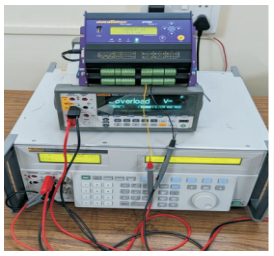
सत्यमेव जयते
Government of India

National Facility for Precise Hydrometric Testing, Calibration & Certification

Central Water and Power Research Station, Pune

The **Central Water and Power Research Station (CWPRS),** Pune, established in 1916, is India's premier National Hydraulic Research Institute under the Ministry of Jal Shakti, Government of India. With over a century of excellence, CWPRS plays a pivotal role in advancing research and development in hydraulics and allied sciences, ensuring the design, safety and sustainability of the nation's critical water infrastructure.

Its expertise and cutting edge research spans river, reservoir, coastal and offshore engineering, system modelling, foundations, applied earth sciences and instrumentation, integrating physical and numerical modelling with field and laboratory investigations and recognised as regional ESCAP laboratory and certified under ISO 9001:2015,

The state-of-the-art TCCF facilities at CWPRS are transforming water resources management by providing accurate, reliable and real-time hydrometric data. Designed to meet the growing demand for precision water information, TCCF empowers scientists, engineers and water managers to address complex hydrological and climate challenges with exceptional technical rigor, while offering advanced testing and calibration services for a wide range of hydrometric monitoring instruments.

List of Testing and Calibration Facility

1. Meterological Sensors Testing and Calibration Laboratory
2. Ingress Protection Testing Laboratory
3. Current Meter Calibration Laboratory
4. Groundwater Level Sensor Testing and Calibration Laboratory
5. Water Quality Sensors Testing and Calibration Facility
6. Data Logger Calibration Laboratory
7. Telemetry Calibration Laboratory
8. Hydraulic Machinery Cavitation and Instrumentation Laboratory
9. Surface Water Level Sensors Demonstration Laboratory

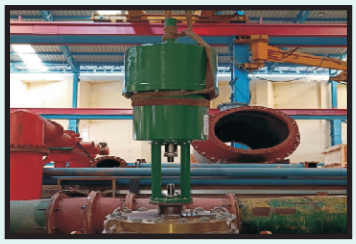
Meterological

Current Meter

Ingress Protection

Groundwater Level Sensor

HMC



Referrence Hydrometric Station at CW&PRS

Automatic Weather Station

Groundwater Level Sensor/ Piezometer

Surface water Level Sensors Demonstration Facility

Meteorological Sensor Calibration

India's First state of art meteorological calibration facility.....

The Meteorological Sensor Calibration Laboratory stands as a beacon of precision and innovation — a facility that truly redefines the art of accuracy in environmental monitoring. Crafted in meticulous alignment with ISO 17025:2017, this dedicated laboratory complex offers world-class calibration and testing excellence across a diverse spectrum of meteorological sensors

Why Choose us?

- ISO 17025:2017 Complied - Global standards of excellence
- NIST/NPL Traceable Calibration - Benchmark, accuracy you can trust upon
- Fully Automated Processes - Faster, smarter, and error-free
- Customized training on calibration for clients

What We Calibrate

- Air Temperature Sensor
- Combined Air Temperature and Relative Humidity Sensor
- Atmospheric Pressure Sensor
- Tipping Bucket Rain gauge

Up Coming Calibration Facility

- Wind speed & direction Sensor
- Solar radiation Sensor

Unique features

- Expeditious and auto calibration
- Simultaneous calibration upto up to 45 sensors
- On field performance testing of weather station
- Providing controlled, repeatable environment for testing of oversized air temperature and relative humidity sensor
- Cyclic test for sensor survivability
- Smart Software Advantage




Calibration parameters of Hydro-meteorological Sensors', Measurement Range and Accuracy

Parameter	Range	Resolution	Reference Standard and Measurement Accuracy	No. of Sensors Per Session
Rain fall intensity	(25 to 775) mm/hr	0.1, 0.2, 0.5, 1 mm/hr	Load cell (0.001 gm)	2
Air temperature In liquid bath (Temperature stability in bath is 0.001°C)	-40°C to 60°C	0.001°C	PT100 Sensor(0.01°C)	45
Air temperature in compact chamber	-5°C to 60°C	0.001°C	PT100 Sensor(0.01°C)	7
Relative humidity in compact chamber	RH 5% to 95% RH	0.01% RH	Dew point hygrometer better then 0.7% RH (Derived accuracy) Dew point accuracy 0.15°C	7
Atmospheric pressure in compact chamber	550 to 1100 hPa	0.001 hPa	Oscillating U tube based Digital Barometer (0.10 hPa)	15




Ingress Protection (IP XX) Testing Laboratory

NABL accredited Ingress Protection (IP XX) Testing Laboratory.....

