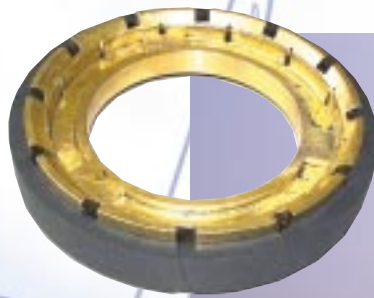


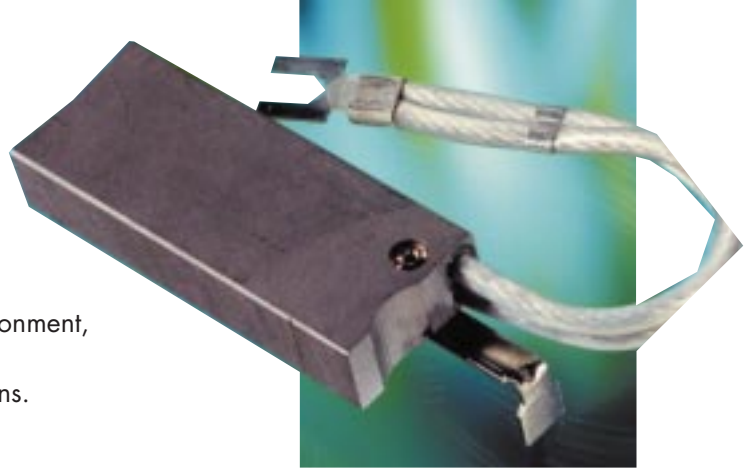
ISO 9001

Innovative technology for wind power generators



*A major player fully committed
in environmental protection*

The wind power generator market is currently expanding fast. CARBONE LORRAINE, based on the strength of its experience in the domain of rotating machines and its commitment to protection of the environment, is active in this market, with technologies that have emerged from its ongoing search for innovative solutions.



We offer products meeting the specific constraints of wind power generators



- Specially developed brush grades
- Patented carbon slip ring assembly technology
- Slip ring assembly with bronze rings
- Brush holders and pressure systems

all engineered and designed by our engineering design departments and tested in our laboratories.

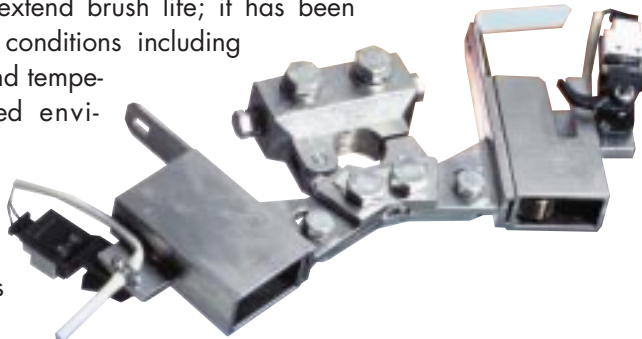
Characteristics of brush grades

Grades	Density	Resistivity $\mu\Omega \cdot \text{cm}$	Speed mm/s	Grade type	Slip ring type
M 8295	1.85	1 900	50	Electrographitic	Bronze / Steel
M 9486	1.62	1 800	50	Electrographitic	Bronze / Steel
C 8386	2.80	100	45	Metal graphite	Bronze / Steel
MK 20	2.00	1 000	50	Metal graphite	Bronze / Steel
MK 75	4.60	11	30	Metal graphite	Bronze / Steel
CG 651	2.90	140	35	Metal graphite	Bronze / Steel
CG 665	4.05	30	35	Metal graphite	Bronze / Steel
M 9426	1.62	1 800	50	Metal graphite	Earth return ring
A 368	1.50	1 100	45	Carbographitic	Carbon

CARBONE LORRAINE offers a complete solution of slip ring assemblies, brushes, and brush holders

Bronze slip ring assemblies:

We have developed an electrographitic grade (M 8295) specially treated to extend brush life; it has been tested under severe conditions including salted atmosphere and temperature in a controlled environment. These tests have confirmed the very good friction, stability and current distribution properties of this grade.



