Dedicated to service. Driven by quality.

IGNITION | FILTERS | WIPERS

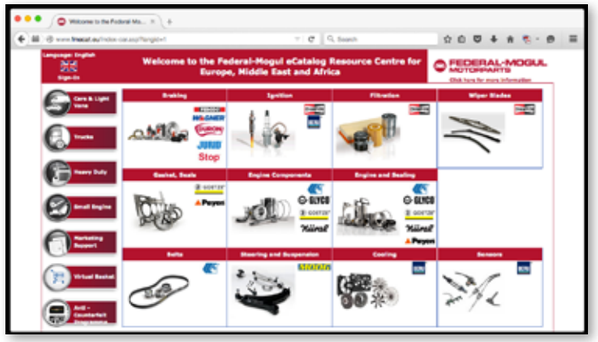
FEDERAL-MOGUL MOTORPARTS

TURN IT ON

CHAMPION SPARK PLUGS

PART II - OUR PART NUMBER STRUCTURE

EXAMPLE OF SMART USAGE OF THE PRODUCT CODE TABLE (E.G. AUDI A6)



Step 1

Go to www.fmecat.eu.
This is the Federal-Mogul Motorparts website which is also accessible from your mobile phone.

Select Champion Ignition as brand.

Step 2

Fill out the Make, Model and Litre of the car **in the top grey bar and start the search** for the right Champion product.

Step 3

If you **click on the technical code** of the spark plug (KEC4PYPBF-1), a pop-up window appears, where you can see the short code (OE 220).

Use this reference: it is the number on the packaging label.

IF IT HAS AN ENGINE, WE HAVE A PLUG FOR IT

We permanently want to serve you better and support your business. How? By offering you first-class products and a complete range in combination with **all the information you need**. That's why we created **3 brochures** for you:

Part 1. How does a spark plug work?
In the first brochure, we **guide you through the components** that are used in Champion spark plugs and determine the performance and durability of the spark plug. But did you know that the most essential information is already at your fingertips? As you will read in our second brochure.

Part 2. Our part number structure explained
Every Champion spark plug product number holds detailed specifications about its different components (e.g. resistor, shell, seat), the used technology (e.g. Copper) and its features (e.g. Ribbed Core Nose). An overview of all possible combinations is available in our paper and online catalogue. We'll give you a more detailed explanation.

Part 3. The technologies inside Champion spark plugs
Finally, in our last brochure, we **guide you through the technologies** that are used in Champion spark plugs.

Original OE-quality

When you are the world's number one spark plug provider, customers turn to you with all kinds of questions. OEMs push us to come up with new technologies and solutions that fit the needs of their latest ignition developments. As these spark plug technologies innovations are quick to be released into the aftermarket, we ensure and inform distributors and installers at the same speed.

Let's get started: just turn the page to learn more about Champion spark plugs!

SEE WHAT OUR PACKAGING CAN TELL YOU

On each Champion spark plug packaging, a label indicates the **short product code** (e.g. OE220).

This short code corresponds with Champion's technical code. For instance, the short code OE220 corresponds to the **technical code** KEC4PYPBF-1.

Short Code	→	Technical Code
OE219	→	KEC4PYPBF
OE220	→	**KEC4PYPBF-1**
OE221	→	KEC6PYPB-1

