

ENERGY
CONVENTIONAL
THERMAL POWER

ELECTRICAL, MECHANICAL
& SEALING SOLUTIONS

mersen

MERSEN



A world leader committed to Energy

● A world leading supplier of mechanical, sealing, power and signal transfer solutions, Mersen contributes to the development of energy sources, including thermal power sources (fuel oil, coal, nuclear, cogeneration, gas...). Our company works with OEMs, thermal power plant operators, maintenance and repair specialists, around the world. Thanks to our knowledge of thermal power plant equipments, such as turbo generators, we have developed solutions tailored to different operating conditions, designed and tested for optimum performance.

Expertise, Knowledge and Experience

● Our company has been working with electrical rotating machinery for more than 100 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 them 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 allows us to develop innovative solutions. Our Research & Development teams are international and combined with our comprehensive test facilities, work on a variety of themes for our sectors of activity, helping 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 thermal power plants:
- On site services (cutting, grinding, bevelling and undercutting of commutators, etc.)
 - Diagnostics (commutator and slip ring profile analysis, surface roughness and carbon brush pressure measurements, axial and circumferential stagger analysis, carbon brush grade studies considering the machine and its environment)
 - Technical support
 - Training
 - Specifically designed measuring tools

Quality and Environment

● Our 56 manufacturing facilities 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

● At Mersen, we believe it is possible to conciliate environmental issues and social progress with the company's interests. That is why 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.

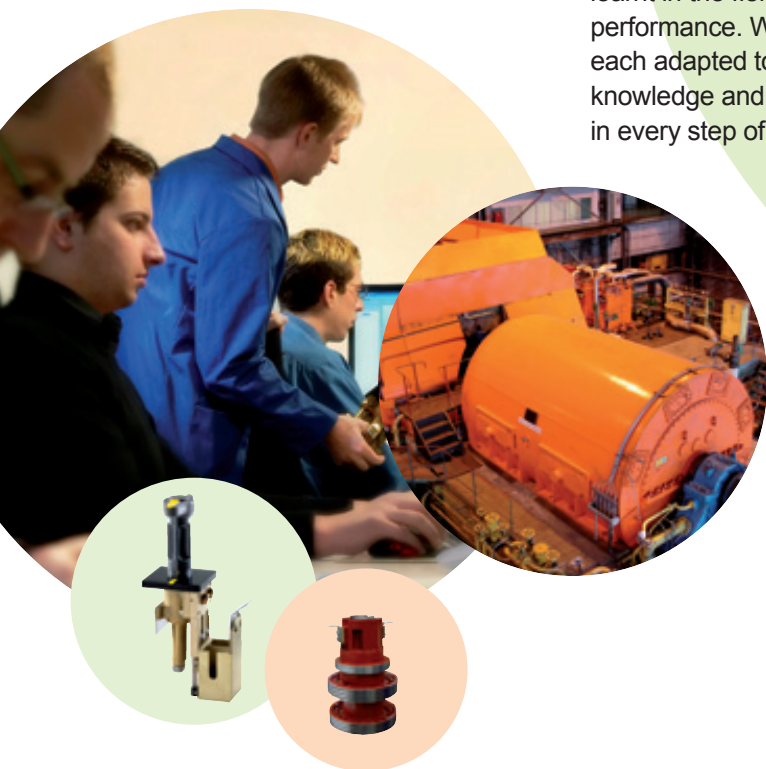


HIGH QUALITY ENGINEERED SOLUTIONS

● Our solutions are based on over 100 years of experience. We have learnt in the field, in different conditions, what works and how to improve performance. We provide our customers with a wide range of solutions, each adapted to a specific need. Our strength is our experience, our knowledge and our ability to design solutions paying attention to detail in every step of the manufacturing process.

● Our solutions for conventional thermal power are made of carefully chosen quality materials, manufactured on cutting-edge equipment (CNC machines, broaching machines, computer aided measuring instruments, high precision microscopes...). They benefit from high precision assembly and respect the international standards (IEC, NEMA, ASTM, SAE, DIN...).

