

B. SERVICES

B.1 MOTOR MAINTENANCE, SERVICES, TOOLS & TRAINING

SERVICE OFFER AND INDUSTRIAL MAINTENANCE

To optimize the operation of your electrical equipment, Mersen offers services (maintenance and training solutions) related to your carbon brushes, slip rings, brush-holders and signal transfer systems.

CUSTOMER SUPPORT

Experts of electrical rotating machines, **Mersen's technicians and engineers work on all types of motors and generators**, whatever your industry.

They offer solutions for in situ machining, design, reengineering, complete modernization or trainings.

CONCRETE RESULTS:

- Optimizing the performance of production equipment;
- Improving the reliability of machines;
- Evaluating the equipment before making any repairs;
- Reducting downtime for maintenance.

Qualification of our technical teams: electrical works, chemical environment, mining, Safety and Health, working in height, offshore, specific customers' safety authorizations, first aid / CPR.

TRAINING AND TECHNICAL SEMINARS



In order to help you optimize your equipment's performance, our specialists have set up training sessions and technical seminars.

These classes take place at either our location (**Stagelec**) or yours (**Extelec**).

They are presented in a lesson-like format according to a defined curriculum or a program adapted to your specific needs.

TRAININGS IN DETAILS

- **High-quality technical training** will help you to maximize the efficiency of your staff while minimizing the costs.
- **With a variety of training solutions** provided by highly qualified Mersen specialists, we can customize a learning solution that works for you.
- **Customized training curriculum:** dedicated program specially adapted to your staff needs and experience level in order to optimize time and learning.
- **Training at your site or in our training facilities** located in Europe, India and USA.

These classes allow you to familiarize yourself on how DC motors work. You will receive a technical report at the end of the session.

WHO SHOULD PARTICIPATE?

Engineers, technicians and electrical maintenance personnel.

WINDTRACKER™



PERFORMANCE OF WIND ENERGY

Mersen is predominantly involved in the alternative energy market.

This is why we created Windtracker™, a specific service primarily dedicated to the optimization and performance of wind energy.

WINDTRACKER™ TEAMS

Technical experts in wind farm interventions, our Windtracker™ teams check your electrical equipment.

If necessary, they will install or replace components and will make technical diagnosis in order to optimize the performance of your equipment.

They may **offer design and reengineering solutions to answer your specific needs.**

Our experts in wind technology will share their expertise while they visit your sites. Wherever you are, our Windtracker™ teams are able to identify your equipment and offer quick solutions thanks to our global Windtracker™ data base.

TOOLS AND MEASURING DEVICES



PREVENTIVE MAINTENANCE

Mersen offers a wide range of tools and measuring devices for the preventive maintenance of your collectors and slip rings.

A WIDE RANGE OF TOOLS

- Grinding stones and accessories
- Portable mica undercutter
- Dynamometers
- Stroboscopes
- Alarm boxes
- Roughness measuring device
- Scrapers and slotting files.

COLLECTORS & SLIP RINGS TOOLS AND MEASURING DEVICES

CL-Profiler, the solution for commutator and slip ring profiles

DiaMeter, for diameter measurement of commutators, slip ring assemblies and rolling stock wheels

ComPro2000™, non-contact high speed diagnostic tool to quickly and easily determine the health of your motor's commutator

Commutation indicator, the solution to accurately measure the spark intensity on DC electrical machines by using a UV detector

R&D TEST BENCHES AVAILABLE







TESTING CAPABILITIES - R&D EXPERTISE

To support you in new development projects or electrical machines diagnostics, **Mersen offers you a large range of test benches and material analysis equipment.** In partnership with you, and according to your specifications, we can adapt existing test benches or develop new test benches.

C. Energy

C.1 RENEWABLE AND CONVENTIONAL ENERGIES

ENERGY

Mersen actively supports the development of alternative energies and contributes to optimizing conventional power sources. Our solutions enable to improve energy efficiency and maximize durability of consumables while guaranteeing safe and easy maintenance of installations.

We cover the entire **solar** cell manufacturing process and the electrical protection of solar panels.

We are a leading supplier to the **wind power** industry, for power conversion and distribution equipment, and safety and security solutions.

RENEWABLE ENERGIES

SOLAR

Mersen manages the entire photovoltaic value chain:

- Production of polysilicon and ingots: Iso-molded and extruded graphite, insulation equipment
- Protection of solar panels: overcurrent and surge protection
- Power management: fuses, cooling devices, laminated bus bars

WIND

Mersen supplies solutions for generator power distribution systems and yaw motors.

- Power generation: slip rings, carbon brushes
- Signal transfer: signal and power transfer systems, carbon brushes, brush holders
- Power distribution: fuses
- Power conversion: fuses, cooling devices, laminated bus bars

HYDROELECTRIC

Mersen offers a broad range of tailored services, and reliable electrical, mechanical and sealing solutions.

