



 **LHMarthinusen**
ELECTRICAL & MECHANICAL ENGINEERS

Established 1913



LHMARTHINUSEN

LHMarthinusen (a division of Actom (Pty) Ltd) is the market leader in the Electro-mechanical repair industry

Established in 1913 LHMarthinusen has been supplying customers with cutting-edge technology based solutions, remaining customer focused, continually investing in quality personnel performing to international standards with one goal in mind - to provide their customers with one-stop-shop solution delivering real value through a win-win relationship.

We pioneer technology in partnership with reputable global players. Our personnel have extensive experience in our core business complimented by experience in applied engineering in the mining, steel, paper, traction, petrochemical, power distribution and general industry sectors. We partner with our customers and never walk away from something once started.

We adhere to ISO 9001 Quality Management System, backed by IEC

specifications and good corporate governance.

LHMarthinusen, is the largest global operations of it's kind, offering a comprehensive suite of on and off-site Electro-Mechanical Repair and Manufacturing Services to all industry sectors.

Core competencies include repairs to low and high voltage Electric Motors, Generators and other rotating equipment, Transformer repairs and manufacture, Fan routine maintenance and Refurbishment, Oil testing & Purification repair and rebuild of DC and AC Traction motors, Motor Coils and Commutator manufacture, supply and manufacture of Bare and Covered Copper Wire, as well as a full range of Motor & Transformer and Industrial Fan Site Services.

DIVISIONS



FAN SERVICE

Routine Maintenance and Refurbishment



ROTATING MACHINES

Large and medium Voltage Motors, DC Motors, AC and DC Traction Motors and Alternators



TRANSFORMERS

50 KVA up to 200MVA at 275 KV



MANUFACTURING

All types of Coils, Commutators, Copper Wire and Laser Cut Laminations



ENGINEERING SERVICES

Site service on Motors, Transformers and Industrial Fans



FLUIDEX LABORATORY

Oil testing, Oil Regeneration Plant and Oil Supply

Certified Management Systems

S A C A S
ISO 14001:2015

S A C A S
OHSAS 18001:2007

S A C A S
ISO 9001:2015

Permit Mark Schemes

SANS 10242-1
SANS 60079-0/1/19 Ex d
SANS 60079-0/15/19 Ex nA
SANS 60079-0/19/31 Ex t
SANS 555

Broad-Based BEE Verification Level 1 Contributor





Where to find us...



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FAN SERVICE

Fan Routine Maintenance and Refurbishment (Backed by OEM)



LHM has the capability to perform the complete range of maintenance and upgrade requirements for fan installations. From the transformer to the motor, through the couplings and bearings to the fan. We have the competence to maintain the entire package.

As the TLT-Turbo Authorised Service Partner you can count on LHM to provide the equipment and engineering backup as the Original Equipment Manufacturer with full technical backup from the technical team in Germany.

LHM will design, construct, supply, install and commission to the OEM standard. Our technicians having gained valuable experience locally have in most cases also been trained in Germany to provide OEM standard backup and service.

Through our parts distribution agreement with TLT, we are able to supply OEM parts to the market, but are also equipped to repair and upgrade all makes of fans.

LHM FLAMEPROOF SERVICES

- LHM is a certified flameproof repairer in terms of IEC Ex
- Special enclosure manufacture and approval
- IP65 dust ignition proof through to Class 1 Div 1 applications

LHM FAN PERFORMANCE TESTING SERVICES

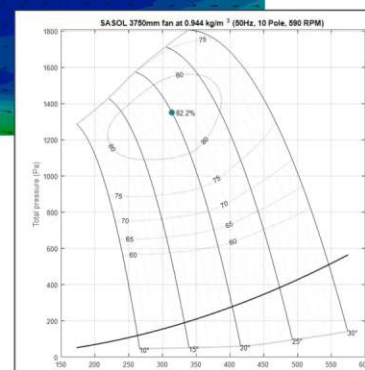
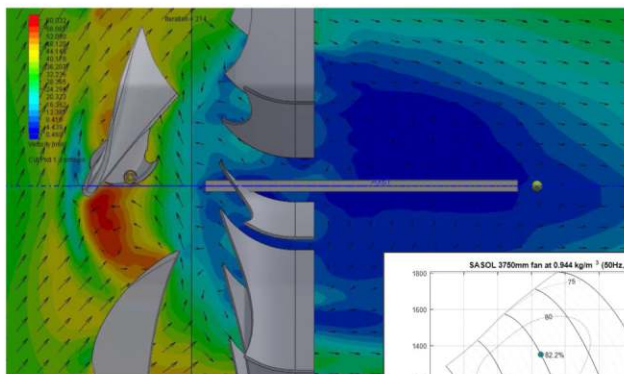
- LHM is a certified Performance testing house for fans
- Approved test columns for Auxiliary fans from 406mm to 1200mm fans
 - Approved sound power performance testing of auxiliary fans
 - Site performance testing
 - Site noise level testing