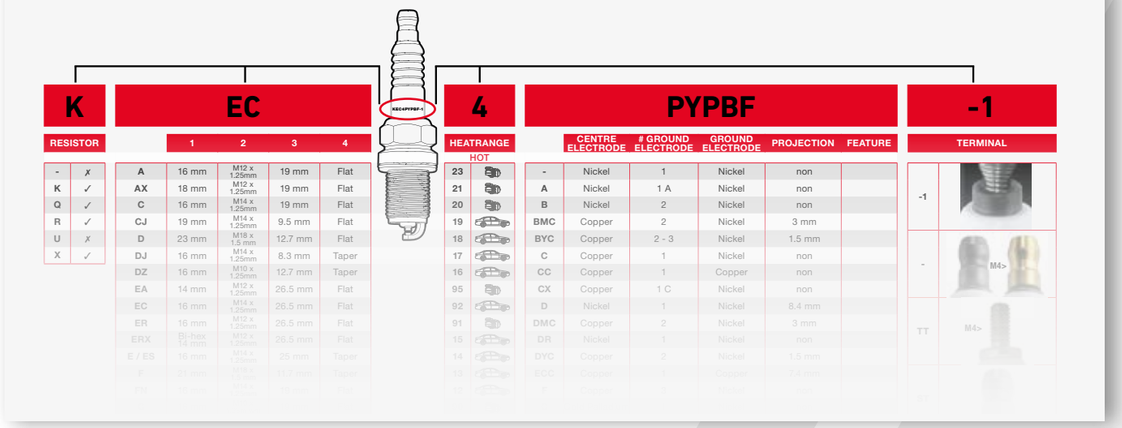
The corresponding codes can be found in our paper or online catalogue: **www.fmecat.eu**

This technical code is a combination of numbers and letters to indicate major features of the plug design and provides detailed information on the technical specifications of **5 main components** of the spark plug (see brochure Part I for more info).

