Equipment Calibration

PROFESSIONAL ELECTRICAL APPARATUS RECYCLERS LEAGUE

Topics of Discussion

• NIST Certification (National Institute of Standards and Technology)
  Who is NIST and how do they play a role in calibration services.
  What is calibration and what does it do? Value, Purpose
  Why do we need calibration and how often? PEARL Standards
  What type of calibration is there?
  What type of instruments are there?
  Pearl calibration standard ...
  National calibration standards

NIST Certification (National Institute of Standards and Technology)

National Institute of Standards and Technology, a unit of the U.S. Commerce Department. Formerly known as the National Bureau of Standards, NIST promotes and maintains measurement standards. It also has active programs for encouraging and assisting industry and science to develop and use these standards.

Heeding the call from the nation's scientists and industrialists to establish an authoritative domestic measurement and standards laboratory, the U.S. Congress founded NIST on March 3, 1901. The fledgling agency quickly assembled standards for electricity, length and mass, temperature, light, and time, and created a system to transfer those values to the public. NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.
What is calibration and what does it do?

- The main purpose is to maintain the instrument accuracy and hold a calibration through its calibration interval for maintaining the quality of measurement as well as to ensure the proper working of a particular instrument.
- There are three main reasons for having instruments calibrated:
  - To ensure readings from an instrument are consistent with other measurements.
  - To determine the accuracy of the instrument readings.
  - To establish the reliability of the instrument i.e. that it can be trusted.

Calibration Certifications

- Calibration Certificate must contain the following:
  - Customer and Calibration Laboratory Address
  - Instrument Nomenclature
  - Manufacturer
  - Model number
  - Serial Number, Certificate number or ID Number
  - Calibration Date and Calibration Due Date
  - Certification Signature and Title
  - Calibration Instruments Listed with Traceability Numbers, Model Numbers and due Dates
  - Instrument
  - Calibration Sticker with ID number, Technician, Cal Dates
  - Void Sticker if applicable

Why do we need calibration and how often?

- Need for Calibration
  - detecting the condition of the measuring instrument
  - to ensure it integrity and reliability

- How Often
  - The equipment manufacture generally suggest a calibration interval based on the measurement tolerances use and storage and environmental range.
  - PEARL Quality Standards
  - Customer or Contract Requirements
  - Usage and History
What type of calibration is there?

**Electrical**
- Volt, Current, Resistance, Capacitance, Inductance, Power

**Temperature**
- Temperature, Humidity

**Mechanical**
- Length, Pressure, Weight, Torque, Flow

**Time**
- Frequency

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Pearl Calibration Standard .. 1010 Rev 6

**1. GENERAL**

1. Suitability of Test Equipment
   - All test equipment shall be in good mechanical and electrical condition.
   - The accuracy of the test equipment must be better than the accuracy of the test equipment being tested.
   - The frequency and waveform of the test equipment shall be appropriate for the test being performed.
   - The accuracy of the test equipment output shall be appropriate for the test.

2. Test Instrument Calibration
   - The organization using this standard shall have a calibration program, which assures that all test instruments are maintained within rated accuracy.
   - The test instruments shall be calibrated at least every 12 months.
   - Calibration records must be maintained which show the date and results of instruments calibrated or tested.

3. Calibration Records
   - The calibration test reports shall include the following:
     1. Serial number or identification for record
     2. Description of equipment tested
     3. Description of test
     4. Tolerance or expected result
     5. Test results
     6. Analysis and recommendations

4. Records Availability
   - Copies of these records shall be stored on premises and be supplied to an inspector or the customer upon request.
Calibration and Quality Standards

- MIL-STD-45662A Military Standard
- ISO-10012-1
- ANSI-Z540-1
- ISO-17025
- ISO-9001-2008

Calibration Flow

- Lab Standards
- Traceability
- Accuracy
- NIST Certification
- Equipment Calibration
- Repairs
- New Equipment
- Annually
- Industry Use
- Measurements
  - Taken
  - Torque
  - Safety

Revisions

- Repairs
- New Equipment
- Annually

Industry Use