LHM ENERGY SAVING RETROFIT FAN SERVICE

RETROFITTING CAPACITY

LHM are able to study your existing installation and through good fan engineering locally and in Germany offer improved replacements. Our unique ability to re-manufacture your electric motor to best suit the improved fan design, will ensure the best system efficiency, rather than evaluating the fan in isolation of the motor.

The offering will be accompanied by a lifecycle payback model to ensure that the capital spend is justified.





LHM Fan Service

Original Equipment Manufacturer

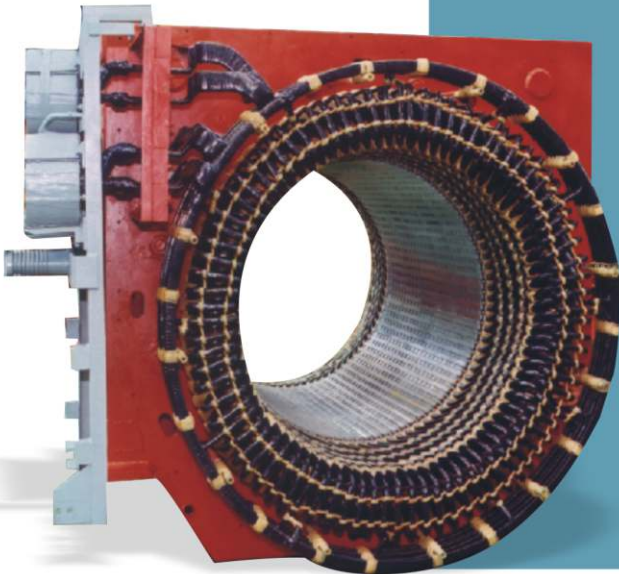
What does it mean?

- Constant Quality
- Long Durability
- Warranty backing
- High availability of your fan, ensuring that you experience less unscheduled shuts and longer service intervals.
- Peace of mind in that the original equipment parts are running in your plant.
- Fan equipment audits and performance testing.

Reverse Engineering of outdated or inefficient fans by a fan OEM sees the replacement of the original fan with improved fan equipment always better than the original and to best fan engineering principals.

ROTATING MACHINES

Africa's leading private Electrical & Mechanical Service and Specialised Manufacture Facility



This facility boasts modern, state-of-the-art equipment for insulation assessment and mechanical repairs across a full range of machines, from fractional KW up to 63MW. Computerised data checking and coil winding is used throughout.

Our vacuum pressure impregnation systems include thixotropic epoxy resin for low voltage machines, 4475 polyester resin for all direct current armatures and an epoxy resin system for high voltage machines.

Our test bays can handle small motors up to 1MW, and large machines up to 21,3MW and 13.2 kV. Load testing up to 2MW is now available. Double-hook cranes up to 100 tons and balancing machines up to 34 tons ensure safe handling. High speed balancing up to 3000 rpm is also available.

We also offer on-site condition monitoring, machine installation, design and manufacture of AC or DC machines to customer specification. We also offer full in-house 3D CAD design capabilities.