● We test our solutions for optimum performance in variable loads and environmental conditions, helping our customers to reduce maintenance costs. We have the knowledge to reengineer existing solutions and create maintenance tools to improve the performance of thermal power plants.



Aside from electrical, mechanical and sealing solutions for conventional thermal power, Mersen can also provide you with a large range of solutions for equipment protection.

Mersen is a global Expert in materials and solutions for extreme environments as well as in the safety and reliability of electrical equipment.

Our markets:

- **Energy:** • Wind • Hydro • Photovoltaic • Nuclear Power • Conventional Thermal Power • Oil & Gas
- **Transportation:** • Railways • Aerospace & Aeronautics • Ports & Marine • Electrical Vehicles
- **Electronics:** • Polysilicon • Power Electronics • Semiconductors • Compound Semiconductors • Optical Fiber Production
- **Chemicals & Pharmaceuticals:** • Organic Chemicals • Inorganic Chemicals • Fine Chemicals & Pharmaceuticals
- **Process industries:** • Metallurgy • Mining • Oil & Gas • Cement • Pulp & Paper • Rubber & Plastic
 - Water & Wastewater Treatment • Assembly Manufacturing • Mould Industry • Glass Industry • Sintering
 - Furnace Industry
- **Other Markets:** • Commercial • Residential • Data Communication • Elevators • Forklifts



SOLUTIONS & SERVICES FOR CONVENTIONAL THERMAL POWER

POWER GENERATION

BRUSH GEARS

complete collector assemblies with:

- Metal boxes with access doors
- Optimized airflow
- Slip ring assemblies & complete metal frames
- Carbon brushes
- Brush-holder arms
- Brush-holder plug sets