In our example : technical code **KEC4PYPBF-1**

K	EC	4	PYPBF	-1
RESISTOR	NUT SIZE, DIMENSIONS, TAPER	HEAT RANGE	CENTRE/GROUND ELECTRODES	TERMINAL (and gap)

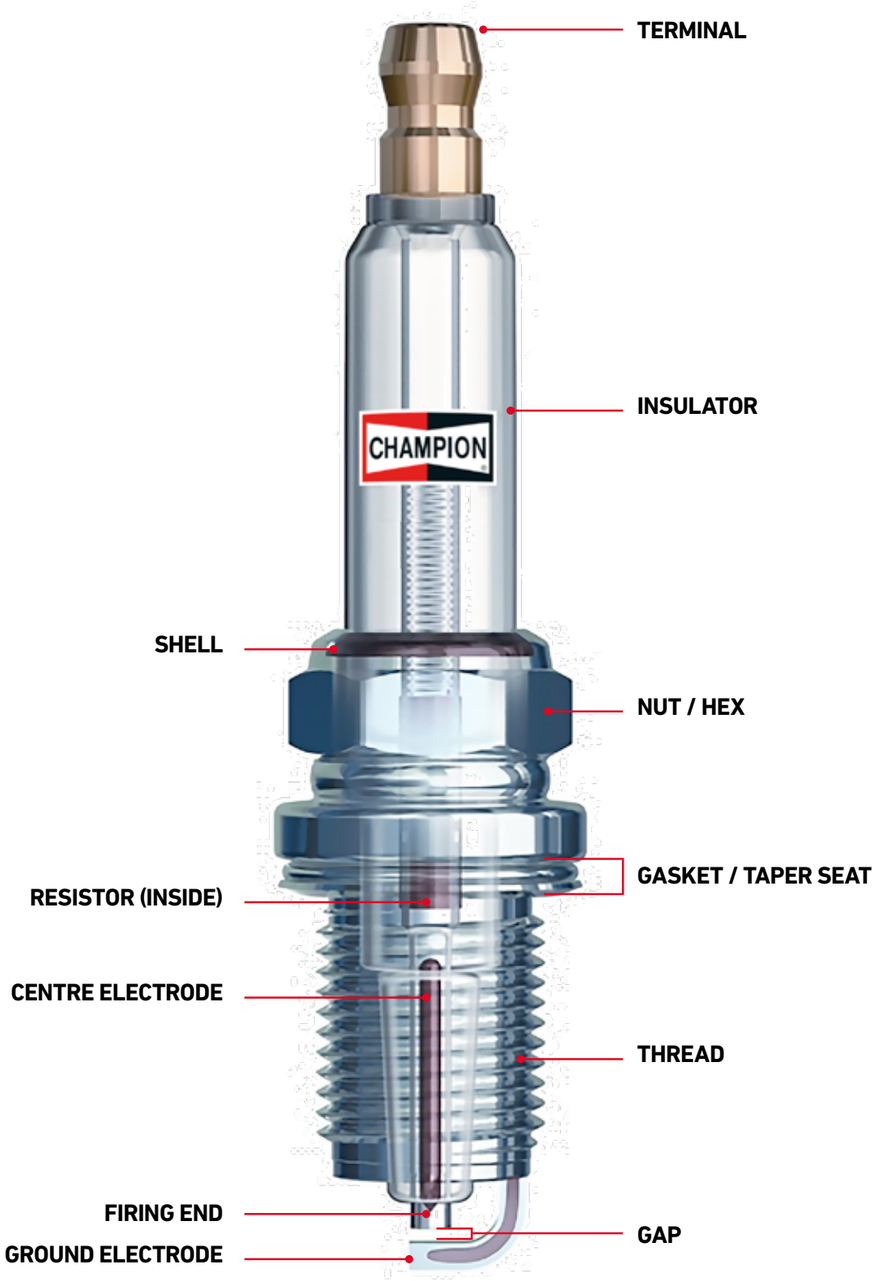
In the table at the end of this brochure or in any of our product catalogues you get a complete overview of the available technical specifications for each component.



