer to table).



The starting performance of IDI and DI engines is greatly influenced by temperature, particularly in cold weather. IDI engines exhibit starting problems below 5°C even if just one glow plug is defective. Starting problems are encountered with DI motors if two glow plugs are defective and temperatures drop below -10°C for example. Workshops should therefore actively inform customers about such problems in good time.

With this aim in mind, it is advisable for workshops to warn customers about this cold weather problem in the form of advertisements or letters for example. Nevertheless, Bosch do not recommend replacing glow plugs as a matter of course but advise workshops to proceed as follows: If a Bosch glow plug develops a fault after less than 50 000 km, it is acceptable to replace just this one plug. Above 50 000 km it is advisable to replace all Bosch glow plugs, as the plugs which are still functioning could soon become faulty as well and the vehicle would then have to be brought in for servicing again.

Reliable accurate checking

The glow plug resistance should only ever be measured using an ohmmeter/multimeter, as this prevents overheating of the glow plug through direct battery voltage.

Regular checking every 80 000 to 100 000 km

Glow plugs are wearing parts which should be checked for proper operation at regular intervals. Experience shows that glow plugs tend to reach their wear limit in quick succession. For customers, replacing the full set is less expensive than repeatedly changing individual defective glow plugs, as connecting cables and busbars have to be removed each time.

Noisy, rough, lack of engine power? Time to check the glow plugs!

Defective glow plugs may be at the root of many a problem. It may be worth checking the glow plugs if confronted with the following symptoms.

- Clouds of smoke, particularly after cold starting
- Loud combustion noise with a cold engine
- Rough engine running although the engine is warm
- Loss of power or increased fuel consumption

Practical advice from Bosch: Always ensure correct torque when changing glow plugs

Important:

Take care never to exceed the breaking torque when removing the old glow plugs.



Tip:

Unscrewing old glow plugs is easier when the engine is warm. If glow plugs are extremely stiff, slacken off carefully in stages and re-tighten paying attention to the breaking torque. If necessary, start the engine again and allow it to warm up. Heed the tightening torque when fitting new glow plugs (refer to vehicle manufacturer's specifications).

Tightening torques for terminal nuts	
Thread	Tightening torque
4 mm (M4)	max. 2.5 Nm
5 mm (M5)	max. 5.0 Nm

Tightening torques for metal glow plugs or ceramic glow plugs like DuraSpeed®		
Thread	Breaking torque	Tightening torque
M 8	20 Nm	6 – 10 Nm
M 9	25 Nm	8 – 10 Nm
M 10	35 Nm	10 – 15 Nm
M 11	45 Nm	15 – 25 Nm

Tip:

Before fitting, clean the glow plug seat and the glow plug hole.

Frequently asked questions: Answers from experts for expertsWhat is a standard glow plug?

A standard glow plug features single or double filament technology. In contrast to Duraterm®, post-glow is not permissible as this would result in burn-out. This standard technology dates back to before 1990 and has been largely replaced by Duraterm® at Bosch.

Can a Duraterm® be replaced with a standard glow plug?

No, it would immediately suffer burn-out as, unlike Duraterm®, it is not capable of post-glow.

Can a standard glow plug be replaced with a Duraterm®?

Usually yes. Please consult the Bosch cross-reference and application lists.

What are the disadvantages/advantages of Duraterm®?

Disadvantages: None

Advantages:

- 40 % longer service life
- Faster starting within 4 seconds, better cold engine running and thus good for the environment

Is it possible to replace a glow plug recommended by Bosch or by the vehicle manufacturer with a glow plug with a longer glow tube?

- Not recommended for IDI engines, as the glow tube would be located directly in the fuel spray and this would result in far quicker burn-out.
- With DI the engine would be at risk: Either the glow plug or the piston would be damaged.

Can a metal glow plug like Duraterm® be replaced with a DuraSpeed® (ceramic) glow plug?

No, as the design is specific to the engine and glow plug system.

Can today's glow plugs still be checked with a test lamp?

A test lamp used to be used for checking general operation of a glow plug between the positive post of the battery and the glow plug terminal. Lighting of the lamp indicated: Function OK. Nowadays this is no longer possible as glow plugs operate on lower voltages in some cases. A test voltage of 12 V would destroy the glow plug.

Can end users replace glow plugs themselves?

Yes, but only if they know what they are doing and have the necessary tools. Without a torque wrench there is a risk of over-tightening the glow plug for example. Checking a low-voltage glow plug with an 11 V test lamp or an old glow plug quick tester would lead to destruction of the glow plug. In some cases, such glow plugs are fitted in the middle of the engine beneath the valve camshafts, in other words, complicated removal work is involved. Expert work should be done in an expert workshop.

What are the recommended replacement intervals for glow plugs?

The glow plug replacement interval is generally indicated in the owner's manual. Bosch recommend checking the proper operation of glow plugs every 80 000 to 100 000 km. The glow plugs should be replaced as a complete set rather than separately.

What are the points to watch when replacing glow plugs?

- Be sure to use replacement glow plugs of the correct type.
- Heed the correct torque on fitting/removal.
- Following removal it is advisable to take a close look at the "glow plug face" to permit diagnosis and rectification of the possible cause of glow plug failure. (refer to the article on Glow plug damage patterns in Tips&Technology January 2012).

Does the Duraterm® have to be greased on fitting?

No. The nickel-plated rolled thread does not corrode and become seized in the engine.

What is to be done if the old glow plug is not easy to remove?

Never exert force. Refer to the tips on Page 3.

Is it possible to find out whether a glow plug has been over-tightened?

Yes, in the Bosch laboratory. Ask Bosch customer service beforehand about the procedure involved.

Are ceramic glow plugs more sensitive to heat than metal glow plugs?

- No, ceramic glow plugs can withstand very high temperatures and can glow up to 1300 °C. They are thus ideally suited to modern ecological engines. Metal plugs would burn out in such situations.
- Ceramic glow plugs are however susceptible to strain and impact. They must not be dropped on the floor for example, as this could cause cracks in the ceramic element which are barely visible to the naked eye. The element could shatter in the combustion chamber and the fragments of ceramic would have a disastrous effect on the engine.

On vehicles not fitted with an "OnBoard diagnosis display", how can customers recognize the need for glow plug replacement?

At warm temperatures in summer, diesel engines will still start without assistance even if one or more glow plugs is/are defective. So customers will not notice anything at first. As the weather turns colder however, the engine takes longer and is more difficult to start. Starting on 3 cylinders may be possible. At temperatures below freezing only the workshop can help. Which means that it is advisable to have the glow plugs checked before the cold weather arrives to keep the engine starting reliably throughout the winter.