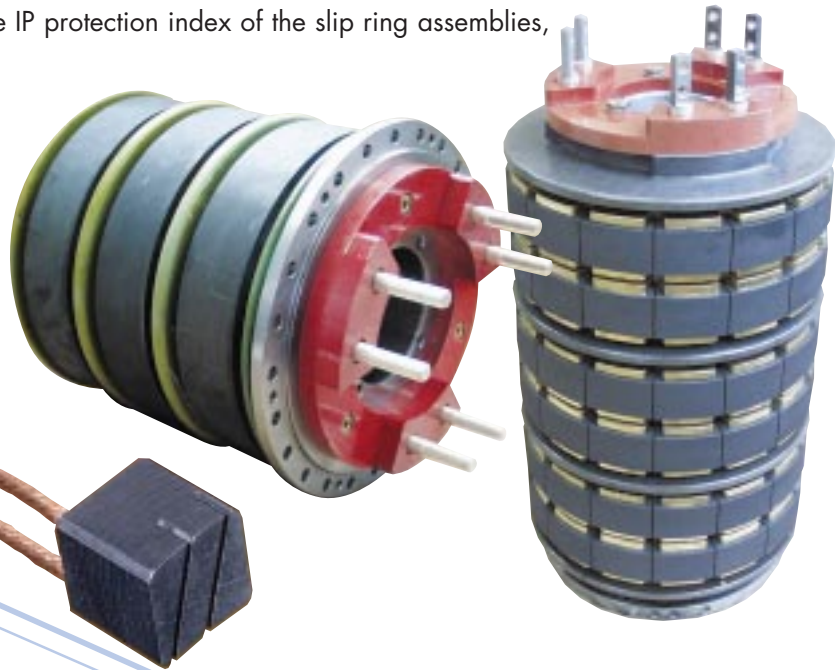
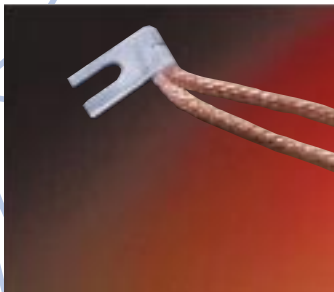
It is an excellent solution to the constraints of the wind power generator application.

Carbon slip ring assemblies

The Carbon slip ring assembly has been developed for wind power generator applications:

- lower weight
- no corrosion of the carbon,
- outstanding lifetime (brush wear = 0.1mm/1,000h),
- excellent no-load and very-low-current operation,
- accepts high peripheral speeds,
- makes it possible to reduce the IP protection index of the slip ring assemblies,
- lower operating costs.

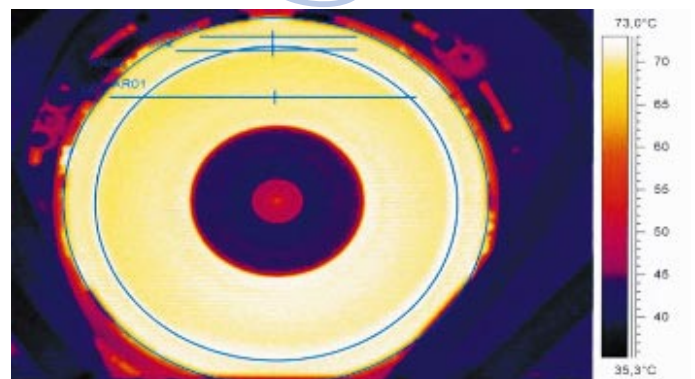
This combination makes the Carbon/Carbon solution the best for the wind power generator application. A special brush grade has been developed : A 368



Many tests have been carried out in our laboratories with external experts and have been conducted in extreme operating conditions:

temperature, corrosive atmosphere, speed with variable current...

Furthermore in order to be closer to this particular severe application, we adapted our test bench to the working cycle of the wind power generators. This assures our customers they will receive high quality products perfectly adapted to wind power generators and their specific constraints.



Wind power generators and industrial applications

These slip-ring assemblies, which benefit from our long experience, have been developed for the wind power generators. They can also be used on industrial asynchronous motors.

