



**Proudly
contributing
to the
making of
UJWAL BHARAT**

www.erda.org

ERDA – Leading India Towards Electrical Independence

Electrical Research and Development Association (ERDA), a not-for-profit professional organisation, registered under societies act and Public Trust formed under the Charity Commissioner of Maharashtra, was promoted by the electrical industries and some utilities with support from Government of India through CSIR and grant given by the Government of Gujarat. ERDA was established at Vadodara on the land provided by Gujarat Government free of cost.

Portfolio of Services

- Testing & Evaluation
- Field Services
- Research & Development and Expert Services

Highlights

- 24 state-of-the-art laboratories
- Project funded by Government of Gujarat and Central Government of India
- Serving to more than 10,000 customers
- Evaluation of more than 141 nos. Electrical Products under BIS Certification
- More than 60 technologies developed with commercialization of 24 technologies
- More than 300 sponsored R&D projects completed
- Holding or applied for more than 15 patents for innovative product technologies

Accreditation & Recognitions

International Recognition:

- INTERTEK (ASTA), UK
- ADWEA/DEWA/SEWA/DCRP Oman
- TNB, Malaysia

National Accreditation:

- National Accreditation Board for Testing & Calibration Laboratories (NABL)
- Bureau of Indian Standards (BIS)
- Ministry of New and Renewable Energy (MNRE)
- Bureau of Energy Efficiency (BEE)
- National Accreditation Board for Certification Bodies (NABCB)
- Integrated Headquarters, Ministry of Defence (Navy) for EMI/EMC Testing
- Central Boiler Board (CBB), Government of India
- Petroleum and Explosive Safety Organisation (PESO), Nagpur
- Information Security Management System (ISO/IEC 27001:2013)
- Scientific and Industrial Research Organisation (SIRO) recognized by Government of India

State Accreditation:

- Electrical Contractors Licence, Government of Gujarat
- Electricity Regulatory Commission of Gujarat and Madhya Pradesh (GERC and MPERC)
- Energy Development Agencies of Gujarat and Uttarakhand (GEDA and UREDA)

Memorandum of Understanding (MOU) with:

- Central Board of Irrigation and Power (CBIP) in the area of Field Services
- Gujarat Industries Power Company Ltd. (GIPCL) in the area of Energy Audit
- Energy Efficiency Services Limited (EESL) in the strategic area of Energy Efficiency



Nationwide spread of Laboratories

- ERDA (Head Office) – Vadodara, Gujarat
- ERDA (West) – Rabale, Navi Mumbai, Maharashtra
- ERDA (North) – Gurgaon, Haryana
- ERDA (South) – Rajahmundry, Andhra Pradesh

ERDA's contribution in the making of UJWAL BHARAT through its support to:

- **"Make in India"** by Indigenised Defence Equipment Development
- **"UJALA"** by Testing of LED Lamps and Luminaires
- **"24 x 7 Power for All"** by Evaluation of Transmission & Distribution Components at ERDA
- **"Quality Control"** by Supporting in implementation of Electrical Transformer (QC) order 2015 by DHI
- **"Environment Friendly Power"** by Evaluation of Solar Lighting and Pumping Systems
- **"UDAY"** and **"SAUBHAGYA"** by Improving operational efficiency of DISCOMs
- **"Smart Grid"** by Smart Meter Testing
- **"SME Development"** by Product Design & Analytical Evaluation of various products for SMEs



Type 'C' Goniophotometric Laboratory



Testing and Evaluation

Key Test Capabilities at a Glance

- On-line short circuit test facilities: 120kA, 575V – 1 no. & 50 kA, 550 V – 2 nos.
- Impulse Generator: 1600kVp, 80kJ – 2 nos. & 800kVp, 40kJ – 1 no.
- High voltage Transformer: 700kVrms & 600 kVrms
- High Voltage Partial Discharge test facility: 600kV
- IEC:61850 Communication Protocol testing facility
- 10 meter semi Anechoic Chamber having shielding effectiveness from 10kHz to 40GHz & turn table capacity up to 3000kg
- Type C Goniophotometric Laboratory for Lighting Testing with capacity of sample size of 1600mm & 50kg weight
- Temperature-rise test facilities up to 20kA
- Time-current characteristics up to 40kA
- Electrical endurance test up to 2.5kA at 690V
- Mechanical endurance test for HT circuit breaker up to 145kV
- IP 5X & 6X test with capacity of chamber (6.8m x 5.8m x 5.0m) and weight 40 Tonnes
- Energy Meter test facility up to 200A using 0.01 class reference energy meter
- Current Transformer facility up to 3200A, 0.05 accuracy class for in-house as well as on-site
- Voltage Transformer testing / calibration facility up to 220kV voltage class / 0.1 accuracy class for In-house & up to 33kV, 0.2 accuracy class at site
- Cable test facilities for type test, acceptance test, routine test upto 66kV as well as special test for
 - 1) Non Electrical test and capability
 - 2) Flammability and Special test capability
 - 3) Electrical Test capability
- Transmission & Distribution hardware testing for Siesmic & Damper tests
- Transformer oil testing for DGA & Furan Analysis
- Motors & pump testing up to 150HP (including flameproof testing)



High Voltage Partial Discharge Laboratory



Field Services

Our field technical services include Residual Life Assessment of Power & Process Plants – for Electrical as well as Mechanical Equipment, Condition Monitoring Services, Energy Management and Audits, Third Party Inspection (TPI) Services and Power System Network studies as Third Party Independent Evaluation Agency for Ministry of Power (MoP), Rural Electrification Corporation Ltd. (REC), and DISCOMs.