NABL-accredited Ingress Protection (IP XX) Testing Laboratory sets the benchmark for precision and reliability in evaluating the degree of protection offered by electrical, electronic, hydro-meteorological instruments and electric motors to ingress of dust and water while in operation. Equipped to simulate the toughest environmental conditions, that ensures the sample or instrument meet the highest global standards for protection against dust and water ingress. The laboratory assesses resilience against Ingress of :

- Solid objects such as dust particles of various sizes
- Water (Ambient / hot and pressurised)

By simulating challenging environmental conditions, the IPXX Laboratory at CWPRS ensures that instruments or its enclosures meet international Ingress Protection standards (IEC/NEMA/ISO). The Lab. helps in providing durable, safe and reliable instruments or product by domestic manufactures boosting the Government's Make in India initiative.

Solid object testing (IP 1X - 4X) and Dust chamber testing (IP 5X & 6X) facilities

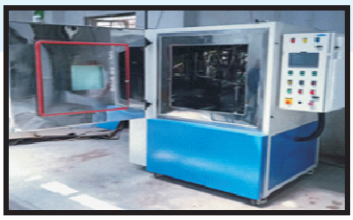
- The size of dust chamber is 3m x 3m x 3m and to test the sample of large size with weight of 1 ton

Water testing facilities (IP X1-IP X8)

- To test the sample size of 2m x 2m x 2m and up to the weight of 1 ton
- Automatic test set up for all IP numbers.

IP X9K Facility for hot & pressurized water Environment

- Chamber size of 1m x 1m x 1m and to test the sample of weight up to 100 kg
- For testing water jet spray with temperature of 80 degree centigrade & pressure at 100 bars.



High voltage facilities for post IP XX acceptance test

- Dielectric test system: AC/DC 0-100 kV
- Lightning Impulse: 0-200 kV & 20 kJ
- High Voltage Insulation Tester: 15 kV

IP TEST PROCEDURES:

- ✓ IS/IEC 60529
- ✓ IS/IEC 60034-5
- ✓ IS 10322(Part1)
- ✓ ISO 20653
- ✓ NEMA 250


National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

INGRESS PROTECTION TESTING LABORATORY, CENTRAL WATER AND POWER RESEARCH STATION

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

KHADAKWASLA, PUNE, MAHARASHTRA, INDIA

in the field of

TESTING

Certificate Number: TC-1742

Issue Date: 24/11/2025 Valid Until: 23/11/2029

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: CENTRAL WATER AND POWER RESEARCH STATION

Signed for and on behalf of NABL

Anita Rani Director

Chakravarthy T. Kannan Chief Executive Officer

Current Meter Calibration Laboratory

Serving the Nation with Precise in Flow Measurement Since 1955....

Nestled within the Central Water and Power Research Station (CWPRS), Pune, the Current Meter Calibration laboratory has, since 1955, stood as a beacon of scientific excellence in hydrometry. For over seven decades, it has ensured precise calibration and performance testing of mechanical, electromagnetic, and acoustic current meters-vital instruments for accurate point-velocity measurement of flowing waters.

Adhering strictly to IS 13371:2014 and ISO 3455:2021 standards, the facility delivers unmatched precision, reliability, and trust, blending a legacy of excellence with modern innovation to safeguard the integrity of water resource management across India.

Sr. No.	Parameters of Calibration / Testing	Range	Accuracy
1	Calibration of rotating type current meters viz. Cup, Propeller, Pigmy cup and Pigmy propeller.	0.01 m/s to 7.5 m/s	• 0.1% in the speed range of 0.01 m/s to 0.099 m/s • 0.05% for the speed range 0.1m/s to 7.5 m/s
2	Performance testing of Electromagnetic, Acoustic Doppler Current profiler (ADCP), Paddle Wheel, Self recording, Direct velocity indicator type current meters and Non contact type current meters.		
3	Performance testing of Non contact type water level Sensor.	0 to 30 m	Less than ±2 mm
4	Drag force evaluation for various size and shapes of water vehicles with add on weights at different direction of flow at various speed of the rating Trolley		

Rating Tank Dimensions: 228 meters Long, 3.66 meters Wide, and 2.13 meters Deep.