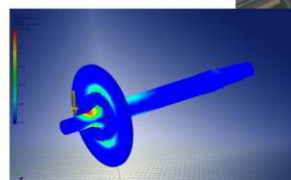
TYPES OF MOTORS

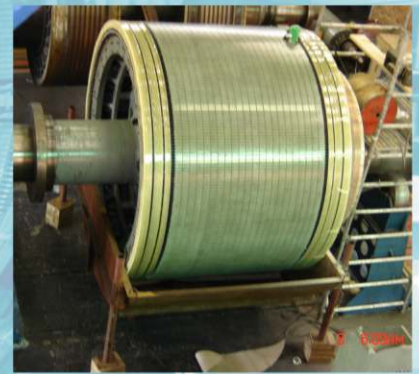
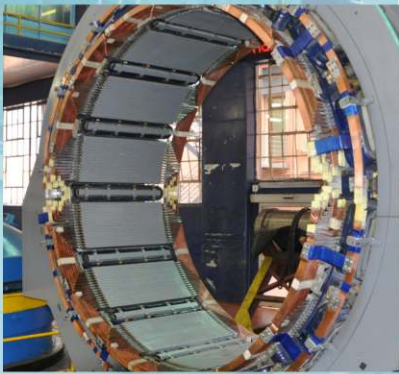
- MEDIUM VOLTAGE MOTORS
- LOW VOLTAGE MOTORS
- INDUSTRIAL DC MACHINES
- LARGE DC MACHINES
- DC TRACTION
- AC TRACTION
- ALTERNATORS



SPECIALIZED TRACTION DIVISION

- Specialized Design & Manufacture
- Vibration Analysis
- Balancing
- Specialized fault finding
- Root-cause Analysis
- Load Testing
- Commutator Manufacture and Repair
- Specially Formulated Resins
- Motor Condition Assessment Center





Our Technical Department offers full Cad assisted design.

Rotating Machine Services

- Total Electrical Asset Management (TEAM)
- On-site Maintenance & Assessment
- 24 Hour Service
- Installations
- Commissioning
- Vibration Analysis and Visual Imaging
- Diagnostics & Condition Monitoring
- Balancing
- Fault Finding
- Laser Alignment
- De-magnetising / De-gaussing
- Advanced Core Testing (ELCID)
- Partial Discharge Analysis
- Live Commutator Skimming
- Training

TRANSFORMERS

Africa's leading private Electrical & Mechanical Service and Specialised Manufacture Facility

The transformer repair facility is fully equipped to repair or refurbish transformers ranging from 10kVA through to 200MVA at 275kV.

The facility is equipped with:

- 160 ton overhead crane capacity.
- Three automated vacuum ovens incorporating nitrogen injection and oil spraying processing, thereby ensuring the active parts are dried to the highest level before tanking.
- Test bay facility up to 350kV and 200Hz, capable of performing most tests in accordance to the IEC and BS standards.
- Pressurised electrical assembly facility.
- MV impulse test facility.

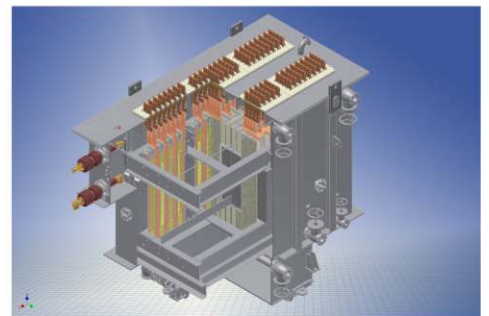
LHMarthinusen specializes in the repair and manufacture of furnace, rectifier, dry type and distribution transformers, as well as the complete repair of underground and surface miniature substations.

The company also designs and manufactures special transformers up to 80MVA and 275kV to customer's specifications. We also offer full in-house 3D CAD design capabilities.



TYPES OF TRANSFORMERS

- POWER
- DISTRIBUTION
- RECTIFIERS
- FURNACE
- GENERATION
- AIR COOLED
- MINI-SUB



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Transformer Services

- 24 Hour Service
- Training
- Transformer Oil Purification
- Fault Finding
- State of the Art Equipment
- Advanced Vacuum Ovens
- Impulse Testing to 1 MV



MANUFACTURING

Africa's leading private Electrical & Mechanical Service and Specialised Manufacture Facility

■ COIL MANUFACTURING

We manufacture coils for all DC, traction, low voltage and high voltage rotating electrical machines, and coils for transformers of all types to IEC specifications.

Transformer coils are wound on horizontal and vertical winding machines using manila or specially developed oil absorbent arimid paper, which is a Class 155 material. Rotating machine coils are looped, machine taped and formed in both resin-lean and resin-rich processes. Comprehensive tests include inter-turn, main wall insulation and surge-pulse withstand-tests to IEC specifications.

