Volkswagen Cabriolet
DIY Guide: Spark Plugs

Cars
1980: all, except California emissions

Electrode	Type	Original Bosch	NGK	Notes
Single, copper	Resistor	WR7DS	BPR5ES (#7734)	
Single, platinum	Resistor	WR7DS	BPR5EGP (#7082)	

Cars
1980: California emissions; 1981-1993: all

Electrode	Type	Original Bosch	NGK	Notes
Single, silver	Resistor	WR7DS	BPR6EY BL1 (#2489)	
Single, copper	Resistor	WR7DC	BPR6ES (#7131)	
Single, platinum	Resistor	WR7DP	BPR6EGP (#7084)	
Single, copper	Non-resistor	W7DC	BP6ES (#7333)	
Triple, platinum	Non-resistor	W7DTC	BP6ET (#1263)	Recommended for Digifant

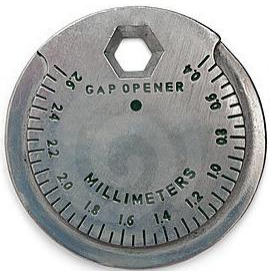
Volkswagen Parts Catalog ~ Complete Current Spark Plug Listings

VW Part No.	Plug	Equivalent	Engines
101000005AD	Bosch W8DTC		EW, HN
101000027AC	NGK BP5ET-10		EW, HN
101000001AD	Beru Z2 14-8DTU		EW, HN
101000007AC	Champion N9BYC		EW, HN
101000002AB	Beru Z61 14-7DUO		EG, EN, HK
N01781139	Bosch W7DC	Beru Z11 14-7DU	EN
101000005AB	Bosch W7DTC		EX, DX, KT, 2H
101000027AA	NGK BP6ET		EX, DX, KT, 2H
101000001AC	Beru Z12 14-7DTU		EX, DX, KT, 2H
101000007AB	Champion N7BYC		EX, DX, KT, 2H
101000026AA	Champion 14L-CHAMPION	Beru Z75 14-G-8DTU	2H
N01781159	Bosch W5DC	Beru Z42 14-5DU	EG, DX, JJ
101000006AA	Bosch W5DCO	Beru Z42 14-5DU	DX, JJ
101000036AA	NGK BUR6ET	Beru Z91 14-GH-7DTUR	JH
101000036AC	NGK BUR5ET-10		RE
101000040AE	Beru Z93 14-GH-8DTURX		RE
101000006AD	Beru Z70 14-8DUO		GH, JB
101000002AA	Beru Z69 14-8DUO		GH, JB
N01781139	?		EJ, EM, FA, FN, FV, GG, GH, HN, JB
101000002AB	Beru Z61 14-7DUO		EJ, EM, FA, FN, FV, GG, GH, HN, JB

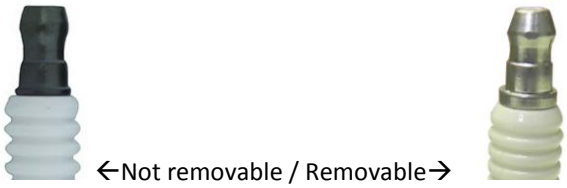
Which plugs to use?

- Copper or platinum; iridium plugs are a waste of money for these cars.
- Single or triple? Resistor or non-resistor? All four types were supplied by VW for these cars. Use the plugs that work best with **your** particular car.
- Brand: NGK is recommended over all others.
- You may come across some folks online telling you to use BP6ET and nothing else, and that resistor plugs are useless. While BP6ET is the best for Digifant (and recommended by VW as seen in the table above), CIS doesn't rightly care, but VW recommends resistor plugs. Again, plugs are trial and error components; use what works best for **your** car. For example: I pulled single, copper resistor plugs out of my '86 CIS, installed the much-ballyhooed W7DTC plugs (back when Bosch was still making decent plugs), and it ran like crap. Replaced the W7DTC's with NGK BPR6ES plugs and it was back to running like new, and that's without making any other adjustments.

