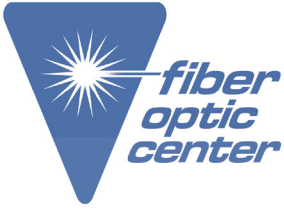


# TECHNICAL BULLETIN



## Manufacturer:

Dymax

## Product Name:

Dymax ACCU-CAL™ 50 UV Radiometer for Measuring UV Curing Flood Lamps and Conveyors

## Manufacturer Part Number:

39561

▶ [Click here for more details on the Dymax ACCU-CAL™ 50 UV Radiometer for Measuring UV Curing Flood Lamps and Conveyors](#)

Click the thumbnail below to navigate to the Technical Bulletin

TECHNICAL BULLETIN

**Manufacturer:** Dymax  
**Product Name:** Dymax ACCU-CAL™ 50 UV Radiometer for Measuring UV Curing Spot & Flood Lamps  
**Manufacturer Part Number:** 39561

▶ [Click here for more details on the Dymax ACCU-CAL™ 50 UV Radiometer for Measuring UV Curing Spot & Flood Lamps](#)

### Process Control: Radiometer Best Practices

Use a radiometer & monitor frequently!

#### 9 Keys to Successful Use of Radiometers

1. **Select the Appropriate Radiometer Configuration for Your System**  
Customizing system configurations and applications require different types of radiometers.
  - Peak-to-peak configurations are ideal for use in conveyor and flood curing system applications.
  - Hand-held configurations can be used for some conveyor and flood system measurements, but are more used for spot and spot-and-flood system measurements.

Figure 1: D-40 Hand Radiometer      Figure 2: Accu-Cal Radiometer

2. **Select a Radiometer with the Correct Frequency Sensitivity Range**  
Curing systems and energy come in a wide spectral range. Therefore it is important to use a radiometer that is designed to measure the exact spectral range that your curing system is emitting.  
Conventional lamp systems and energy come in a wide spectral range across the UV and visible portions of the spectrum. ACCU-CAL™ 50 and ACCU-CAL™ 100 models are designed to measure all energy across these two regions (250 - 380 nm).

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[Process Control](#)  
[Radiometer Best Practices](#)

TECHNICAL BULLETIN

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### Radiometer Calibration Schedule

Radiometer	Calibration Period	Test Method
ACCU-CAL™ 50 Radiometer (For Spot)		
PR 24020 - 100vacuum (200 up to 20" Flood)	6 Months	1-2 Beams
PR 40011 - 100vacuum (200 up to 20" Flood)	6 Months	2-3 Beams
SET - 100vacuum Plus Calibration (For Conveyors)		
PR 20170 - 100vacuum (200)	6 Months	2-3 Beams
ACCU-CAL™ 100 and ACCU-CAL™ 100 Calibration (For Spot, Flood, and Conveyors)		
PR 20100 - 100vacuum (200) for Flood and conveyors		
PR 20101 - 100vacuum (200) for Spot		
PR 40010 - 100vacuum (200) for Spot, Flood and conveyors		
PR 40011 - 100vacuum (200) for Spot, Flood and conveyors	12 Months	1-2 Beams
PR 40012 - 100vacuum (200) for Spot, Flood and conveyors	12 Months	1-2 Beams
PR 40013 - 100vacuum (200) for Spot, Flood and conveyors	12 Months	1-2 Beams
SET - Power Peak Calibration (For Conveyors)		
PR 20170 - 100vacuum (200), 100, 100, and 100V	6 Months	2-3 Beams
ACCU-CAL™ 100 and ACCU-CAL™ 100 Calibration (For Flood and Conveyors)		
PR 20170 - 100vacuum (200)	6 Months	2-3 Beams
PR 40011 - 100vacuum (200)	6 Months	2-3 Beams
ACCU-CAL™ 100 Calibration		
PR 40010 - 100vacuum (200)	12 Months	1-2 Beams
PR 40011 - 100vacuum (200)	12 Months	1-2 Beams

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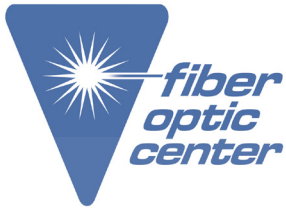
[Radiometer Calibration](#)  
[Schedule](#)

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Dymax

**Product Name:**

Dymax ACCU-CAL™ 50 UV Radiometer for Measuring UV Curing Flood Lamps and Conveyors

**Manufacturer Part Number:**

39561

▶ [Click here for more details on the Dymax ACCU-CAL™ 50 UV Radiometer for Measuring UV Curing Flood Lamps and Conveyors](#)

## Process Control: Radiometer Best Practices

Use a radiometer & monitor frequently!

### 9 Keys to Successful Use of Radiometers

#### 1. Select the Appropriate Radiometer Configuration for Your System

Different curing system configurations and applications require different styles of radiometers:

- Puck-style configurations are ideal for use in conveyor and flood chamber curing system applications.
- Hand-held/wand configurations can be used for some conveyor and flood system measurements, but are more suited for spot and end-of-wand curing system configurations.