■ WIRE DRAWING AND COVERING

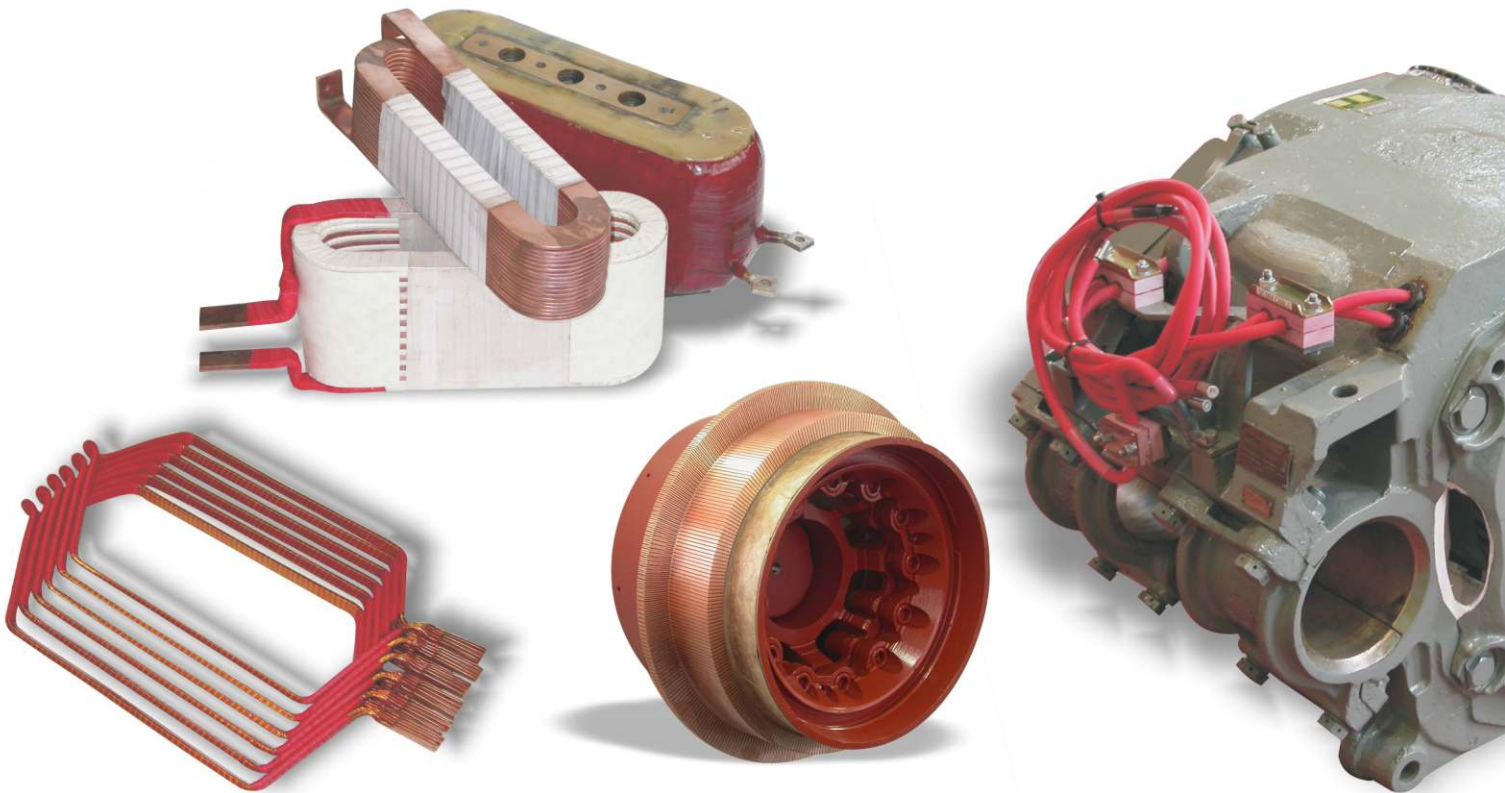
Our wire drawing and covering facility uses pure, high-conductivity copper to give us very short lead times for conductor manufacturing. Conductors for medium voltage applications are covered with mica folium tapes. Transformer conductors are covered with either conventional manila paper, or with oil absorbent arimid tape developed by LH Marthinusen and Du Pont specifically for higher operating temperatures.