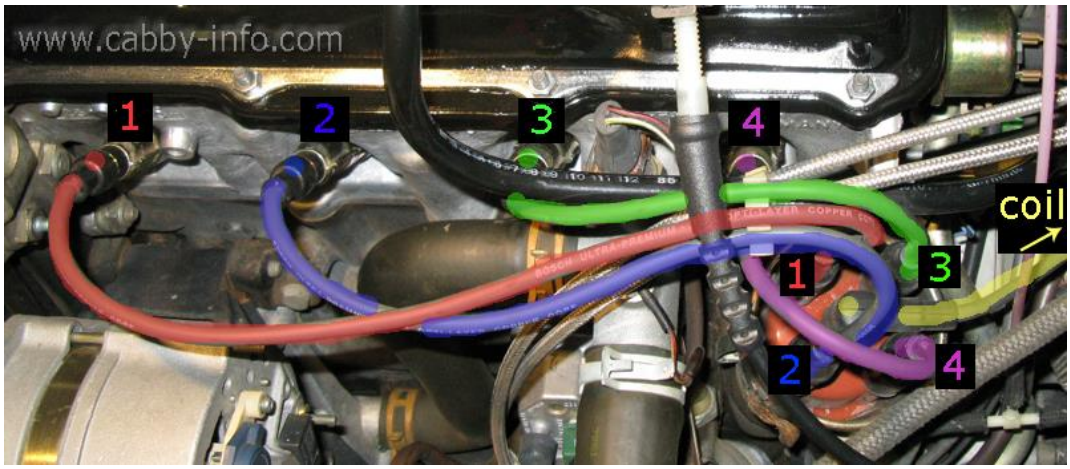
Spark plug gap: 0.028"/0.7mm. Plugs come pre-gapped; however, it is good practice to check all new plugs with a plug gapping tool like those shown below.



Spark plug terminal:

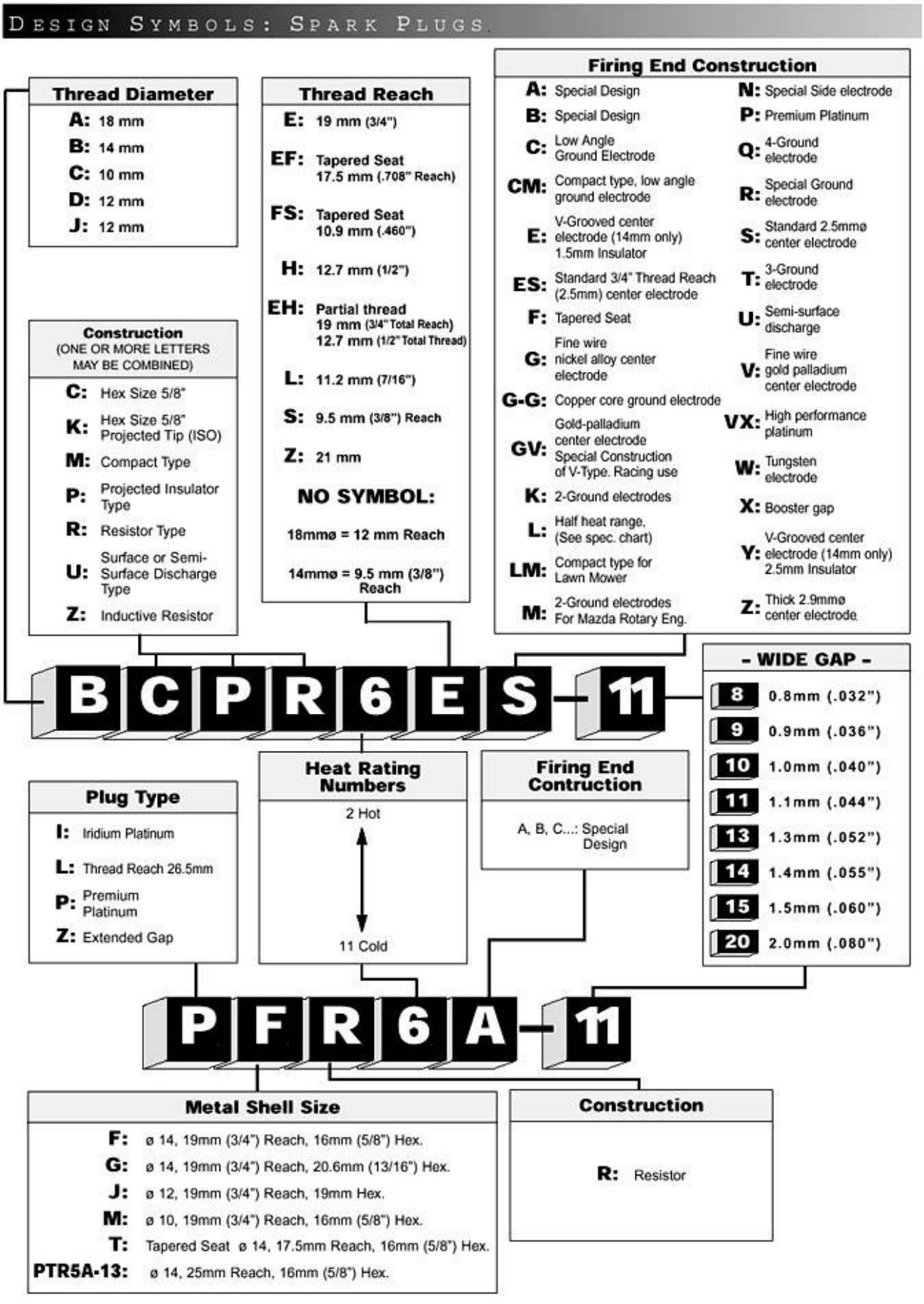
These cars use plugs with a threaded terminal. If your new plugs come with a terminal nut installed, unscrew it and throw it away. 	NGK plugs differentiate between removable nuts and non-removable by color:  ←Not removable / Removable→