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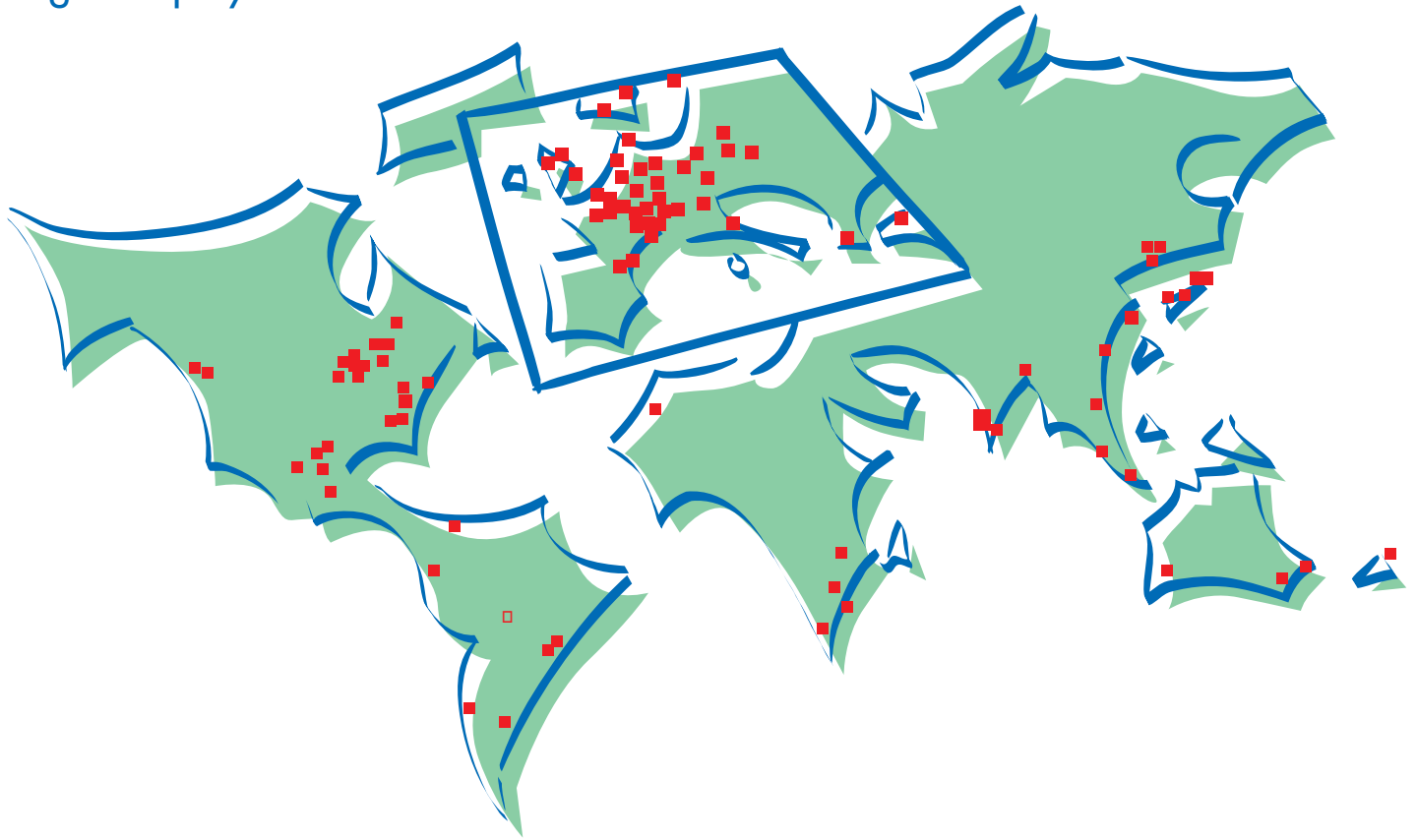
A WORLD LEADER in the field of brushes for electric motors

Since its foundation in 1892, CARBONE LORRAINE has built up an international reputation by creating subsidiaries on all continents.

Today with industrial and commercial plants scattered in more than 30 countries, agencies and representatives

in more than 70 countries and 250 commercial contacts throughout the world, CARBONE LORRAINE offers its customers everywhere reliable high technology products and the service of its experienced technicians.

A global player



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