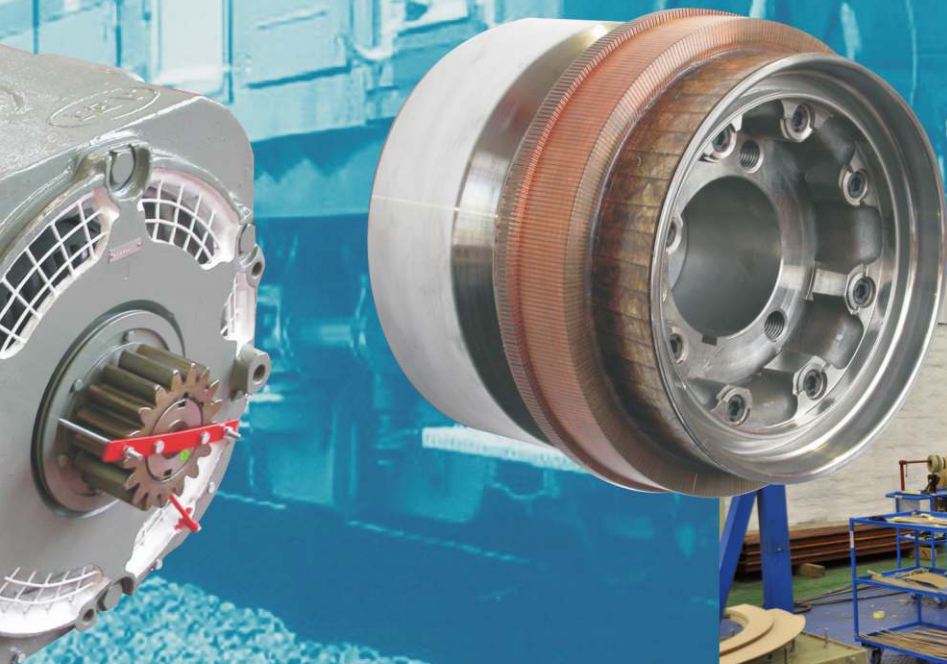
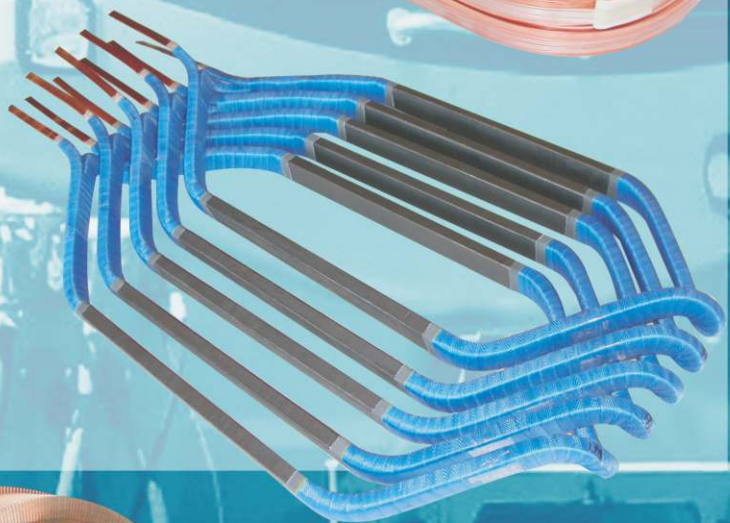
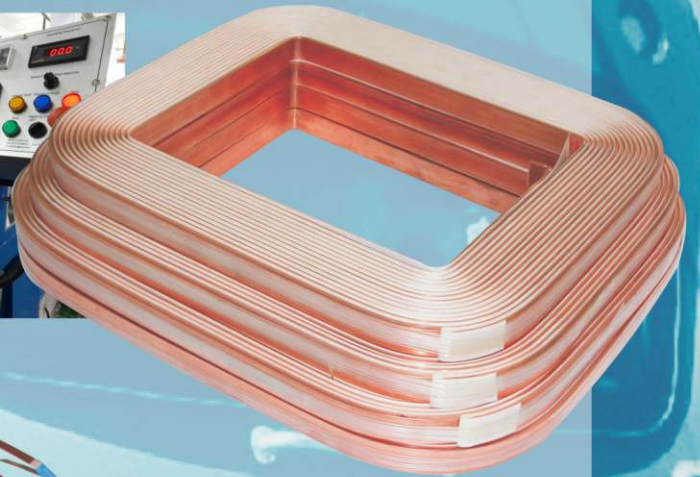
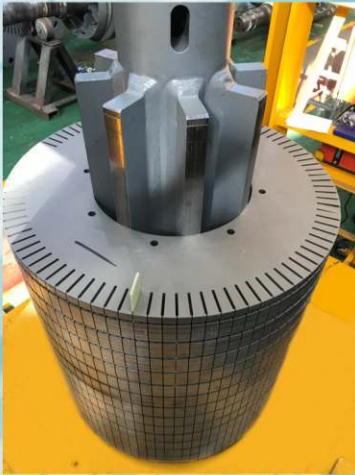
■ LAMINATION MANUFACTURE