- Power generator: slip rings, carbon brushes, dust collectors
- Mechanical protection: seals, soft insulation
- Services: maintenance, training, tools

CONVENTIONAL ENERGY

Mersen is active in oil & gas, thermal, nuclear and mining industries and offers solution for power generation and conversion.

- Extraction: graphite, carbon brushes, brush holders

- Power generation: carbon brushes, slip rings
- Power conversion: fuses, cooling devices, laminated bus bars

ENERGY STORAGE AND TRANSPORT

HVDC: HIGH VOLTAGE DIRECT CURRENT TRANSMISSION SYSTEM

Mersen harnesses HVDC technology for power conversion.

- Power conversion: fuses, cooling devices, laminated bus bars

ENERGY STORAGE

Mersen offers a wide range of products and solutions covering all aspects of Electrical Energy Storage safety and power management:

- Over current protection: hybrid DC devices
- Thermal management: water- and air-cooled heat sinks
- Battery connection: laminated bus bar
- Electrical protection: surge protection devices



Solar



Wind



Hydro



Oil and gas



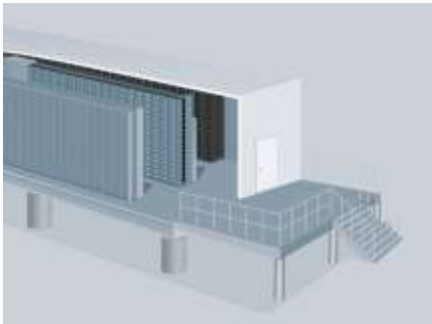
Thermal



Mining



HVDC



Energy storage

D. TRANSPORTATION

D.1 RAILWAY AND TRANSIT

TRANSPORTATION

Mersen lends its expertise to various industries that involve the movement of goods and people.

RAILWAYS

Mersen offers rail industry manufacturers and operators solutions to improve the performance and reliability of their equipment:

- Earth return current units
- Traction brushes and brush holders
- Bus bars
- Cooling devices
- Onboard disconnectors
- Bursting discs

TRANSIT AND METRO

The Group supports urban transit system operators with a wide array of services and products for

ENERGY SUPPLY VIA POWER CONVERSION

- Cooling devices
- Bus bars
- Fuses
- Current collector devices
- Onboard fuseboxes
- Onboard disconnectors
- Earth return current units

ENERGY SUPPLY TO MOTORS

- Traction brushes and brush-holders
- 3RD rail shoes
- Pantograph contact strips
- Motor maintenance

ELECTRIC VEHICLES

Mersen offers an extensive array of products and solutions covering all aspects of on- and off-board safety and power management for electric vehicles:

- Fuses
- Cooling devices
- Laminated bus bars
- Surge Protection Devices

AERONAUTICS

Mersen supplies complex technical components that are capable of withstanding extreme environments and meeting highly demanding and strict industry safety standards:

- Sealing technologies
- C/C parts
- Iso graphite
- Cooling devices
- Carbon brushes
- Bursting discs

AEROSPACE

Optical instruments for space exploration require precise and stable geometry under temperature variation. Mersen supplies Silicon Carbide (SiC) mirrors and structures.

PORT & MARINE

Mersen's solutions are adapted to difficult environment of ports and marine:

- Power conversion: bus bars, cooling devices, fuses
- Motors: carbon brushes, slip rings



Railways



Transit & Metro



Electric vehicles



Aeronautics



Aerospace



Ports & marine

E. PROCESS INDUSTRIES

E.1 PROCESSES

PROCESS INDUSTRIES

Mersen supplies process industries with a wide range of products and purpose-built solutions. It supports the changes occurring across all of these industries, in particular changes linked to energy efficiency.

GREATER ENERGY EFFICIENCY, SAFER PROCESSES

Mersen brings expertise in:

HIGH-TEMPERATURE RESISTANCE

- Graphite
- Carbon insulation

CORROSION RESISTANCE

- HCl Synthesis units
- Heat exchangers
- Reactive metals columns
- Armylor fluoropolymer piping

ELECTRICAL CONDUCTIVITY

- Graphite

MOTOR AND GENERATOR PERFORMANCE

- Carbon brushes
- Slip rings
- Signal & Power Transfer Technologies

ELECTRICAL INSTALLATION PERFORMANCE

- Fuses

- Surge Protection Devices

POWER CONVERSION

- Cooling devices
- Laminated bus bars
- Semiconductor protection



Metallurgy



Furnace



Sintering



Glass



Wire and cable



FHP motors



Pulp and paper



Water treatment



Dies & Moulds



Rubber, Tire, plastic



Cement