Self-propelled, electrically driven rating trolley (carriage) designed for advanced calibration operations.

Equipped with state-of-the-art technology integrating AC servo motors and drives.

Controlled through a Programmable Logic Controller (PLC) ensuring precise speed regulation.

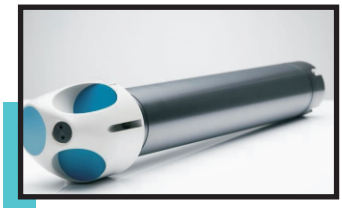
Provides speed control in the range of 0.01 m/s to 7.5 m/s, meeting diverse testing requirements.

Integrated with a PC-based data acquisition and processing system.

Operates on tailor-made, specially developed software for seamless calibration and performance analysis.

Current Meter Rating Trolley (CMRT)

Rear View of CMRT



Groundwater Levels Sensors Testing & Calibration Laboratory

Precision in Sustainable Groundwater Measurement.....

The TCCF-Groundwater level Sensors laboratory stands in forefront of groundwater monitoring and calibration, weaving together precision, innovation and sustainability. Through its advanced facilities and dedicated expertise, CWPRS aimed to transforms the science of groundwater assessment into a cornerstone of sustainable development, guiding the way toward reliability, resilience and responsible stewardship of water resources

Capabilities

Testing & calibration Facility for Groundwater Level Sensor (GWLS/DWLR)

- Pressure Calibration in Laboratory
- Test performed in Laboratory for pressure parameter
  - Linearity test
  - Time lag test
  - Repeatability test
  - Output stability test
  - Long term trending test
- Testing at Laboratory with Environmental Chamber
  - Pressure: 100mbar to 10 bar with ±0.1 % F.S accuracy,
  - Under temperature variation: 0°C to 65°C with ±1°C stability,
  - Under humidity control: 5% to 95% with ±3 percent stability.
- On site Testing & Calibration of pressure parameter

Extending guidance in various aspects

- Groundwater level instrumentation
- Site selection
- Measurement practices
- Installation criteria
- Maintenance criteria
- Testing and calibration practices

Specialization

- Precise Testing & Calibration
- Equipped with an environmental chamber which enable testing of DWLRs in various environmental condition of temperature and humidity
- Extend expertise to strengthen India's Groundwater resources Infrastructure

Testing & Calibration Laboratory

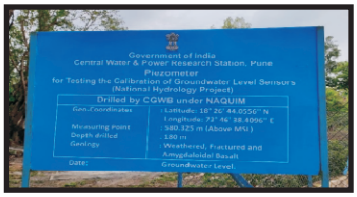
Laboratory Calibrator 0 to 10 bar with 0.01% accuracy

Environmental Chamber 100 mbar to 10 bar

Hand held Calibrator 0 to 20 bar with 0.02% accuracy

Hand held Calibrator 0 to 10 bar with 0.02% accuracy

Model Training Center



Water Quality Sensors Testing & Calibration Laboratory

A State-of-the-Art Facility for Precise Water Quality Sensors Testing & Calibration.....

The Testing and Calibration Facility (TCF) stands as a specialized high-precision hub devoted to safeguarding the accuracy and reliability of water quality sensors. At its core, the Sensor Testing Chamber (STC) provides a controlled environment for precise calibration and rigorous validation, ensuring dependable sensor performance under real-world scenarios.

Unique Features

- Environmental Chamber to simulate different Temperature (+5 to 45 °C) and Humidity (40-90% RH) conditions
- NIST traceable standard calibration solutions are used
- Testing and Calibration without Human intervention using a robotic arm

Sensor Testing Chamber With Automation

Calibration Parameters

Parameter	Range	Resolution	Accuracy
pH	4 to 10	0.01 pH Units	±0.1 pH units within ±10 °C of calibration temperature;±0.2 pH units for entire temperature range
Electrical Conductivity (EC)	0 – 1000 µS/cm	1 µS/cm	±1% of reading or 2 µS/cm
Turbidity	0 to 12.7 NTU	1 NTU	±2% of reading or ±0.5 NTU, whichever is greater
Dissolved Oxygen (DO)	0 to 12 mg/L	0.01 mg/L	±0.1 mg/L or 1% of reading