We are equipped with a Trumpf® Trumatic dual-head laser cutter, De-coiler and Cut to length line and Spot welder (end/vent plates). We manufacture laminations for Stator, Rotor, Armature and Segmental laminations as well as Pole shoes (Max diameter - 1.2m).

■ COMMUTATORS

LHM is an approved supplier to Transnet for a wide range of commutators for traction and auxilliary motor applications. Services include the manufacture of complete new commutators, rebuilds with new segment packs and existing steelwork, partial repairs including segment and/or riser replacement and replacement of mica cones and/or inter-segment mica. Work is carried out in accordance with stringent Transnet specifications. Other commutators and sliprings for mining and industrial applications are also manufactured.





ENGINEERING SERVICES

Africa's leading private Electrical & Mechanical Service and Specialised Manufacture Facility

ENGINEERING SERVICES

Our Transformer Engineering Services team is fully equipped to perform a wide range of on-site services, from condition monitoring through to complete refurbishment, covering anything from individual transformers to complete substation equipment. This team specializes in condition assessment, life extension, fault finding, transformer oil testing and purification, erection and commissioning of transformers and general onsite maintenance and assessment - support by a dedicated but independent oil and insulation assessment laboratory.

Equally impressive dedicated in-house or on-site capabilities exist for the Rotating Machines Engineering Services team, with advanced Partial Discharge Insulation and Tan-Delta measurement and analysis. Advanced machine condition assessment, as well as life-assessment and extension services compliment the traditional services such as vibration measurement and diagnostics, commissioning, alignment and general on-site maintenance.

LHM FAN SERVICES

TLT axial and radial fans are found in power plants, steel and cement industries and in chemical production facilities. In TLT fans have been extensively used in mining, for main ventilation, boosting, bulk air cooling and in auxiliary applications. These products can withstand the most extreme and challenging environments.

TLT's extensive product portfolio means that we can offer the perfect fan for every application and can back it up with first class service once in operation. We provide our customers with a wide range of tailor made solutions. In every application we will test the situation, preferring to think laterally and promoting the concept of brainstorming with the customer and our engineers to find the optimal solution. This innovative approach sees a partnership with the customer, looking the best fit fan, for the best efficiency coupled with the best life cycle cost.



Emergency breakdown repairs are a standard service for our Engineering Services Division

OFF-SHORE & MARINE

As an accredited service agent for AvK and STAMFORD alternators, we offer the full spectrum of maintenance services for the Off-Shore and Marine industry to OEM specifications to all makes of equipment. Our field engineers are active on the African West Coast and provide service to all the major international marine and off-shore players.

We offer a 24-hour service for the in-voyage repair of refrigeration and HVAC equipment, automation & control instrumentation, navigational equipment and secondary injection testing and calibration of breakers and relays.

We are an accredited member of ISES, the international Ship Electrical Engineering Services association.





LHM SITE SERVICES

Site Services Provided by experienced crews

- 3 monthly legal inspections by fan expert technicians
- Analysis and condition monitoring
- Balancing to ISO 1940
- Preventative maintenance and lubrication
- Advice on the best lubrication for the temperature and service intervals.
- Experienced technicians looking for deterioration signs which can be arrested saving cost in the long run.
- Specialist Non-Destructive-Testing NDT specifically looking for fatigue damage.
- Wear Assessment ensure that in high wear applications that the equipment is protected and safe (risk mitigation – as the fans wear their strength deteriorates).
- Corrosion damage assessments and rectification proposals to extend the plant life.