Firing order: 1-3-4-2



Plug wires on distributor cap may vary from the image above; the #1 plug wire should be in the same position as the rotor tip.

NGK numbering system:



Diagnostics:

DIAGNOSTIC CHART

Normal	Normal	Normal
Using Unleaded Petrol 	Using Lead Replacement Petrol 	Using Lead Replacement Petrol 

Symptoms	Causes	Remedy
• Hard starting • Misfiring • Black exhaust smoke	**Carbon Fouled**  • Rich mixture • Retarded ignition • Low compression • Too cold a spark plug	• Check float level • Check choke • Check ignition timing • Check air cleaner • Check compression • Replace spark plug with correct heat range
• Hard starting • Misfiring • Grey / white exhaust smoke • Loss of oil	**Oil Fouled**  • Worn rings • Worn piston • Leaking valve stem seals • Over-filled oil sump	• Replace worn components • Replace spark plug with correct heat range
• "Pinking" under acceleration or climbing hills • Engine run-on after switching off	**Overheated**  • Lean mixture • Advanced ignition timing • Too hot a spark plug	• Check jets are not clogged • Check float level • Check ignition timing • Replace spark plug with correct heat range
• Misfiring • Loss of power • Hard starting • Noise in engine	**Damaged**  • Foreign particles inside cylinder • Broken or damaged valve	• Replace spark plugs • Remove foreign or damaged components
• Melted spark plug • Damaged piston crown • Damage to cylinder head	**Under Tightened**  • Spark plug incorrectly torqued • Spark plug only hand tightened • Dirt or carbon in threads of cylinder head	• Replace spark plugs • Tighten spark plug to correct torque • Replace damaged components • Check compression on all cylinders
• Hard starting • Reduced fuel economy	**Worn**  • Normal electrode wear • ±0.03mm / 1 000km • Fuel deposits (carbon, lead, additives & salts)	• Replace spark plug with correct heat range
• Redish brown stain above metal shell on insulator	**Corona Stain**  Corona Stain • Oil particles suspended in the air adhere to the insulator due to high voltage	• No deteriation to the function of the spark plug • Change spark plug ONLY at recommended service intervals

Normal

Combustion deposits are slight and not heavy enough to cause any detrimental effect on engine performance. Note the brown to greyish tan color, and minimal amount of electrode erosion which clearly indicates the plug is in the correct heat range and has been operating in a "healthy" engine.