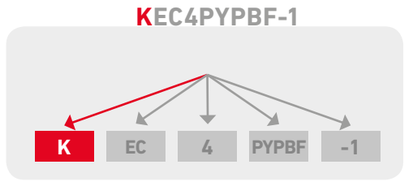
Your Champion benefit: detailed information throughout the range

In order to meet the different demands of OE manufacturers, automotive professionals and end-users, Champion offers the **most complete spark plug range** that's currently available. This also means offering a host of technologies and specifications.

Champion packaging, catalogues and product numbers provide you with **specific information on every plug**. Find out the components on the next pages.

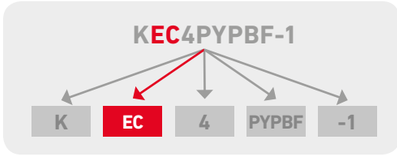


1. RESISTOR



Product code	Value	Explanation
-	Non resistor	Plugs without a resistor inside.
K	FISS 1-2 KΩ	With Fired In Suppressor Seal (FISS). Fired construction - stronger insulator - increases heat dissipation. The plug can be used as a sensor coupled to modern O.B.D (On Board Diagnostic (OBD) systems.
Q	25-140 Ω	Plug with inductive suppressors. This type is mostly used in racing applications. It is suited for high-performance capacitive discharge ignition systems with a wire wound inductive coil to reduce RFI without negatively affecting ignition performance.
R	SAC9 6-15 KΩ / FISS 3-10 KΩ	Champion developed the SAC-9 suppressor in the early 1980s. This semi-conductor resistor/suppressor is formed from strontium carbonate, aluminium oxide and copper oxide powders. This technology was patented by Champion and assures optimum performance under any circumstances.
U	Spark Booster Gap (Non resistor)	This type of resistor is rarely used by Champion because it increases RFI compared to non-resistor spark plugs.
X	Dual Resistor-Suppressor (Kohler, Briggs & Stratton)	Combines both a SAC-9 resistor with an inductive suppressor to minimise RFI in specific non-automotive applications.