On-Site Services

TRANSFORMERS

- Oil Sampling
- Oil Purification
- Testing
- General Repair
- Installation & Commissioning

ELECTRIC MOTORS

- Diagnosis
- Alignment
- Testing
- Winding Cleaning
- Brush Gear Setting
- General Repair
- Installation & Start-Up

INDUSTRIAL FANS

- Fan Vibration Analysis
- Fault Diagnosis
- Alignment
- General Repair
- Installation & Start-Up
- Impeller blade changes

FLUIDEX

Africa's leading private Electrical & Mechanical Service and Specialised Manufacture Facility

The Fluidex oil regeneration facility at LHMarthinusen is fully operational and is providing the intended support service to the transformer workshops and field service team as well as the industry at large.

The facility comprises a fully automated, PLC controlled, 60 column regeneration plant, capable of producing 400,000 litres of oil per month, 2 dedicated oil purification machines and a SCADA / PLC controlled tank farm, which links all the equipment (and laboratory) into the control process. For instance, all receipts and deliveries of oil are automatically recorded and linked to a test report number, in order to ensure that the laboratory has performed the necessary tests prior to receipt / despatch. Fluidex owns two 30kl stainless steel road tankers, which facilitate the collection and delivery of oil.

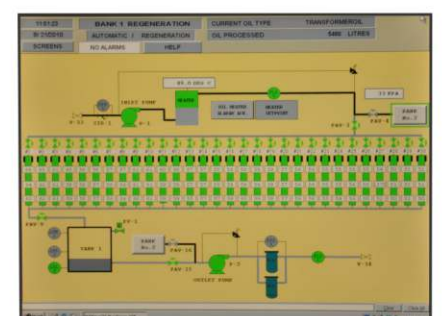
Fluidex offers its services to the open market, ranging from oil regeneration (<20ppm PCB); oil regeneration (zero PCB); new oil supply; and oil analysis.

The tank farm control system has built-in controls for safety-, environmental- and quality aspects of the business, and as such has been granted an EIA approval and Section 20 waste permit by the relevant authorities. More recently, the Fluidex facility has been subjected to various audits and now boasts SANS 555 accreditation.



THE FULLY EQUIPPED LABORATORY CAN PERFORM ALL THE TRANSFORMER DIAGNOSTIC TESTS AS FOLLOWS:

- MOISTURE
- DIELECTRIC STRENGTH
- ACIDITY
- DGA
- FURANICS
- OIL QUALITY TESTS-TO DETERMINE COMPLIANCE WITH SANS 555
- TAN DELTA
- VISCOSITY
- IFT
- OXIDATION STABILITY
- PCB
- CORROSIVE SULPHUR
- FTIR
- SILICONE CONTAMINATION







SCHOOL OF ENGINEERING AND MAINTENANCE

Structured courses at LHMarthinusen (or a venue of choice), presenting the extensive range of knowledge, experience and expertise of LHMarthinusen in a form that will provide maximum benefit to our customers.

■ FOCUSING ON

• AC Machines • DC Machines • Transformers • Testing • Condition Monitoring • Lifetime Extension / Optimisation • Asset Management • Repair and Re-manufacture • Design (Rotating Machines and Transformers) • Root Cause Failure Analysis: Transformers and Rotating Machines • Vibration of Rotating Electrical Machines • Variable Speed Drives and Motors • Materials and Insulation • Failure Mechanisms of Electrical Machines (Transformers and Rotating Electrical Machines)

■ TAILOR CUSTOMER-SPECIFIC COURSES CAN BE ACCOMMODATED ON REQUEST

• Repair and Re-manufacture • Design (Rotating Machines and Transformers) • Root Cause Failure Analysis: Transformers and Rotating Machines • Vibration of Rotating Electrical Machines • Variable Speed Drives and Motors • Materials and Insulation • Failure Mechanisms of Electrical Machines (Transformers and Rotating Electrical Machines)



LHMarthinusen
SCHOOL OF ENGINEERING AND MAINTENANCE