At Mersen, innovation is driven by close cooperation with our customers. Our understanding of the challenges, environments and applications, and our ability to develop highly complex and unique components to meet the specific needs of the leading players in each of our markets ensure our ongoing success.

**TESTING FACILITIES FOR POWER & SIGNAL TRANSFER AND CURRENT COLLECTION**

Mersen has an outstanding capability attracting product development from international OEMs in the Energy and Transportation sectors.

- Environmental chamber (2 x 1.5 x 2 m / 6.6 x 5 x 6.6 ft)
- High speed performance simulation with / without controlled temperature
- Thermal fatigue test
- Multiple signal protocol injection

**PATENTED INNOVATIONS**

Some recent examples in the energy and transportation markets

**DESIGN AND NUMERICAL ANALYSIS**

- Mechanical, thermal, electrical, fluid dynamic and multi-physic simulations
- Ventilation simulations for brush gear and carbon dust collection systems
- Analysis of the thermo-mechanic behaviour of contact strips
- Standard and internally developed design and calculation softwares

**EXTERNAL CERTIFICATIONS**

**LIGHTNING PROTECTION SYSTEMS FOR WIND TURBINES**

Our dedicated carbon brushes and brush-holders passed the “Class 1 lightning protection tests” of the Kiel University of Applied Sciences laboratory in Germany.
A WORLD LEADER COMMITTED TO INDUSTRY
Mersen’s electrical solutions and services for motors and generators contribute to the safety, reliability and performance of electrical installations and power electronics in our leading markets (Energy, Transportation and Process Industries).
We provide our customers with high quality engineered solutions tailored to various operating conditions (temperature, dust, corrosive atmosphere, etc.), designed and tested for reliability and optimum performance.

EXPERTISE, KNOWLEDGE AND EXPERIENCE
Our company has been working with electrical rotating machinery for over 120 years. We know motors and generators very well and this is one of the reasons why our customers come to us. They know that we provide solutions that are controlled through the complete product life cycle (development, manufacture of materials, product design, quality control, distribution, technical expertise and training). We offer reliable solutions and the benefit of our extensive knowledge, years of experience and strong expertise.

SOLUTION-ORIENTATED APPROACH AND R&D POLICY
We work in partnership with our suppliers to create the solution needed to improve the performance of our customers’ applications. This solution-orientated approach drives our R&D facilities and enables us to provide innovative solutions. Our R&D teams are international and combined with our comprehensive test facilities work on a wide range of subjects for our sectors of activity, allowing us to meet today the market requirements of tomorrow.

SERVICES
On the 5 continents, our engineers and technicians provide specific services to optimize the performance of our customers’ plants.

QUALITY AND ENVIRONMENT
Our 60 manufacturing facilities in 40 countries are registered to ISO quality and environmental standards. This ensures that we can provide our customers with manufacturing sites implementing quality manufacturing processes and respecting environmental standards.

SUSTAINABLE DEVELOPMENT
Here at Mersen, we believe it is possible to bring together our company’s interests while respecting environmental issues and social progress. For this reason, we make sure that an environmental approach is adopted during the life cycle of every solution. As an example, we have developed lead-free carbon brushes and can offer recycling programs to our customers.
LIMITLESS PRODUCT CONFIGURATIONS

CARBON BRUSHES
ALONGSIDE STANDARD PRODUCTS, CUSTOMIZED CONFIGURATIONS FOR ANY APPLICATION

Contact the Mersen Experts to determine the carbon grades adapted to your applications (see contacts on back cover page).

BRUSH GRADES SUITED TO ANY ENVIRONMENTS AND OPERATING CONDITIONS

SOME FEATURED GRADES & APPLICATIONS

<table>
<thead>
<tr>
<th>ELECTROGRAPHIC</th>
<th>CARBON</th>
<th>LFC</th>
<th>RESIN-GRAPHITE</th>
<th>METAL-GRAPHITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG34D EG59P CB86 AC137 EG313 EG8220 EG7655</td>
<td>A121 A176 A252</td>
<td>LFC534</td>
<td>B6412 B6469 B6348</td>
<td>A121 A176 A252</td>
</tr>
</tbody>
</table>

BRUSH-HOLDERS
ORIGINAL EQUIPMENT OR RETROFIT

Manufacturing Capabilities
- Die Casting
- Stamping
- Machining

MAIN FEATURES
- Customized products or standard per our catalogue
- Constant force pressure systems
- Brush-holder plug sets
- Brush wear monitoring devices
- DustCollector systems

SLIP RING ASSEMBLIES
KEY FEATURES IN A MODULAR CONSTRUCTION

Manufacturing Capabilities
- From 1 to X rings
- Diameter: Up to 2500 mm (98 inches)

AVAILABLE RING MATERIALS
- Copper
- Bronze
- Brass
- Steel
- Stainless steel

CURRENT COLLECTORS
FOR TRANSPORTATION OR INDUSTRIAL MACHINES

CONTACT STRIPS
CONTACT STRIPS WITH INTEGRATED HORNS
KASPEROWSKI TYPE STRIPS
3rd RAIL SHOES
INDUSTRIAL CURRENT COLLECTORS

SPECIFICATIONS
- Plain or copper impregnated, mounted on metal carriers
- Automatic Dropping Device (ADD) for impact or wear detection
The performance of your electrical equipment depends on the efficient interaction of components such as slip ring assemblies, brush-holders and carbon brushes. Mersen's integrated solutions are designed with parts that complement each other's performance.