2. SHELL

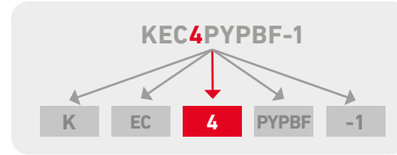


Product code	1	2	3	4
A	16 mm	M12 x 1.25mm	19 mm	Flat
AX	18 mm	M12 x 1.25mm	19 mm	Flat
C	16 mm	M14 x 1.25mm	19 mm	Flat
CJ	19 mm	M14 x 1.25mm	9.5 mm	Flat
D	23 mm	M18 x 1.5 mm	12.7 mm	Flat
DJ	16 mm	M14 x 1.25mm	8.3 mm	Taper
DZ	16 mm	M10 x 1.25mm	12.7 mm	Taper
EA	14 mm	M12 x 1.25mm	26.5 mm	Flat
EC	16 mm	M14 x 1.25mm	26.5 mm	Flat
ER	16 mm	M12 x 1.25mm	26.5 mm	Flat
ERX	Bi-hex 14 mm	M12 x 1.25mm	26.5 mm	Flat
E / ES	16 mm	M14 x 1.25mm	25 mm	Taper
F	21 mm	M18 x 1.5 mm	11.7 mm	Taper
FN	16 mm	M14 x 1.25mm	19 mm	Flat
G	16 mm	M10 x 1.25mm	19 mm	Flat
H	21 mm	M14 x 1.25mm	11.1 mm	Flat
J	21 mm	M14 x 1.25mm	9.5 mm	Flat
L	21 mm	M14 x 1.25mm	12.7 mm	Flat
N	21 mm	M14 x 1.25mm	19 mm	Flat
P	18 mm	M12 x 1.25mm	12.5 mm	Flat
S	16 mm	M14 x 1.25mm	18 mm	Taper
V	16 mm	M14 x 1.25mm	11.7 mm	Taper
W	24 mm	7/8"-18	16 - 19 mm	Flat
X	16 mm	M14 x 1.25mm	12.7 mm	Flat
Y	16 mm	M10 x 1.25mm	6.4 - 9.5 mm	Flat
Z	16 mm	M10 x 1.25mm	12.7 mm	Flat
ZF	21 mm	M18 x 1.5 mm	11.1 mm	Taper
X plug	24 mm	1/2"-14	25.4 mm	Taper
7989	16 mm	M16 x 1.5 mm	21.6 mm	Taper

Your Champion benefit: perfect performance guaranteed

- Every Champion spark plug has a shell that is developed to **meet OE requirements** and to **perfectly fit specific application(s)**
- Clear dimensions allowing **correct instalment** according to Champion specifications given above

3. HEAT RANGE



Specific automotive applications	General & industrial engine applications	High-performance applications
23		
21		
20		
19	**95**	
	92	
18	**91**	
17	**90**	
16		
15		
14		
13		
12	**86**	
11		
10		
9		
8		
7		
6	**85**	**63**
5	**82**	**61**
4	**81**	**59**
	79	
	78	
3	**77**	**57**
	76	
	75	
2		**55**
1		**54**
		53

HOT

COLD

Each spark plug manufacturer uses its own logic and heat range numbering. Champion categorises plugs according to the application.

The numbers are not real figures indicating degrees. They are 'product codes' used to give an indication of the heat range: plugs are hotter the higher the number, colder the lower the number. For more details, please consult the Champion catalogues.

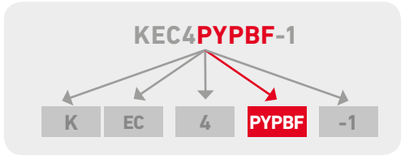
In our example :
technical code **KEC4PYPBF-1**
↳ the Heat range is 4

Your Champion benefit: the perfect plug for every engine

The current trend of downsizing engines and increasing the power output per cubic inch means that these engines get a higher compression. Champion addresses this new trend by creating cold spark plugs that are suited for these types of engines and of course still serves the rest of the market with hot spark plugs.

In this way, Champion has a **complete range that enables you to service a broad vehicle parc**, from older (basic) models to modern (high-performance) cars that are equipped with the latest engine technology.

4. ELECTRODES



Centre Electrode	
C	Copper
G	Gold Palladium
W	Iridium
-	Nickel
P	Platinum
-	Steel
B	Fine Wire

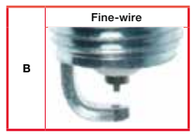
# Ground Electrodes	
-	1
B	2/3
D	2
T	3
Q	4
1+2	1+2 side electrodes
1A	1 angled
1C	1 cut back

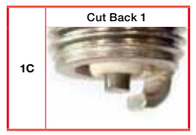
Ground Electrode	
-	Nickel
-	125 Nickel
-	Non
C	Copper
P	Platinum
F	Side-fire

