



CSIR-National Physical Laboratory is one of the first National laboratories set-up under CSIR. Its foundation stone was laid by the first Prime Minister of India, late Pandit Jawaharlal Nehru on 4th January 1947. Late Dr. K.S. Krishnan, FRS, was the first Director of the laboratory. The main building was opened by the then Deputy Prime Minister, late Sardar Vallabhbhai Patel on 21st January 1950.

### **CHARTER**

The main objectives of NPL have been a) to establish, maintain and improve National Standards of Measurements and to realize the Units based on International system, b) to identify and conduct research in areas of Physics, which are most appropriate to the needs of the Nation and for the advancement of the field, c) to assist industries, national and other agencies in their developmental tasks by precision measurements, calibration, development of devices, processes and other allied problems related to physics and d) to keep itself informed of and study critically the status of physics.

### **CUSTODIAN OF NATIONAL STANDARDS OF MEASUREMENT**

National Physical Laboratory has the responsibility of realizing the units of physical measurements based on the International System (SI units) under the subordinate legislations of Weights & Measures Act 1956 (reissued in 1988 under the

1976 Act). NPL also has the statutory obligation to establish, maintain and update the national standards of measurement & calibration facilities for different parameters. The seven SI base units are metre, kilogram, second, Kelvin, Ampere, candela, mole and the SI supplementary units are radian (rad) & steradian (sr). The other derived units for physical measurement, that the laboratory currently maintains, are: force, pressure, vacuum, luminous flux, sound pressure, ultrasonic power; ac voltage; current and power; low frequency voltage; impedance and power; high frequency voltage; attenuation and noise; microwave power and frequency.

### **NATIONAL APEX BODY FOR CALIBRATION**

The laboratory provides apex level calibration services in the country, offering National Accreditation Board for Testing and Calibration (NABL), the national accreditation body in the country, (i) its qualified assessors as needed for establishing best measurement capability of the applicant laboratory; (ii) its technical input to enable NABL to decide the suitability of the applicant laboratory for accreditation, and (iii) its faculty to train testing laboratories for estimation of uncertainty in their measurements.

Besides, the laboratory is engaged in development of Certified Reference Materials to ensure high quality measurement and traceability of





analytical measurements to national/international measurement system (SI unit) in order to fulfill the mandatory requirement of quality systems (ISO/IEC-17025) and of the NABL.

### MAJOR ACHIEVEMENTS

National Physical Laboratory has to its credit innumerable number of achievements, a few major achievements are: a) Introduction of Metric system of measurements in India, b) Development of Indelible ink-the indelible contribution to Indian democracy, c) Estimation of methane gas emission from India-a nationwide measurement campaign giving countrywide advantage in environment protection, d) Setting up a pilot plant for development of Electronic Components (ferrites), which led to setting up a public sector Unit called Central Electronics Ltd. (CEL) in 1973, e) Development of know-how of the Electrostatic Photocopying machine using indigenous materials and f) Indian Standard Time.

### THE MAJOR THRUST AREAS OF R & D

#### (A) Metrology

- ✓ Calibration & Testing Services to Industries
- ✓ Electrical & Electronic Standards
- ✓ Physico - Mechanical Standards
- ✓ Metrology in Chemistry
- ✓ Nano Metrology
- ✓ Primary Standards
- ✓ Realization of SI units

#### (B) Materials

- Light weight, high strength metallic materials
- Bulk Nanometallic and Nanocomposite materials
- Carbon & Carbon composites

- Plasma Processed Materials
- Organic and Inorganic Photovoltaics
- Luminescent Materials
- Organic Light Emitting Diodes
- Conduction Polymers & Composites
- Superconducting materials and Superconductivity
- Fuel cells
- Sensors (based on Bio, Gas, Chemicals, MEMS)
- Advanced Characterization Techniques

#### (C) Radio and Atmospheric Sciences

- Ionosphere & Troposphere
- Atmospheric Environment
- Global Climate Change
- Antarctica and Arctic studies
- Radio-Propagation
- Communications (Fixed, mobile and marine)

### ORGANIZATION AND MANAGEMENT

The laboratory has structured its total activities under seven scientific decision units. These are: (i) Physics of Energy Harvesting, (ii) Materials Physics and Engineering, (iii) Radio and Atmospheric Sciences, (iv) Time and Frequency Standards, (v) Apex Level Standards and Industrial Metrology, (vi) Quantum Phenomena and Applications (vii) Sophisticated and Analytical Instruments.

In addition, it has set-up eight support units for its organization and management. These are (i) Administration (ii) Finance & Accounts, (iii) Stores & Purchase, (iv) Works and Services, (v) Workshop and Cryogenics, (vi) Computation & Network Facility, (vii) Directorate, (viii) Intellectual Property and Human Resource.