

## **Standards and Calibration Laboratory (S&CL)**

This facility is used to Perform legally defensible calibrations not involving ionizing radiation. The facility provides basic calibration service for items involving pressure, flow, voltage, current, force and length. CFA-698 has an atmospheric controlled area, which provides a stable environment for calibration of items. The calibrations performed are traceable to the National Institute of Standards and Technology (NIST).

The S&CL was established in 1969 to provide the service of calibrating standards for the then National Reactor Testing Station (NRTS). The S&CL has grown in capability and services since its inception and is now considered a premier calibration laboratory.

The facility presently has a staff of 17 Metrologists facility and approximately \$15 M of standard test equipment. The S&CL currently supports approximately 8000 calibrations per year in the areas of Electronic, Dimensional and Physical parameters. The measurement capabilities enable the lab to support 99% of all non-radiological measurement instrumentation at the INL.

The National Voluntary Accreditation Program (NVLAP) has accredited the S&CL to ISO –17025 *General Requirements for the Competence of Calibration and Testing Laboratories*. NVLAP is part of the National Institute of Science and Technology. This accreditation is generally accepted world wide as prima facie evidence of the quality program and capabilities of a metrology laboratory. It insures the S&CL is in compliance with international calibration requirements enabling the INL to support work from anywhere in the world.

The S&CL is primarily being used as a calibration service to the INEEL. The S&CL is an underutilized asset since the service base has not grown significantly, despite the increased capabilities and international accreditation.

## CFA 698 S&CL CAPABILITIES BY LABS

### **106D, Electronics Standards Lab (primary electrical standards)**

#### **This lab calibrates:**

- DC Voltage
  - Josephson Junction – most accurate means that exists. 0.016 ppm accredited uncertainty.
  - Zener References – 0.3 ppm accredited uncertainty.
- Resistance – 0.3 ppm accredited uncertainty.
- Frequency – 1 part in  $10^{-12}$
- AC and DC Current
- Capacitance
- Inductance

### **106C, Physical Primary Laboratory**

#### **This lab calibrates:**

- Masses from 1mg up to 1000 pounds using multiple balances and NIST calibrated weight sets.
- Pressure devices from an inch of water to 40,000 psig using dead weight testers and precision digital pressure standards.
- Volumetric devices and Densitometers.
- Photo Film Density
- Liquid Density
- Specific Gravity

### **106B, Primary Physical Dimensional Laboratory**

#### **This lab calibrates:**

- Gage Blocks from 0.010 “ through 20” Accredited: Uncertainty: +/- 3.4u”
- Other lengths up to 10 feet: +/- 10u”
- Inside and outside diameters.
- Surface Optical Flatness
- Thread Gages and thread wires.
- Precision pin gages, Survey equipment, Angles, and squareness
- **Federal Surface Analyzer** which covers:
  - Roundness
  - Roughness
  - Concentricity
  - Surface pro
  - Surface Finish with overall uncertainty of +/- 3u”.

### **Room 112, Electronics Lab**

#### **This lab calibrates:**

- Lower accuracy instrumentation with same parameters as Electronics Standards Lab.
- Temperature – SPRT's and fixed point cells, uncertainty in milli-degrees.
- Oscilloscopes – full function calibrator.
- Tachometers
- Phase
- Sound level and dosimetry
- Breaker testers
- Power supplies

### **Room 111, Physical Dimensional Calibration Laboratory**

#### **This lab calibrates:**

- Hand Tools
- Force devices up to 100,000 lbf Inside the lab and 400,000 lbf Outside of the lab.
  - Best uncertainty of +/-0.025% of f/s
- Flow Devices from ½ sccm to 500 scfm.
  - Best Uncertainty of +/- .3% rdg.
- Light Meters.

### **Room 110, RF Lab**

#### **This lab calibrates:**

- Generators/Function generators
  - Level, frequency, distortion, AM/FM modulation, symmetry, etc.
- Communications monitors
- Attenuation
- RF Power
  - -127 dBm to 100 W, frequency ranging to 1.3 GHz. Standards to 26.5 GHz on hand.
- Fiber-Optic test equipment
  - Sources and meters – 850, 1300, 1550 nanometer wavelengths.
  - OTDR's – time base and fiber-optic cable length measurements.

### **Room 213, Industrial Hygiene / Torque Laboratory**

#### **This lab calibrates:**

- Industrial Gas monitoring equipment.
- Humidity Dew point, and Temperature measuring devices.
- Torque Devices from 1oz inch to 5000 foot-pounds of torque.
  - Uncertainty: +/- 0.1% f/s.
- High Voltage devices requiring a safety cage.

### **107, CF-689 Wind Tunnel and Ballistic Flow Calibrator Laboratory**

#### **This lab calibrates:**

- Air Speed measuring equipment from 50 fpm to 140 mph. This is accomplished using a state of the art Wind Tunnel that is closed loop, temperature controlled and measures over 37 feet in length. Tunnel has a laminar flow uncertainty of

better than 0.25%. Airspeed measuring equipment has uncertainties of +/- 3% of f/s.

- Liquid Flow meters up to 800 GPM.