

OJT Resource: NIST OWM GMPs

Good Measuring Practices

What are GMPs

NIST Good Measuring Practices are a series of technical guidance documents developed by NIST OWM to support measurement laboratories in establishing consistent, reliable, and traceable measurement processes. Each GMP focuses on a specific area of measurement or laboratory operation and provides practical procedures and best practices to ensure compliance. GMPs are intended as supplemental resources to NIST Handbooks 143 and 150.

History

The GMPs, or Good Measurement Practices originally were in NIST HB 145, "Handbook for the Quality Assurance of Metrological Measurements," which was published in 1986. These practices have been updated and are now available online.

Location

<https://www.nist.gov/pml/owm/laboratory-metrology/documentary-standards-and-resources/gmps>

GMPs Quick Summary Guide

GMP 1 – Reading Turning Points on an Equal Arm Balance (May 2019)

This explains the proper procedure for measurements taken with an equal arm balance, including handling practices and determining balance indications. Turning points have been used with loadcell systems for weight carts and large weights.

GMP 2 – Reading the Center of Graduations When Using a Microscope (October 2014)

This is used in Length calibrations and explains how to accurately read the center of scale graduations through a microscope by aligning the crosshair with the middle of the line, minimizing parallax and reading errors.

GMP 3 – Method of Reading a Meniscus Using Water or Other Wetting Liquid (May 2019)

This describes how to correctly read a meniscus formed by water or other liquids in volumetric calibrations – by aligning the eye level with the lowest point of the curved surface.

GMP 4 – Adjusting the Optical Scale on a Single Pan Mechanical Balance (1986)

This covers how to properly adjust the optical scale, ensuring the scale pointer or vernier aligns correctly with the measurement markings.

GMP 5 – Weight Cleaning Procedures (1986)

This practice provides guidance on proper cleaning procedures for weights, detailing methods to remove dirt, oils, corrosion without damaging the weight. It includes one-piece and two-piece weights.

GMP 6 – Cleaning Metal Volumetric Measures (May 2019)

This practice provides guidance on proper cleaning procedures for volumetric test measures and would be great to share with customers.

GMP 7 – Cleaning Precision Glassware (May 2019)

This practice provides guidance on proper cleaning procedures for Precision Glassware so they're sufficiently clean to ensure uniform wetting of the entire internal surface.

GMP 8 – Recommended Form of Reporting Tape Calibrations (October 2014)

This practice explains how Tape calibration results should be reported and gives an example Calibration Certificate.

GMP 9 – Equations for Metallic Tapes (October 2014)

This provides the equations and procedures for correcting metallic tape measurements for factors such as temperature, tension, and sag.

GMP 10 – Understanding Factors Affecting Weighing Operations (May 2019)

This explains the various factors that can affect mass measurements, such as balance sensitivity, environmental conditions, air current, vibration, and operator technique. It includes how to account for them to ensure accurate results.

GMP 11 – Assignment & Adjustment of Calibration Intervals (May 2019)

This practice establishes calibration intervals for standards and instrumentation used in measurement processes. For legal metrology (weights and measures) laboratories, no calibration interval may exceed 10 years without exceptional analysis of laboratory measurement assurance data. Included are tables with initial calibration intervals and explanation on how to adjust with appropriate data.

GMP 12 – Standard Operating Procedure Selection (May 2019)

This provides a matrix recommending which SOP to use based on parameter, type of calibration items, and level of uncertainty needed.

GMP 13 – Ensuring Traceability (June 2019)

This lists the 7 essential elements of traceability, with explanations for each. Examples are also given for assessing the objective evidence of metrological traceability and example flow charts are provided. Audit forms in this GMP can be used internally to document laboratory's traceability.

How To Use GMPs

As a state metrology lab, you can use NISTs GMPs as the baseline framework for ensuring your measurement processes, documentation, and quality assurance practices align with national and internationally recognized standards. They guide how you structure procedures, maintain competency, and demonstrate metrological traceability so your results are consistent and defensible.