

Calibration Procedure

DeFelsko PosiTector CMM IS Probe

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1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of the DeFelsko PosiTector CMM IS probe with the following specifications:

Table 1-1 Measurement Ranges

| Function | Measurement Range | Resolution |
|-------------------|------------------------------|------------------|
| Air Temperature | 0 to 80 °C (32 to 176 °F) | 0.1°C (0.1°F) |
| Relative Humidity | 10 to 100% RH | 0.1% |

1.2 The unit being calibrated will be referred to as the UUC (Unit-Under-Calibration).

2 Measurement Standards and Support Equipment Performance Requirements

2.1 The UUC accuracy requirements are based upon the published UUC performance specifications.

2.2 The test uncertainty ratio applied in this calibration procedure is 4:1 unless otherwise stated.

2.3 Minimum-Use-Specifications are the minimum test equipment specifications required to meet all the UUC accuracy requirements and the test uncertainty ratio applied.

Table 2-1 UUC Accuracy Requirements and Description

| UUC Function | Range | Accuracy | Test Method |
|-------------------|------------------------------|------------------------|--------------------|
| Air Temperature | 0 to 80 °C (32 to 176 °F) | ± 0.5 °C (± 1.0 °F) | Humidity Generator |
| Relative Humidity | 10 to 90% RH > 90% RH | ± 2.0 % ± 3.0 % | |

Table 2-2 Minimum Use Specifications

| Function | Range | Accuracy |
|-------------------|------------------------------|---------------------------|
| Air temperature | 0 to 80 °C (32 to 176 °F) | ± 0.125 °C (± 0.25 °F) |
| Relative Humidity | 10 to 100% RH | ± 0.75% |

Table 2-3 Actual Equipment Specifications

| Manufacturer/Model #'s Applicable | Actual Equipment Specifications | |
|---|---------------------------------|--------------------------|
| | Range | Accuracy |
| Thunder Scientific Model 2500 Humidity Generator | 0 to 70 °C (32 to 158 °F) | ± 0.06 °C (± 0.11 °F) |
| | 10 to 95% RH | ± 0.5% |

Caution: The instructions in this Calibration Procedure relate specifically to the equipment and conditions listed in this section. If other equipment is substituted, the information and instructions must be interpreted accordingly.

Table 2-4 Calibration Environment and Warm-Up Requirements

| | |
|--|--|
| Measurement Standards & Support Equipment Environmental Requirements: | Temperature: $23 \pm 5^\circ \text{C}$. Relative Humidity: Less than 95% Barometric Pressure $30 \pm 1.5 \text{ in Hg}$ ($1016 \pm 50 \text{ mbar}$) |
| Measurement Standards & Support Equipment Warm-up and Stabilization Requirements: | Thunder Scientific Humidity Generator: 60 minutes |

3 Preliminary Operations

Note: Review the entire document before starting the calibration process.

3.1 Visual Inspection

3.1.1 Damage or excess wear must be repaired prior to beginning the calibration process.

3.1.2 Visually inspect the UUC for:

- Wear or damage to the probe body or sensor end
- Missing parts
- Proper identification

3.2 Ensure the UUC has been properly stored within the calibration check chamber when not in use and it's been at least 24 hours since use. If the unit has not been properly stored in the check chamber when not in use or the Boveda pack in the chamber was allowed to dry out, the unit will need to be in the chamber for three days prior to attempting calibration.

3.3 Remove the battery cap, insert a battery and replace the battery cap.

3.4 Using a smart device, launch the PosiTector SmartLink app and verify the device detects the probe. Also verify the probe has at least 25% battery.

4 Calibration Process

Refer to UUC and equipment instruction manual(s) for menu navigation instructions, details on features and operating instructions.

Note: Whenever a test requirement is not met as indicated in table 6-1, verify the results of the test and take corrective action before proceeding.

- 4.1 Place the probe(s) in the humidity chamber such that the sensor end is exposed. Do not set the sensor on the bottom of the chamber with the sensor facing down. Multiple probes can be calibrated in the chamber simultaneously. Record the probe serial number(s) and the Barometric pressure (mbars).
- 4.2 Adjust the set point of the humidity chamber to 75 %RH and allow to stabilize for at least 2 hours. Do not record any readings at this set point. This step is to ensure the probe was at 75% prior to starting the process.
- 4.3 Adjust the set point of the humidity chamber to 50 %RH and allow to stabilize for at least 2 hours. After the stabilization time, record the chamber relative humidity and air temperature. Use a smart device to access the UUC as describe in section 3.4. Record the UUC relative humidity and air temperature.
- 4.4 Adjust the set point of the humidity chamber to 90 %RH and allow to stabilize for at least 2 hours. After the stabilization time record the chamber relative humidity reading. Use a smart device to access the UUC as describe in section 3.4. Record the UUC relative humidity.
- 4.5 Remove the probe(s) from the chamber, remove the battery and immediately store in the Calibration Check Chamber.

5 Performance Requirements

Note: The technician will collect the data needed to complete columns D and E. The technician shall then calculate the values for Column F and record all information as shown in table 5-1. Do not write in this procedure.

Table 5-1 Requirements and Calibration Data for DeFelsko PosiTector CMM IS Probe

| Reference (A) | Units (B) | Set Point (C) | Test Equipment Reading (D) | Gage Reading (E) | Probe Measurement Accuracy (F) | Allowable Tolerance (G) |
|---------------------|-----------|---------------|----------------------------|------------------|--------------------------------|-------------------------|
| Relative Humidity | %RH | 50 | | | | ± 2.0 |
| Ambient Temperature | °C | N/A | | | | ± 0.5 |
| Relative Humidity | %RH | 90 | | | | ± 2.0 |

Note: To convert from °C to °F → $T_{°F} = 1.8 * T_{°C} + 32$

Management Procedure Change Notice

Procedure Number: MP 2566
 Revision Level: B
 Date of Change: November 7, 2019
 Title: Calibration Procedure for DeFelsko PosiTector CMM IS Probe

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|--|
| Reason for Change: <ul style="list-style-type: none"> Clarify storage requirements |
| Description of Change: <ul style="list-style-type: none"> Added text to 3.2 to clarify storage conditions Added step 4.2 |

I confirm I have read and understand the procedure and the change described above.

| Printed Name | Signature | Date |
|--------------|-----------|------|
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