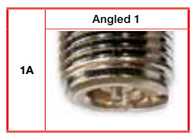
Projection mm	
-	non
H	0,8
Y	1,4
	1,5
M	2,3
	3,0
L	5,1
E	7,4
D	8,4

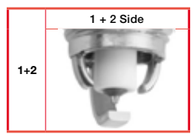
Feature	
7989	Ford High Thread
X-plug	Ford Model T
X	Ribbed Core Nose
	Special Feature
V	Surface Gap
Z	Skirted Shell

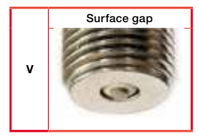
Types



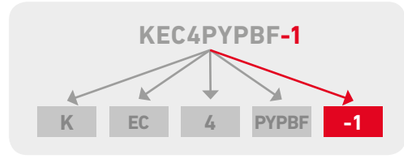








5. TERMINAL



Product code	Image	Explanation
ST		Plugs with a **solid terminal** are used where the terminal snaps onto a boot with a large connector inside. This is the standard plug type.
TT		Plugs with a **threaded terminal** can only be used with plug caps or wires designed to snap over the smaller threaded stud. This type is common in motorcycle and power sports applications. Plugs with a removable terminal are a combination of the threaded and solid terminal. The removable terminal seems optimal – as it has both options – but sometimes the terminal could become loose (due to vehicle movement e.g.) and deliver a bad contact.
-		**SAE solid terminal** or **threaded** with SAE knurl attached.
-1		**Cup Terminal**. Because the terminal is smaller, the plug has an extended insulator neck creating a greater insulation surface and better ignition performance.

5. THE GAP

Product code	Value
-	0,7-0,9 mm
2	0,6 mm
3	0,9 mm
4	1,0 mm
5	1,3 mm
6	1,5 mm
8	2,0 mm

CHAMPION COMPLETE PRODUCT CODE TABLE

Find out the **complete overview** of the available technical specifications for each component on the next page. The first column of each section contains the product code – numbers and letters – that is included in the technical code of each plug. The following column contains indications of possible values. Where necessary a visual is used to illustrate differences or details.

Remember that these values and categorisation are the **Champion product code**. Other (OE) Manufacturers can have a different code, e.g. the heat range is manufacturer-specific: each manufacturer has its own indication. Conversion tables can be found on the web.

Special plugs

The 7989 and the X-plug are special plugs. They were developed to very specific technical requirements by OEMs.

7989

The OE 'high thread' style spark plug with an improved one-piece design by Champion (over prior OE two-piece design) for a superior durability.

X-plug

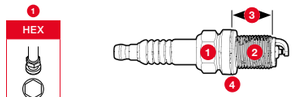
The Champion spark plug for Ford's famous model T.

K

RESISTOR	
-	✗
K	✓
Q	✓
R	✓
U	✗
X	✓

EC

	1	2	3	4
A	16 mm	M12 x 1.25mm	19 mm	Flat
AX	18 mm	M12 x 1.25mm	19 mm	Flat
C	16 mm	M14 x 1.25mm	19 mm	Flat
CJ	19 mm	M14 x 1.25mm	9.5 mm	Flat
D	23 mm	M18 x 1.5 mm	12.7 mm	Flat
DJ	16 mm	M14 x 1.25mm	8.3 mm	Taper
DZ	16 mm	M10 x 1.25mm	12.7 mm	Taper
EA	14 mm	M12 x 1.25mm	26.5 mm	Flat
EC	16 mm	M14 x 1.25mm	26.5 mm	Flat
ER	16 mm	M12 x 1.25mm	26.5 mm	Flat
ERX	Bi-hex 14 mm	M12 x 1.25mm	26.5 mm	Flat
E / ES	16 mm	M14 x 1.25mm	25 mm	Taper
F	21 mm	M18 x 1.5 mm	11.7 mm	Taper
FN	16 mm	M14 x 1.25mm	19 mm	Flat
G	16 mm	M10 x 1.25mm	19 mm	Flat
H	21 mm	M14 x 1.25mm	11.1 mm	Flat
J	21 mm	M14 x 1.25mm	9.5 mm	Flat
L	21 mm	M14 x 1.25mm	12.7 mm	Flat
N	21 mm	M14 x 1.25mm	19 mm	Flat
P	18 mm	M12 x 1.25mm	12.5 mm	Flat
S	16 mm	M14 x 1.25mm	18 mm	Taper
V	16 mm	M14 x 1.25mm	11.7 mm	Taper
W	24 mm	7/8"-18	16 - 19 mm	Flat
X	16 mm	M14 x 1.25mm	12.7 mm	Flat
Y	16 mm	M10 x 1.25mm	6.4 - 9.5 mm	Flat
Z	16 mm	M10 x 1.25mm	12.7 mm	Flat
ZF	21 mm	M18 x 1.5 mm	11.1 mm	Taper
X plug	24 mm	1/2"-14	25.4 mm	Taper
7989	16 mm	M16 x 1.5 mm	21.6 mm	Taper