**ELECTRICAL ROTATING MACHINES**

The performance of your electrical equipment depends on the efficient interaction of components such as slip ring assemblies, brush-holders and carbon brushes. Mersen's integrated solutions are designed with parts that complement each other's performance.

**BRUSH GEAR HOUSINGS**

We design and produce complete brush gear housings, including slip ring assemblies and smart enclosures to protect the brush gear against unfavorable environmental conditions.

**SLIP RING AND BRUSH ROCKER ASSEMBLIES**

Many parameters must be taken into consideration in order to attain maximum performance from slip ring assemblies: slip ring material, brush coverage ratios, spring pressure...

**PLUG SETS**

Plug set brush-holders guarantee a perfect contact between the plug set and the brush bar as well as full protection with associated PPE when replacing carbon brushes under load.

**RAIL TRANSPORT**

Motivated by the challenge for ever increasing demands, Mersen equipped the high-speed train that broke the world speed record on rails in 2007. Mersen’s contact strips and earth return current units were mounted on the French TGV that reached 574.8 km/h (357 mph). Mersen can now provide products benefiting from these experiences obtained in such extreme conditions.
When it comes to transferring signal and power between static and rotating parts, reliability is always a key issue. Signal & power transfer systems can be found in numerous applications like wind turbines, cranes or cable bunching machines. Since all these applications do not have the same requirements, Mersen has developed a flexible range of solutions, each adapted to suit your requirements.
SERVICE AS A CORE VALUE

MOTOR MAINTENANCE SERVICE AND TRAINING: A COMPLETE RANGE OF SERVICES

RE-ENGINEERED SOLUTIONS
- Long term involvement with OEMs and aftermarket worldwide
- Technological solutions making our customers more competitive
- Redesign to reduce brush wear, maintenance and downtime
- Complete retrofit solutions (carbon brushes, brush-holders, slip ring assemblies, brush gear housings)

ON-SITE INTERVENTIONS / DIAGNOSTICS
- In-situ commutator and slip ring machining (approved and licensed technology)
- Motor inspection
  - Diagnostics (specific expertise capabilities)
  - Commutator and slip ring analysis (profile, surface roughness)
  - Brush-holder pressure measurements
  - Commutation study, control and adjustment
- Technical support, recommendations with documented written report

TRAINING
- High quality technical training programs provided by Expert teams will help you maximize the efficiency of your equipment and minimize your operating and maintenance costs. Training sessions can take place either at our location or at yours.

WINDTRACKER™: DEDICATED WIND SERVICES
As a leading supplier to the wind industry, Mersen built a global team of sales and technical experts to assist customers in their challenge to improve wind turbine performance and reliability.
- Reactive fast service
- Hundreds of wind turbines inspected every year
- Data collection and shared intelligence reservoir
- Carbon brush / brush-holder / slip ring re-engineering
- Carbon brush recycling programs

MAINTENANCE TOOLS AND MEASURING DEVICES

A FULL RANGE OF MAINTENANCE TOOLS
- Brush seating stones and garnet paper
- Grinding stones and accessories
- Portable mica undercutters
- Alarm boxes
- Scrapers, slotting files, saws...

SPECIFICALLY DESIGNED MEASURING DEVICES
- CL-Profiler, the smart solution for profiling slip ring assemblies and commutators
- DiaMeter, the essential tool for measuring the commutator/wheel diameter of all types of rolling stock prior to any possible machining
- ComPro2000™, non-contact high speed diagnostic tool to quickly and easily determine the health of your motor’s commutator
- Dynamometers, stroboscopes, roughness meters
- Commutation indicator
- Brush wear monitoring devices

ASK US ABOUT OUR WINDTRACKER™ SERVICES
GLOBAL EXPERT IN ELECTRICAL POWER AND ADVANCED MATERIALS

EUROPE
FRANCE
Mersen France Amiens SAS
10, avenue Roger Dumoulin
80084 Amiens
France
Tel.: +33 3 22 54 45 00
infos.amiens@mersen.com

AUSTRIA
Mersen Österreich Hittisau
Ges.m.b.H
Brand 389
A - 6952 Hittisau
Austria
Tel.: +43 5513 4113
info.hittisau@mersen.com

ASIA
CHINA
Mersen Pudong Co., Ltd
No 2 Building, 72 Jinwen Road
Pudong New District, Shanghai
201323 P.R China
Tel.: 86 21 58106360
sales.pudong@mersen.com

INDIA
Mersen India Pvt. Ltd.
5 Bommasandra Industrial Area
Bangalore 560099,
Karnataka
India
Tel.: +91 80 3094 6121/24/25
sales.ptt.india@mersen.com

NORTH AMERICA
USA
Mersen USA Bn Corp.
400 Myrtle Avenue
Boonton NJ 07005
U.S.A.
Tel.: +1 973 334 07 00
contact.ptt.usa@mersen.com

CANADA
Mersen Canada Dn Ltd
225 Harwood Boulevard
Vaudreuil-Dorion, Quebec
J7V 1Y3
Canada
Tel.: +1 450 455 5728
contact.ptt.dorion@mersen.com

SOUTH AMERICA
BRAZIL
Mersen do Brasil Ltda.
Rua Anita Maria Botti
Pedroso, 3
13315-000 - Cabreua - SP
Brazil
Tel.: +55 11 2348 2360
vendas.ptt.brasil@mersen.com

WWW.MERSEN.COM