Inside view of Chamber


Water Quality Monitor

Testing & Calibration Laboratory for Data Logger

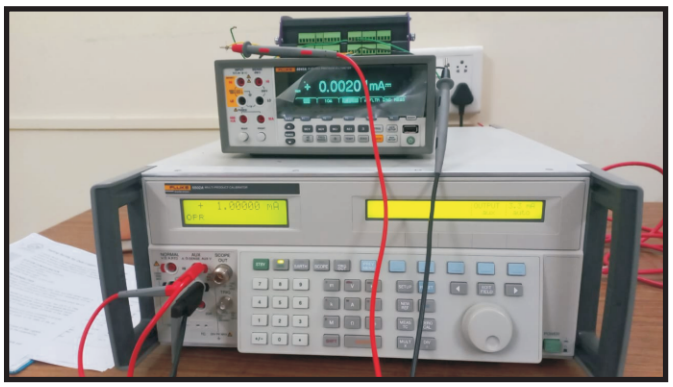
Precision in Every Pulse of Data...

Data Logger Testing & Calibration Facility is established with the aim of ensuring accuracy across India's expanding network of Automatic Weather Stations (AWS), Surface Water Level (SWL) and Ground Water Level (GWL) sites.

This facility safeguards the precision, reliability and trustworthiness of hydrological data vital to national water resource management.The testing procedure at CWPRS primarily ensures the functionality of Data Loggers and verifies the resolution of their Analog to Digital Converters (ADC). The TCCF-Data Logger setup comprises, Multiproduct Calibrator, 6.5 digit precision Multimeter, Reference Data Logger. At the core of the setup is a Reference Data Logger with 18 bit resolution, designed to be fully compatible with all sensor types deployed under the National Hydrology Project (NHP).

Heart of Set-Up

Multiproduct Calibrator for Data Logger



Device Under Test

Impact & Utility

- Accuracy in hydrological measurement
- Reliability of monitoring network
- Confidence in national water data system

Simulates

- Sensor outputs
- Voltage
- Current
- Resistance
- Capacitance

RTD signals

- 50 ppm
- 0.005% accuracy
- 4.5 digit display

Testing & Calibration Laboratory for Telemetry

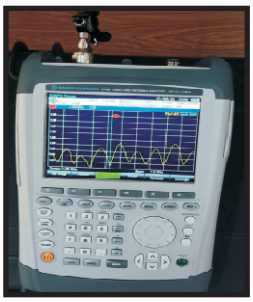
CWPRS Telemetry Facility - Every signal counts, every measurement matters

Telemetry is vital for continuous, real-time hydrological measurements, enabling accurate monitoring, flood forecasting and effective water resource management.Under the National Hydrology Project (NHP), CWPRS Pune has developed a Telemetry Testing and Calibration Facility to ensure reliable data transmission from Automatic Weather Stations (AWS), Surface Water Level (SWL) sites, Ground Water Level (GWL) sites and centralized control rooms across Pan India.

Telemetry Installations for GSM/GPRS communicationmostly include Cable & Antenna. For maximum data reception availability, certain parameters are required to be checked/tested at regular intervals. The most important parameters areVoltage Standing Wave Ratio (VSWR), Impedance, cable faultsetc. For proper & efficient transmission and reception of data, all these most important parameters are to be checked periodically. The need of prior and post installation checking/testing of parameters is of utmost importance. A Cable and Antenna Analyzer having frequency range from 100 KHz to 8 GHz is used as a standard equipment for Laboratory as well as field testing andit is duly calibrated from NABL accredited Laboratory. Services are provided to State and Central agencies, Start-ups, Manufacturers and Suppliers of Radio Frequency Cables and Antennas.

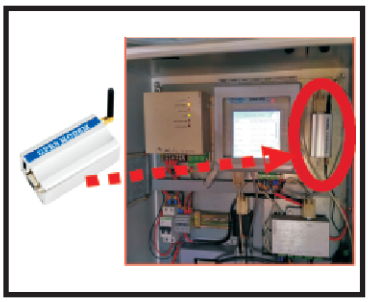
Testing Component	Parameter Used	Testing State
• Testing Component • Cables • Antennas	• VSWR • Impedance • Cable Fault	• Pre Installation • Post Installation • Random Testing

Testing Impedence



Testing VSWR

Testing Cable Fault-DTF



Antenna to be Tested at Site

Table. Telemetry Parameters, their required values, Ranges & Resolution

Sr. No	Parameters	Required value	Measurement Range Available	Resolution
1	Frequency	Depending on Antenna tuning 2G to 5G	100 KHz to 8 GHz	1 Hz
2	VSWR (Voltage Standing Wave Ratio)	<= 2.0	1 to 21	0.01
3	Impedance Matching	50 Ohm	With Imaginary part	>0.01 ohm
4	Distance to fault	No fault	0 to 1500 m	0.01 m

Hydraulic Machinery, Cavitation and Instrumentation Laboratory

Harnessing Hydraulic Power, Safeguarding Water Futures.....