TIGHTENING TORQUE NM

2 CYLINDER HEAD			4
THREAD	IRON	ALU	FLAT SEAT
M10	10-15	10-15	
M12	15-25	12-20	
M14	20-35	15-30	
M18	30-45	20-35	
			TAPER SEAT
M10	11-12	11-12	
M14	15-25	12-20	
M18	15-30	15-25	

4

HEATRANGE	
HOT	
23	
21	
20	
19	
18	
17	
16	
95	
92	
91	
15	
14	
13	
12	
90	
11	
10	
9	
89	
87	
8	
86	
7	
82	
81	
6	
5	
78	
77	
76	
65	
4	
63	
61	
3	
2	
59	
57	
55	
1	
54	
53	
COLD	

PYPBF

	CENTRE ELECTRODE	# GROUND ELECTRODE	GROUND ELECTRODE	PROJECTION	FEATURE
-	Nickel	1	Nickel	non	
A	Nickel	1 A	Nickel	non	
B	Nickel	2	Nickel	non	
BMC	Copper	2	Nickel	3 mm	
BYC	Copper	2 - 3	Nickel	1.5 mm	
C	Copper	1	Nickel	non	
CC	Copper	1	Copper	non	
CX	Copper	1 C	Nickel	non	
D	Nickel	1	Nickel	8.4 mm	
DMC	Copper	2	Nickel	3 mm	
DR	Nickel	1	Nickel	non	
DYC	Copper	2	Nickel	1.5 mm	
ECC	Copper	1	Copper	7.4 mm	
F	Copper	3	Nickel	non	
G	Gold Palladium	1	Nickel	non	
GC	Gold Palladium	1	Copper	non	
H	Nickel	1	Nickel	0.8 mm	
HC	Copper	1	Nickel	0.8 mm	
HCC	Copper	1	Copper	0.8 mm	
HCX	Copper	1 C	Nickel	0.8 mm	
HX	Nickel	1 C	Nickel	0.8 mm	
J	Nickel	1	Nickel	non	
JC	Copper	1	Nickel	non	
LC	Copper	1	Nickel	2.3 mm	
LCC	Copper	1	Copper	2.3 mm	
LM	Nickel	1	Nickel	non	
LMC	Steel	1	Copper	non	
LY	Nickel	1	Nickel	5.1 mm	
LYC	Copper	1	Nickel	5.1 mm	
MC	Copper	1	Nickel	3 mm	
MCC	Copper	1	Copper	3 mm	
MCLX	Copper	1	Copper	3 mm	Ribbed Core Nose
MCX	Copper	1	125 Nickel	3 mm	
MX	Copper	1	125 Nickel	3 mm	
P	Platinum	1 - 2	Nickel / Platinum	non	
PEC	Platinum	1	Copper	7.4 mm	
PEP	Platinum	1	Platinum	7.4 mm	
PEPB	Platinum B	1	Platinum	7.4 mm	
PHP	Platinum	1	Platinum	0.8 mm	
PLP	Platinum	1	Platinum	5.1 mm	
PLPB	Platinum B	1	Platinum	5.1 mm	
PMC	Platinum	1	Copper	3 mm	
PMCB	Platinum B	1	Copper	3 mm	
PMP	Platinum	1	Platinum	3 mm	
PMPB	Platinum B	1	Platinum	3 mm	
PP	Platinum	1	Platinum	non	
PYB	Platinum	1	Nickel	1.5 mm	
PYC	Platinum	1	Copper	1.5 mm	
PYCB	Platinum B	1	Copper	1.5 mm	
PYCBX	Platinum B	1	Copper	1.5 mm	Ribbed Core Nose
PYP	Platinum	1	Platinum	1.5 mm	
PYPB	Platinum B	1	Platinum	1.5 mm	
PYPBF	Platinum B	1	Platinum Side-fire	1.5 mm	
PYPBX	Platinum B	1	Platinum	1.5 mm	Special
QMC	Copper	4	Nickel	3 mm	
QMP	Platinum	4	Nickel	3 mm	
R	Nickel	1	Nickel	Retracted	
TMC	Copper	3	Nickel	3 mm	
TYC	Copper	3	Nickel	1.5 mm	
V	Nickel	non	non	non	V
VC	Copper	non	non	non	V
VPYC	Platinum	1	Copper	1.5 mm	
VTYC	Copper	3	Nickel	1.5 mm	
WEP	Iridium fine-wire	1	Platinum	7.4 mm	
WHPB	Iridium fine-wire	1	Platinum	0.8 mm	
WMPB	Iridium fine-wire	1	Platinum	3 mm	
WP	Iridium	1	Platinum	non	
WYCB	Iridium fine-wire	1	Copper	1.5 mm	
WYPB	Iridium fine-wire	1	Platinum	0.8 mm	
Y	Nickel	1	Nickel	1.5 mm	
YC	Copper	1	Nickel	1.5 mm	
YCC	Copper	1	Copper	1.5 mm	
YCL	Copper	1	Copper	1.5 mm	
YCX	Copper	1	125 Nickel	1.5 mm	
YDR	Nickel	1 C	Nickel	1.5 mm	
YX	Nickel fine-wire	1	Nickel	1.5 mm	
ZMCC	Copper	1	Copper	3 mm	Z
ZPMPBX	Platinum B	1 + 2	Platinum	3 mm	Z
ZPYPB	Platinum B	1	Platinum	1.5 mm	Z
ZTMC	Copper	1	Nickel	3 mm	Z
X plug	Nickel	1	Nickel	non	Ford Model T
7989	Platinum	1	Platinum	1.4 mm	Ford High thread