Mechanical Damage

May be caused by a foreign object that has accidentally entered the combustion chamber. When this condition is discovered, check the other cylinders to prevent a recurrence, since it is possible for a small object to "travel" from one cylinder to another where a large degree of valve overlap exists. This condition may also be due to improper reach spark plugs that permit the piston to touch or collide with the firing end.

Oil Fouled

Too much oil is entering the combustion chamber. This is often caused by piston rings or cylinder walls that are badly worn. Oil may also be pulled into the chamber because of excessive clearance in the valve stem guides. If the PCV valve is plugged or inoperative it can cause a build-up of crankcase pressure which can force oil and oil vapors past the rings and valve guides into the combustion chamber.

Overheated

A clean, white insulator firing tip and/or excessive electrode erosion indicates this spark plug condition. k This is often caused by over advanced ignition, timing, poor engine cooling system efficiency (scale, stoppages, low level), a very lean air/fuel mixture, or a leaking intake manifold. When these conditions prevail, even a plug of the correct heat range will overheat.

Insulator Glazing

Glazing appears as a yellowish, varnish-like color. This condition indicates that spark plug temperatures have risen suddenly during a hard, fast acceleration period. As a result, normal combustion deposits do not have an opportunity to "fluff-off" as they normally do. Instead, they melt to form a conductive coating and misfire will occur.

Pre-Ignition

Usually one or a combination of several engine operating conditions are the prime causes of pre-ignition. It may originate from glowing combustion chamber deposits, hot spots in the combustion chamber due to poor control of engine heat, cross-firing (electrical induction between spark plug wires), or the plug heat range is too high for the engine or its operating conditions.

Gap Bridging

Rarely occurs in automotive engines, however, this condition is caused by similar conditions that produce splash fouling. Combustion deposits thrown loose may lodge between the electrodes, causing a dead short and misfire. Fluffy materials that accumulate on the side electrode may melt to bridge the gap when the engine is suddenly put under a heavy load.

Splash Fouled

Appears as "spotted" deposits on the firing tip of the insulator and often occurs after a long delayed tune-up. By-products of combustion may loosen suddenly when normal combustion temperatures are restored. During hard acceleration these materials shed from the piston crown or valve heads, and are thrown against the hot insulator surface.

Detonation

This form of abnormal combustion has fractured the insulator core nose of the plug. The explosion that occurs in this situation apples extreme pressures on internal engine components. Prime causes include ignition time advanced too far, lean air/fuel mixtures, and insufficient octane rating of the gasoline.

Ash Fouled

A build-up of combustion deposits stemming primarily from the burning of oil and/or fuel additives during normal combustion ... normally non-conductive. When heavier deposits are allowed to accumulate over a longer mileage period, they can "mask" the spark, resulting in a plug misfire condition.

Carbon Fouled

Soft, black, sooty deposits easily identify this plug condition. This is most often caused by an over-rich, air/fuel mixture.
Check for a sticking choke, clogged air cleaner, or a carburetor problem - float level high, defective needle or seat, etc.
This may also be attributed to weak ignition voltage, an inoperative preheating system (carburetor intake air), or extremely low cylinder compression.

Worn

This plug has served its useful life and should be replaced. The voltage required to fire the plug has approximately doubled and will continue to increase with additional miles of travel. Even higher voltage requirements, as much as 100% above normal, may occur when the engine is quickly accelerated. Poor engine performance and a loss in fuel economy are traits of a worn spark

SOURCE: Champion Spark Plugs