Hydraulic Machinery, Cavitation & Instrumentation (HMCI) Facility is a state-of-the-art Centre of Excellence at CWPRS, dedicated to research, testing, and development in the domain of hydraulic machinery and water conductor systems. The facility plays a pivotal role in addressing critical issues related to hydraulic performance, site testing, flow measurement, and system reliability in water infrastructure projects.

Through a synergistic integration of experimental investigations, advanced instrumentation, numerical modelling, and engineering expertise, HMCI provides comprehensive solutions for performance evaluation, calibration, and optimisation of hydraulic systems. The facility supports enhanced efficiency, operational stability, and long-term sustainability of hydraulic structures and machinery. By translating complex hydraulic phenomena into practical, reliable engineering solutions, HMCI significantly contributes to national water resources development, infrastructure safety, and technological innovation.

Gravimetric Calibration Laboratory

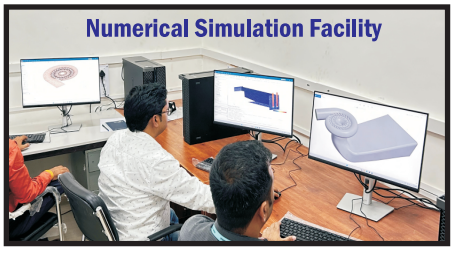
- Conforms to ISO 4185
- For calibration of flow meters, testing of filters and ascertaining valve charecteristics
- Max. line size:1200mm NB
- Extendable up to 3000 mm NB
- Maximum flow rate 7200 m^3/hr
- Calibration ubncertainity: ±0.3%
- Weighing tank 100 tonnes

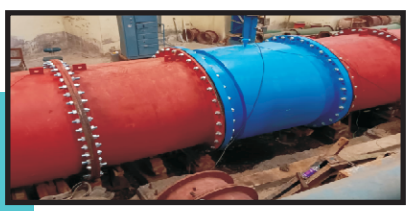
Volumetric Calibration Laboratory

- Conforms to ISO 8316
- For performance testing of submersible pumps, calibration of flow meters,testing of filters, ascertaining valve charecteristics
- Max. line size:250mm NB
- Integrated and submersible pump test rig
- Maximum flow rate 250 m^3/hr
- Calibration ubncertainity: ±0.5%
- Capacity of volumetric tank 3.862 m^3

Numerical Simulation Facility

- 3-D CFD studies using star ccm+ code for pump intakes and hydraulic machines
- 1-D analysis for surge protection in lift irrigation schemes and long running pipe lines using flomaster software.





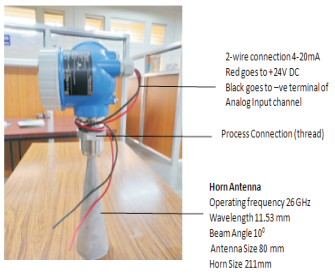
Surface Water Level Sensors Demonstration Laboratory

CWPRS Surface Water Level Facility - Precision in Demonstration, Reliability in Practice....

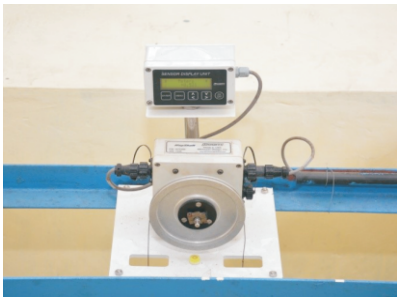
Surface Water Level Sensor Demonstration Facility was established with the aim of strengthening India's hydrological network and support real-time water resource management, flood forecasting, and reservoir operations.

Various Surface Water Level Recorders

Ultrasonic transducer



Radar Type Water Level Sensor

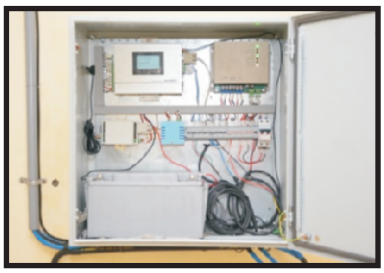


Shaft Encoder

Field Installation

E-module Guide *for*

- Optimal placement at rivers, dams, or bridges
- Effects of beam angle and diameter in RADAR installations
- Maintenance essentials for reliable performance



Data Logger

Racording Room

For further details, please contact

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