-1

TERMINAL	
-1	
-	 M4>
TT	 M4>
ST	

GAP	
-	0.7 - 0.9 mm
2	0.6 mm
3	0.9 mm
4	1.0 mm
5	1.3 mm
6	1.5 mm
8	2.0 mm

B	Fine-wire 
1A	Angled 1 
1C	Cut Back 1 
1+2	1 + 2 Side 
F	Side-fire 
Z	Skirted Shell 
X	Ribbed Core Nose 
V	Surface gap 

SAME QUALITY, DIFFERENT PLUG

Champion plugs are developed **in close cooperation with the OE manufacturers**, in compliance with the most stringent requirements. In the **same OE facilities**, we also produce and optimize all our spark plugs for the aftermarket. So you can be sure that they will keep on **meeting or even exceeding the same standards**.

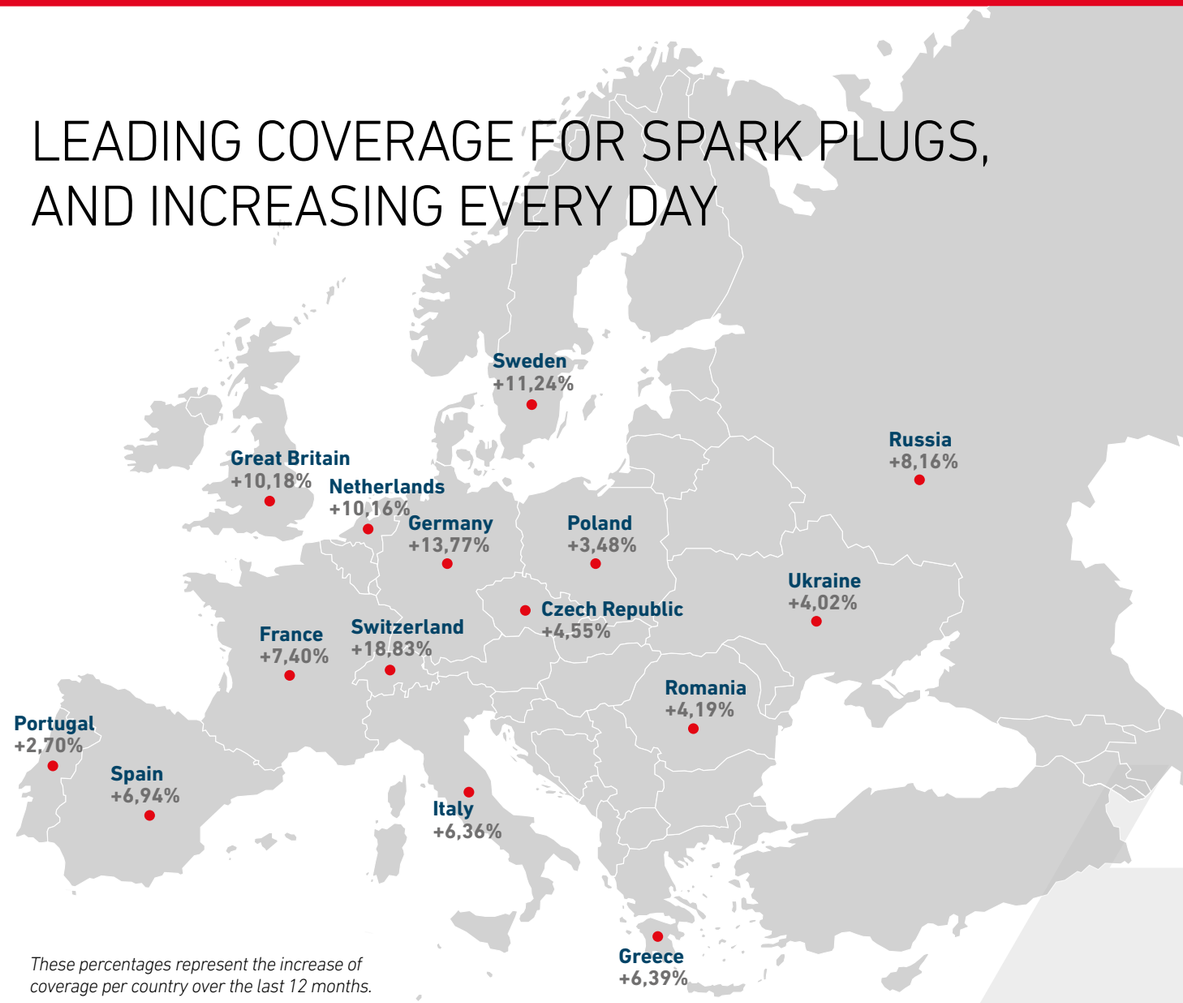
Champion plug *OEM plug*

PROVEN TECHNOLOGY, PRODUCED IN WEST-EUROPE

- Improved **ignitability, performance and durability**
- Developed, tested and produced in our **global OE facilities**
- **European production** in our Chazelles-sur-Lyon (France) OE facility
- Same quality and same production line as **BERU**
- Meeting the **most stringent requirements** of OE manufacturers
- **Same quality standards** for OE manufacturers as for the aftermarket
- Including all **proven technologies** and industry-first **innovations**

Chazelles

LEADING COVERAGE FOR SPARK PLUGS, AND INCREASING EVERY DAY



These percentages represent the increase of coverage per country over the last 12 months.

LEADING THE AFTERMARKET WITH OVER 95% COVERAGE FOR SPARK PLUGS

- For **automotive** and **non-automotive** applications
- OE plugs **directly available** for the aftermarket
- Including **technological innovations**
- Regular New Product Introductions **increasing the percentage of coverage continuously**