


# YOUR SOURCE FOR RELIABLE GLOW PLUGS

Perfection  
built in

**BERU**



# REQUIREMENTS OF A MODERN GLOW PLUG

## SHORT HEAT-UP TIME

Glow plugs must provide a high temperature within an as short as possible time to assist with ignition – and it must maintain this temperature regardless of the basic conditions, or even adjust the temperature in dependence of the latter.

## SMALL SPACE REQUIREMENT

In the past, the diesel engines of passenger cars mainly operated as indirect injection engines with 2 valves and thus offered sufficient space for injection nozzles and glow plugs. In modern diesel engines with common rail or pump-nozzle injection system and 4-valve technology, however, the available space is very restricted. This means that the space required for the glow plug must be reduced to a minimum, resulting in a very thin and long shape. Today, BERU glow plugs with glow tube diameters that have been reduced to 3 mm are already in use.

## PRECISE ADAPTATION TO THE COMBUSTION CHAMBER

Ideally, the glow rod should be situated precisely at the edge of the mixture turbulence - however, it must still immerse sufficiently deep into the combustion chamber or the antechamber. Only then is it able to introduce the heat accurately. It may not protrude too far into the combustion chamber, as it would otherwise interfere with the preparation of the injected fuel and thus the carburetion of an ignitable fuel-air mixture. This would result in increased exhaust gas emissions.

## SUFFICIENT GLOWING VOLUME

Apart from the glow plug, the injection system is of particular significance for the engine cold start. Only a system that has been optimized in terms of its injection point, quantity and carburetion in conjunction with the correct position and thermal rating of the glow plug will ensure good cold start performance. Even after the engine has been started, the glow plug may not be “blown cold” by the increased air movement in the combustion chamber. Very high air speeds are in particular present in ante- or turbulence chamber engines at the glow plug tip. In this environment, the plug will only work if it has sufficient reserves; i.e. if sufficient glowing volume is available so that heat can immediately be introduced in the cold- blown zone.

The glow plugs developed by BERU fulfill all these requirements in an optimal manner. BERU engineers work closely with the automotive industry during engine development. The result: an environmentally-sound diesel quick start in 2-5 seconds (in conjunction with the Instant Start System ISS even shorter), a reliable start up to  $-30^{\circ}\text{C}$ , a steady engine start-up that is gentle on the engine, up to 40 % less carbon-particulate emission in the warm-up phase for post-heating glow plugs.



# DON'T SCRIMP ON YOUR GLOW PLUGS

The glow plug is one of the essential parts of a diesel car, a beautiful piece of technology that in a cold engine gets the entire combustion cycle going and the engine turning in a flash. For this part you naturally want only the very best that can be found on the market. BERU's glow plugs are built for optimal and consistent cold starts, not only when they're fresh out of the package, but many thousands of cold starts later as well. And that's more important than ever, since in recent years diesel engines have grown increasingly complex and perform at their best when every part is in top form. For this you can rely on BERU, as is also shown when we test and compare our glow plugs with other ones.

## CLEANER EMISSIONS AND GREATER COMFORT

Thanks to BERU's high production quality, the glow plugs perform highly consistently. They therefore have a very short warm-up time, so that the engine is working as quickly as possible in optimal conditions. At the same time they are built for a long service life, which ensures the performances, offers the user peace of mind and generates clean emissions.



Many engines that still have to run daily rely on classic steel glow plugs. Recent tests on BERU GN glow plugs clearly demonstrate the outstanding and consistent performance:

### GN 993 Ford 1,8 engine year 2000–2015 \*

	BERU	Comparable competitor
Heating to 850°C	min. 3,18s max. 3,32s	min. 6,41s max. 9,14s

### GN 053 Fiat/Ford/Opel 1,3 engine 2004 \*

	BERU	Comparable competitor
Heating to 850°C	min. 4,57s max. 5,27s	min. 5,18s max. 5,94s

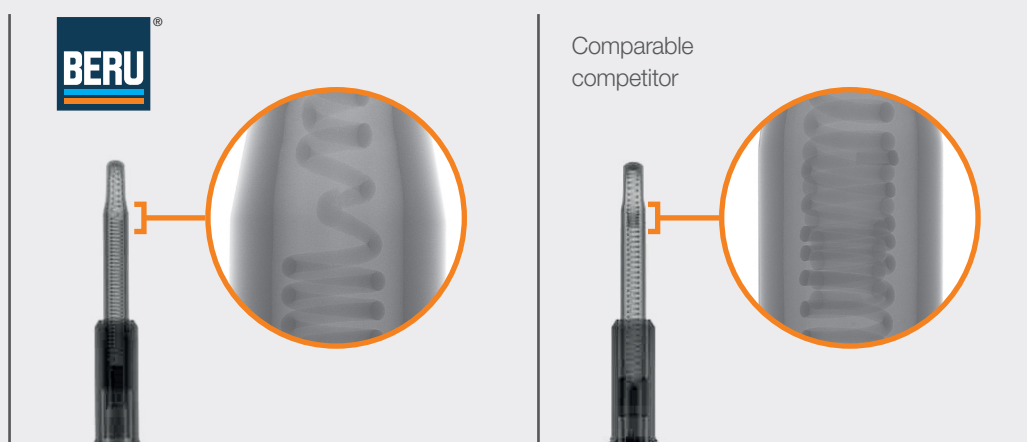
### GN 016 Fiat/PSA/Toyota 1,9 engine 1998–2005 \*

	BERU	Comparable competitor
Heating to 850°C	min. 3,97s max. 4,39s	min. 7,08s max. 9,84s

All tested BERU GN glow plugs meet life cycle requirements and offer a stable performance.

