Title: Measurement Requirements for Calibration of NDT Equipment

CP-136 D

Page: 1 of 5
Supersedes: 24-Jul-13
Effective: 8-Jan-15

# 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

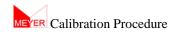
Standards: Traceable to NIST, ANSI/NCSL Z540-1, ISO 10012-1, 2003

DIX - 555A - Visible Light Sensor

Calibrated at 3 set points: 2fc, 100fc & 180fc

Date	Prepared by	
Date	Approved	Level III
Date	Approved	

This document and the information contained within is the property of Meyer Tool, Inc. Any reproduction, disclosure, or uses of the information within this document are prohibited except authorized in writing by Meyer Tool, Inc. The recipient accepts the responsibility for maintaining the confidentiality of the contents of this document.



Range of use: 0fc to 199fc

DIX - 365 - UV A Sensor

Calibrated at 3 set points: 200µW/cm², 2000µW/cm² &

7000µW/cm<sup>2</sup>

Range of use: 200µW/cm² to 3000µW/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: ± 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 µW/cm<sup>2</sup>, 2000 µW/cm<sup>2</sup>,

4000 μW/cm<sup>2</sup> & 7000 μW/cm<sup>2</sup>

Range of use: 200 µW/cm<sup>2</sup> to 7000 µW/cm<sup>2</sup>

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/m<sup>2</sup> at 5 set points: 0 cd/m<sup>2</sup>, 100 cd/m<sup>2</sup>,

200 cd/m<sup>2</sup>, 300 cd/m<sup>2</sup> & 400 cd/m<sup>2</sup> Range of use: 0 – 1,000,000 cd/m<sup>2</sup>

#### 4.1.3 Gould Bass Radiometer with Luminance Sensor

Model: DLM-1000

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

Accuracy: ± 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

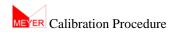
Calibrated at 4 set points: 000fl, 25000fl, 50000fl & 150000fl

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: ± 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: ± .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: ± .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: ±.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

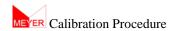
#### 4.5.1 Dosimeter

4.5.1.1 Model: 138

Range of Use: 0-200mR

Calibrated at 3 set points: 0, 100 & 200mR

Accuracy: ± 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: ± 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: ± 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 ±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.





# **Revision History**

Rev. Ltr.	Parg.	Description of Revision	Date Rev.	Rev. By
Orig.	All	New procedure	5-Oct-09	D. Olson
A	4.3.1, 4.3.2, 4.3.3	Added Calibration Interval: 6 months	19-Jul-10	D. Olson
A	4.6.1	Changed QP-107 to PI-224 and added Calibration Intervals: annually.	19-Jul-10	D. Olson
A	4.7.1	Added: Calibration Intrvals: Quarterly.	19-Jul-10	D. Olson
A	4.8.1	Added: Calibration Intrvals: Quarterly.	19-Jul-10	D. Olson
В	4.6	Replaced PI-224 with QP-107	22-Nov-11	D. Olson
С	2.8	Added QP-112	24-Jul-13	A. Powers
С	3.2	Added QP-112	24-Jul-13	A. Powers
С	4.1.2	Changed number of set points,added 25000 fl, and added requirements for candelas readings	24-Jul-13	A. Powers
С	4.1.3	Corrected model #, added s/n's for the sensors and added footcandle requirements	24-Jul-13	A. Powers
D	4.1.2	Added s/n for the dual sensor and requirements	8-Jan-15	A. Powers