Portfolio of Field Services

- Electrical Diagnostics (Completed more than 350 Transformers, 3000 Motors & 75 Generators)
- Mechanical Diagnostics (Completed more than 150 Boilers and 75 Turbines upto 500MW)
- Energy Audits & PG Testing (More than 250 Energy Audits including 150 Power Generating Units upto 660MW)
- Onsite Testing of Transformers (Tested more than 8000 Distribution Transformers and 300 Power Transformer at the manufacturer premises)
- Onsite Combined CT/PT and Energy Meter testing by Primary or Secondary Injection Method
- Working as Third Party Inspection Agency (TPIA) & Project Management Agency (PMA) under Government Schemes like DDUGJY, IPDS for various utilities



Online Partial Discharge Testing



Research & Development and Expert Services

The focus of the R&D vertical is undertaking Research Projects and providing Expert Services in five technology missions,

- Advanced Materials (with the expert services for Failure Analysis)
- Renewable Energy
- Diagnostics
- Power System & Smart Grid (with the expert services for Power Quality Measurements)
- New Product Technologies

Facilities

Engineering Analysis Centre

Equipped with state-of-the-art simulation and modelling packages based on finite element methods for Electromagnetic, Structural, Thermal, Dynamical and coupled analysis such as Solid Works, Ansys, CFX, Fluent, Maxwell, RMXprt, CFTurbo/ Pumplinx.

Power Electronic Lab

Lab is equipped with simulation and modelling tools based on MATLAB, Simulink. Real time simulations and rapid prototyping of any power electronic system can be designed with ease through DSpace Microlab box. The lab has access to circuit simulation and debugging, circuit schematic development and PCB layout generation with ORCAD PSPICE. For programming and software development for various microcontrollers and digital signal processors can be done with the help of Keil μ vision software. Facility also exists for simulating solar energy using PV Simulator for various power electronics projects.

Power System Study and Power Quality Lab

With leading-edge technologies and software, coupled with practical experience, we have provided services in the area of power system studies like load flow, short circuit, relay coordination, transient stability analysis etc. for various utilities and private companies. This lab is equipped with softwares like ETAP, EMTP-RV and Mi-Power to provide services in power system studies. Lab is also equipped with IEC61000-4-30 compliant class-A power analyzer for power quality measurement and its analysis.

Material Research Lab

ERDA is leveraging nano technology to develop new class of nano-dielectrics, contact materials and novel performance enhancing coatings for applications in thermal, hydro and photovoltaic power plant components. Facilities exist for carrying out nano synthesis using high shear rate planetary ball milling and molecular self-assembly using chemical techniques such as sol gel and hydro thermal synthesis.

Material Characterization Lab

Wide range of materials characterization techniques for various properties such as electrical, mechanical, thermal, magnetic, environmental, etc., are available for evaluation of metallic, polymeric, ceramic, composite materials using optical microscopy, SEM, XRD, EDS, FTIR, etc.

Pilot Plant Facilities

Laboratory scale processing facilities to develop and synthesize tailor made materials are available. More than a dozen advanced materials having enhanced performance have been developed. Advanced facilities available including Plasticoder, Extruder, Injection Moulding Machine etc.



ERDA Innovations

1. Anti-dust, Self-Cleaning Nano Crystalline Coating for Solar Panels

Innovation: The coating developed helps to reduce dust accumulation on solar panels and thereby reduces cleaning frequency and increases efficiency of solar PV Panels.

Benefits:

- Saving in expenditure for cleaning of dust from solar panels
- Reduction in power generation loss



2. Nano-Silver Contacts

Innovation: A Silver nano-carbon contacts developed using novel technique improves performance of low voltage switchgear and also reduces the cost.

Benefits:

- Higher resistance to arc-erosion & higher anti-weldability and hence, more life and reliability of switchgears
- Saving in silver cost as the requirement of total contact size is less by 20%



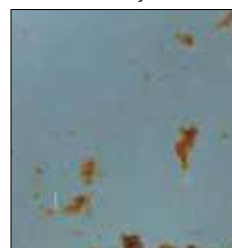
3. Corrosion Resistant Paint

Innovation: Development of a paint using conventional paint and nano-carbon to improve performance of conventional paint against atmospheric corrosion for structural applications.

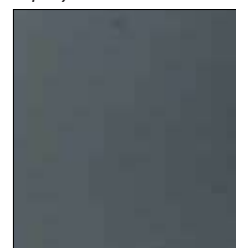
Benefits:

- Saving in expenditure on painting
- Longer service life of structures

After 500 hrs Salt Spray Test



'C' Grade Paint as Per ASTM B 895



'A' Grade Paint as Per ASTM B 895

4. Charge Controller for Electric Vehicle

Innovation: Development of charge controller for charging Electric vehicle by the use of renewable energy.

Benefits:

- Use of micro-grid model for charging electric vehicles
- Reducing grid dependency



Charging Station Installed at ERDA



Golf Cart Charged Through Developed Charging Station

5. IE4 Induction Motor

Innovation: Design and development of a 2.2 kW IE4 induction motor which can lead to significant reductions in energy consumption and also reduce the environmental impact.

Benefits:

- Increased Efficiency of 89.5% for 2.2 kW induction motor
- Effective fan design for better cooling
- Payback period of 140 days for replacement with IE2 class motor at 8 hours of daily run





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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