\* tests performed by Federal-Mogul Motorparts/BorgWarner

## X-RAY



BERU filaments are welded instead of being woven, so the glow plugs perform more consistently

## LIFE CYCLE TEST



Minimum deformation during the life cycle, thanks to choosing high-quality materials

## X-RAY + LIFE CYCLE TEST



The thread spiral doesn't break, and passes the life cycle test with ease



#### WHY THE BERU BLACK TIP?

Meeting the highest quality standards is our biggest concern. That's why we test every single plug before it leaves the workshop. The result: the characteristic BERU black tip. It's our quality promise, certifying that your plug has been tested before use.

#### TECHNICAL CHARACTERISTICS

- Built according to precise dimensions (ISO standard), for optimal combustion
- A short and clean cold start (2 to 5 seconds, depending on the engine and the conditions)
- Fewer particle emissions during the warm-up phase
- Vibration-resistant and protected against shorting by the ceramic sheathing of filaments
- Our promise: functioning down to -30° Celsius
- Tested and used in diesel engines of for example Fiat, Ford, Opel, PSA, Renault, Toyota etc.
- Developed in collaboration with OEMs

## ADVANTAGES OF BERU GLOW PLUGS

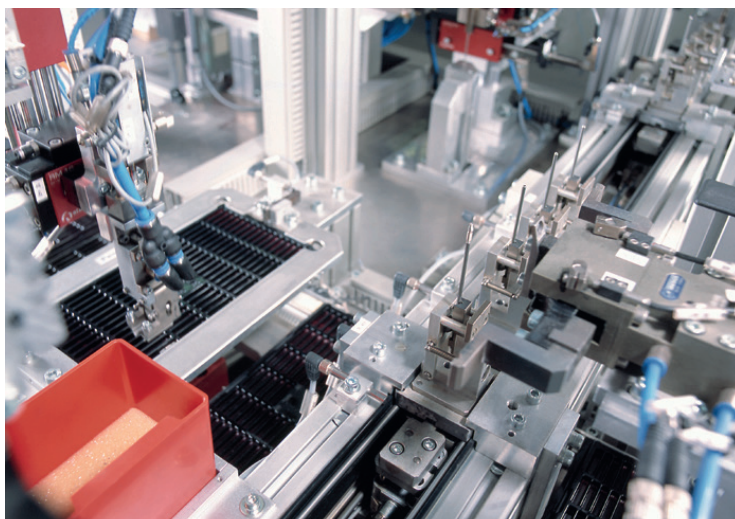
- 1 Promised reliability throughout the service life of the glow plug
- 2 Up to 100% faster warm-up time
- 3 Precise operation regardless of the outside temperature
- 4 Maximum temperature always within tolerances, resulting in longer service life
- 5 Significantly less warping, crumbling or corrosion thanks to better choice of materials
- 6 Less knocking during a cold start, which extends the engine's service life

# TRUSTED TECHNOLOGY

## ADVANCED TECHNOLOGY

Our advanced technology is achieved by more than 100 years of experience, coupled with the latest development, quality and production methods that make BERU one of the leading companies in the aftermarket and a renowned OEM supplier to the automotive industry. The facilities in the Beru Group are certified to global quality standards like DIN ISO 9001:2000 for instance. In Germany, the requirements of ISO/TS 16949, and DIN EN ISO 14001 are also met.

Engineered and made  
in Germany



BERU glow plugs are designed in compliance with ISO Standard 7578 and 6550. These specify the dimensions and tolerances of the geometry, of the sealing angle, of the wrench size, of the heating rod diameter, etc.



### FIVEFOLD SAFETY FOR MAXIMUM QUALITY

- ▶ Products are designed in close cooperation with car manufacturers
- ▶ Manufacturing according to ISO standards
- ▶ Products are developed according to the specifications of the automotive industry
- ▶ Products are subjected to special BERU tests
- ▶ Manufacturing according to the latest production methods



# OE PEDIGREE

## RELY ON OUR OE PEDIGREE

BERU has an international reputation for delivering innovative diesel cold-start solutions that meet original equipment (OE) manufacturer standards. Our diesel cold-start know-how and constant drive for innovation makes us a global market leader and trusted name in diesel cold-start & ignition.



Many leading OE manufacturers choose premium quality BERU components for their vehicles and automotive systems. Our spark plugs, glow plugs, coils, leads, and sensors are always produced to the same stringent OE-quality standards.



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