



Page: 1 of 5
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1.0 Purpose

- 1.1 This procedure establishes the measurement requirements to determine the accuracy, range of use and required number of points to be used in the calibration of Non-Destructive Testing equipment by an outside vendor.

2.0 Reference Documents

- 2.1 MT-20, Meyer Tool Quality Control Manual
- 2.2 ISO 10012-1, Calibration System Requirements
- 2.3 ANSI/NCSL Z540-1 American Standard for Calibration/Calibration laboratories and Measuring and Test Equipment – General Requirements
- 2.4 PI-157 Meyer Tool Purchase Order procedure
- 2.5 QP-105 Meyer Tool Radiographic procedure
- 2.6 QP-106 Meyer Tool Computed Radiographic procedure
- 2.7 QP-107 Meyer Tool Liquid Penetrant procedure
- 2.8 QP-112 Meyer Tool Digital Radiography procedure

3.0 General

- 3.1 The following calibration requirements are for use by our approved external suppliers for calibration use only. Internal calibration will be completed in accordance with the appropriate procedures.
- 3.2 This procedure will be used in conjunction with QP-105, QP-106 and QP-107 and QP-112.

4.0 Equipment

4.1 Light Meters

4.1.1 Spectronics Radiometer

Model: DSE-100X – Read out unit
 Calibrated at 3 set points: 2mV, 100mV & 180 mV
 Accuracy: ± 5%
 Calibration Interval: 6 months
 Standards: Traceable to NIST, ANSI/NCSL Z540-1, ISO 10012-1, 2003

DIX – 555A – Visible Light Sensor
 Calibrated at 3 set points: 2fc, 100fc & 180fc

Date		Prepared by	
Date		Approved	Level III
Date		Approved	

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Range of use: 0fc to 199fc

DIX – 365 - UV A Sensor

Calibrated at 3 set points: 200 μ W/cm², 2000 μ W/cm² & 7000 μ W/cm²

Range of use: 200 μ W/cm² to 3000 μ W/cm²

4.1.2 Spectronics Radiometer/Photometer

Model: XR – 1000 – Read out unit

Calibrated in footlamberts at 4 set points: 500 fl, 25000 fl, 50000 fl & 200000 fl

Accuracy: \pm 5%

Calibration Interval: 6 months

Standards: Traceable to NIST, ANSI/NCSL Z540-1, ISO 10012-1, 2003

XDS-1000 – Dual Sensor

White Light sensor

Calibrated in foot candles at 4 set points: 2 fc, 50 fc, 100 fc & 180 fc

Range of use: 0 fc to 180 fc

UV Sensor

Calibrated using 4 set points: 200 μ W/cm², 2000 μ W/cm², 4000 μ W/cm² & 7000 μ W/cm²

Range of use: 200 μ W/cm² to 7000 μ W/cm²

XS – 555/L – Luminance Sensor Detector

Calibrated in footlamberts at 4 set points: 500 fl, 25000 fl, 50000 fl & 200000 fl

Range of use: 500 fl to 200000 fl

XS – 555/L – Luminance Sensor Detector

Calibrated in Candelas/m² at 5 set points: 0 cd/m², 100 cd/m², 200 cd/m², 300 cd/m² & 400 cd/m²

Range of use: 0 – 1,000,000 cd/m²

4.1.3 Gould Bass Radiometer with Luminance Sensor

Model: DLM-1000

Calibrated at 4 set points: 000fl, 25000fl, 50000fl & 150000fl

Accuracy: \pm 5%

Calibration Interval: 6 months

Standards: Traceable to NIST, ANSI/NCSL Z540-1, ISO 10012-1, 2003

Range of use: 0 fl to 150000 fl

Footlambert sensor: 0915028F

Calibrated at 4 set points: 000fl, 25000fl, 50000fl & 150000fl

Range of use: 0 fl to 150000 fl

Footcandle sensor: 0915028C

Calibrated at 5 set points: 0fc, 50 fc, 200 fc, 350 fc & 500 fc

Range of use 0 fc to 500 fc

4.2 Water Temperature Gages

- 4.2.1 Model: Dial Thermometer
Calibrated at 4 set points: 40 f, 80 f, 120 f & 160 f
Accuracy: $\pm 2\%$
Calibration Interval: 6 months
Standards: Traceable to NIST, ANSI/NCSL Z540-1, ISO 10012-1, 2003,
ISO/IEC 17025
Range of use: 50 f to 100 f