EARTHING

- Grounding carbon brushes
- Brush-holders
- Shaft earthing systems

SERVICES

- Motor & maintenance services
- Training
- Tools & measuring devices

TURBINE SEALING

- Carbon seals
- Papyex® gaskets

EARTHING



Brush-holders and grounding carbon brushes

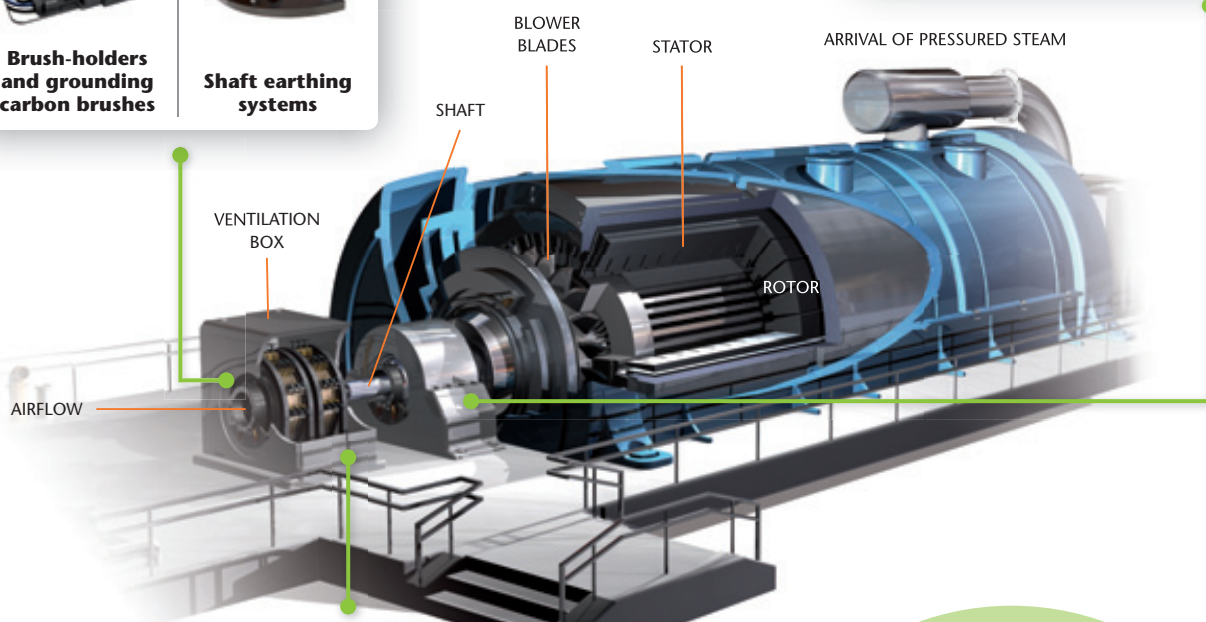


Shaft earthing systems

TURBINE SEALING



Carbon seals



POWER GENERATION



Carbon brushes



Brush-holder plug sets



Arms & plug set systems



High speed slip ring assemblies



Brush gears



Ventilation boxes with access doors

CARBON BRUSHES

- Top grades, including LFC 554, adapted to specific needs
- Selected materials: graphite, copper...
- Good mechanical stability
- Low friction coefficient
- High quality tamping
- Optimized cable dimensions
- Specific design
- High electrical conductivity
- Wide speed range (up to 100 m/s)
- High transient current density
- Adapted to load variation
- Low resistivity material
- Brush wear warning systems

BRUSH-HOLDERS

- Wide range: metric & imperial systems
- Moulded
- Fitted with independent pressure systems: wound or coil springs
- Single or multiple boxes
- Safe on-load removable systems
- Side attachment on arms
- Brush-holder attachment arms with a good repartition of current between brushes and arms
- Brush wear warning systems
- Brush-rocker assemblies
- Selected materials: non-ferrous alloys, anti-corrosion...
- Customized designs
- Die casting
- Stamping
- Reinforced plastic injection
- Spark machining technologies

SLIP RING ASSEMBLIES

- Machined rings for high speed (up to 3,600 rpm)
- Selected materials: non-ferrous alloys, stainless steel, dielectric materials...
- Customized designs
- Reinforced plastic injection
- Finished product compliance: balance, dielectric testing

BRUSH GEARS

- Large range for generators (turbo-generators from 10 to 1,200 MW) & alternators
- Selected materials
- Customized designs
- High quality solutions
- Performance & optimization
- Dust filtration with collecting systems
- Parameter control boxes (temperature, hygrometry, airflow...)

CARBON SEALS

- Adjustable orientation of segmented seals
- Design with overlapping to improve sealing performance
- Customized design & material to make the seal integration easier
- Self lubrication properties
- Extended life solutions

SERVICES

MOTOR & MAINTENANCE SERVICES

- Expertise
- Diagnostics
- On site intervention
- Refurbishing & re-engineering of solutions and components

TRAINING

- Led by technical experts
- According to a defined curriculum or adapted to specific needs
- Transfer of skills
- At either our location or our clients'

TOOLS & MEASURING DEVICES

- CL-Profilor
- ComPro2000™
- Grinding stones
- Mica undercutters
- Dynamometers
- Stroboscopes
- Alarm boxes
- Roughness meters
- Grinders & accessories
- Saws
- Scrapers
- Slotting files

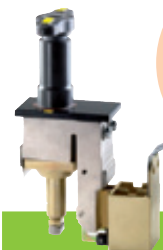
FOCUS ON



LFC 554 natural graphite, an internationally renowned grade

- Low friction coefficient at 100 m/s
- Low contact drop
- Low losses/higher load capabilities/cooler running
- Long life
- Can handle high current densities up to 13 A/cm² (80 A/inch²)
- Speed capabilities up to 100 m/s (20,000 fpm)
- Brush pressures of 130-180 g/cm² (1.85 - 2.55 psi)

FOCUS ON



Brush-holder Plug set, a top solution in the market

- Modular construction
- Silver "multi-contact" socket transferring the current to the bus
- Optional integral brush hold-off device
- 400 & 600 Amp capacity units available
- Constant force springs
- Brush wear indication & Safety system
- "Magazine" and "Single" brush style plug-sets available
- ATE, Dietrich, Ferraz types available



A GLOBAL PLAYER

Global expert in materials and solutions for extreme environments as well as in the safety and reliability of electrical equipment, Mersen designs innovative solutions to address its clients' specific

needs to enable them to optimize their manufacturing process in sectors such as energy, transportation, electronics, chemical, pharmaceutical and process industries.

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