4.3 Pressure Gages

- 4.3.1 Model: 0-15 PSI Pressure gage
Calibrated at 4 set points: 3, 6, 9 & 12 PSI
Accuracy: $\pm .3$ PSI
Calibration Interval: 6 Months.
Standards: Traceable to NIST, ISO 10012-1, 2003, ISO/IEC 17025, ISO
9001: 2000, Mil-Std-45662A
Range of Use: 0 to 5 PSI
- 4.3.2 Model: 0-30 PSI Pressure gage
Calibrated at 4 set points: 6, 12, 18 & 24 PSI
Accuracy: $\pm .6$ PSI
Calibration Interval: 6 Months.
Standards: Traceable to NIST, ISO 10012-1, 2003, ISO/IEC 17025, ISO
9001: 2000, Mil-Std-45662A
Range of Use: 0-25 PSI
- 4.3.3 Model: 0-100 PSI Pressure gage
Calibrated at 4 set points: 20, 40, 60 & 80 PSI
Accuracy: ± 2 PSI
Calibration Interval: 6 Months.
Standards: Traceable to NIST, ISO 10012-1, 2003, ISO/IEC 17025, ISO
9001: 2000, Mil-Std-45662A
Range of Use: 0-40 PSI

4.4 Refractometer

- 4.4.1 Model: ATAGO N1-e Refractometer
Calibrated at 5 set Points: 1%, 5j%, 10%, 20% & 30% Brix.
Accuracy: $\pm .2\%$
Range of Use: 0 to 10 Brix.
Calibration Intervals: 6 months
Standards: ISO 10012-1, ANSI/NCSL Z540-1

4.5 Personal Monitoring Devices

- 4.5.1 Dosimeter
 - 4.5.1.1 Model: 138
Range of Use: 0-200mR
Calibrated at 3 set points: 0, 100 & 200mR
Accuracy: $\pm 5\%$

Calibration Intervals: Annually
Standards: Traceable to NIST, ISO 10012-1, ISO/IEC
17025, Mil-Std-45662A

4.5.2 Rate Alarms:

4.5.1.2 Model: RA-500
Range of Use: 0-1000mR
Calibrated at 3 set points: 0, 500 & 1000mR
Accuracy: $\pm 5\%$
Calibration Intervals: Annually
Standards: Traceable to NIST, ISO 10012-1, ISO/IEC
17025, Mil-Std-45662A

4.5.3 Survey Meters:

4.5.1.3 Models: ND-2000 series or Victoreen
Range of Use: 0-1000mR/hr
Calibrated at 3 set points: 0-10mR/hr, 0-100mR/hr &
1000mR/hr
Accuracy: $\pm 5\%$
Calibration Intervals: 6 months
Standards: Traceable to NIST, ISO 10012-1, ISO/IEC
17025, Mil-Std-45662A

4.6 Tam Panels

4.6.1 Tam Panels are calibrated in accordance with QP-107
4.6.2 Calibration intervals: Annually

4.7 Densitometers

4.7.1 Densitometers are calibrated in accordance with CP-132
4.7.2 Calibration Intervals: Quarterly

4.8 Dryer Ovens

4.8.1 Dryer ovens are calibrated in accordance with CP-115
4.8.2 Calibration Intervals: Quarterly

4.9 Timers

4.9.1 Timers are calibrated in accordance with CP-120
4.9.2 Calibration Intervals: Quarterly

5.0 Out of Tolerance Condition

5.1 Any Calibration that exceeds the \pm value specified in section 4.0 of this procedure shall be considered "OUT OF TOLERANCE" and removed from service or ban from entering service.

5.2 If a calibration fails to conform to a specified requirement the calibration department will refer to Quality Manual MT-20 for further action to be taken.