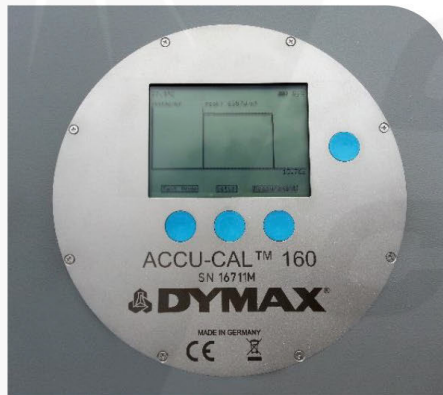


Figure 1. Puck-Style Radiometer



Figure 2. Hand-Held Radiometer

#### 2. Select a Radiometer with the Correct Frequency Sensitivity Range

Curing systems emit energy over a wide spectral range, therefore it is important to use a radiometer that is designed to measure the same spectral range that your curing system is emitting.

- Conventional lamp systems emit energy over a wide spectral range across the UV and visible portions of the spectrum. ACCU-CAL™ 50 and ACCU-CAL™ 160 models are designed to measure all energy across these same regions (~310 – 395 nm).

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- LED curing systems have much narrower frequency emission ranges, making the ACCU-CAL™ 50-LED and ACCU-CAL™ 160 L the appropriate models to insure accurate measurements within the 350 – 450 nm portion of the spectrum.

### 3. Handle Your Radiometer Carefully

Radiometers are delicate instruments and need to be handled carefully. Sharp blows or dropping will affect accuracy/calibration, and may also permanently damage the instrument.

### 4. Get Your Radiometer Calibrated

Radiometers need to be calibrated periodically, typically every 6 months or a year. Calibration times should be included in the user guide for your particular radiometer.

The next calibration due date can be found on a calibration sticker, the calibration certificate, or for some radiometers, such as the ACCU-CAL™ 160, it appears on the display screen.

### 5. Keep You Radiometer Clean

It is important to keep your radiometer clean, as debris deposited onto the surface of the sensor will reduce the energy reaching the device. To keep this area clean, wipe the sensor with a soft, lint-free cloth dampened with >90% isopropyl alcohol. Also ensure that the emitting-end optics of the lightguide are clean and detector is not loose on the wand.

### 6. Ensure Consistency

Two calibrated radiometers could *potentially* experience >10% difference when compared to each other. Dymax radiometers are calibrated to a controlled standard with a maximum acceptable deviation of +/- 7.1% (<3% is typical). Dymax recommends using only one radiometer for daily use.

#### Repeatable Measurement Orientation:

- Spots – consistent lightguide orientation and form (bent or straight)
- Floods and conveyors – consistent position beneath lamp
- All – Consistent/same radiometer sensor rotational position orientation

### 7. Replace Batteries as Needed

Radiometers are typically powered by batteries. Replace them as needed to ensure top performance. Most radiometers have low battery indicators.

### 8. Never Swap Detectors or Adapters

The detector, meter, and in cases where adapters are included, are all calibrated as a matched set, so they cannot be switched or shared by other meters. Unmatched sets can provide drastically incorrect measurements.

### 9. Avoid Over-Exposing the Sensor

Sensors are sensitive and can be damaged by prolonged exposure to high intensity UV + heat. Customers should use an exposure time <5 seconds during their radiometer measurement routine, especially when measuring high intensity light sources.

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## Radiometer Modes

### Primary Mode: Intensity

- Ideal for establishing intensity levels for curing application, and subsequent measurements to identify changes with distance, position, intensity setting and component degradation variables
- Best for process set up and verification of stability
- Ideal for safety demonstrations

### Less Used Mode: Peak Intensity

- Eliminates flutter sometimes seen in “intensity” mode
- Easier for an operator to record a measurement – but does not represent accurate intensity over longer exposure times
- Radiometer will only display highest measurement even if peak was only for a moment

### Alternative Mode: Dose

- Measurement of energy collected during a specific time in mJ/cm<sup>2</sup> or J/cm<sup>2</sup>
- Good for a product in motion such as with a conveyor, or determining total energy impinged onto exposure site
- Joules = Intensity \* Time e.g.: 212 mW/cm<sup>2</sup> \* 6 seconds= 1.2 J/cm<sup>2</sup>
- Not the best option for process creation – low intensity over a very long time can accumulate the same dosage but may not yield the same cured mechanical properties such as proper depth of cure.

## Understanding Radiometer Calibration

- **Accuracy Specification:** This is stated as +/-0.5%. This is the accuracy of multiple measurements. Multiple measurements should not vary more than +/-0.5%.
- **Incoming Maximum Deviation:** This is stated as +/-10%. This is in reference to the “As-Is” condition of a radiometer received in our lab for calibration. This measurement is taken prior to any cleaning of the radiometer and detector, with the intention of witnessing what the customer would witness during measurement.
  - The radiometer should not be more than +/-10% deviation from the Calibration Standard after 12 months of use in the field.
  - Contributing factors to a radiometer that exceeds 10% deviation during 12 months of use include debris build up on the detector sensor window, exposure to high temperatures, and/or rough handling during use.
  - Measurements “as is” of 10% or more are considered out of tolerance (“OOT”) and the customer is notified.
- **Post-Calibration Maximum Deviation:** This is stated as +/- 7.1%. After a radiometer is calibrated, it shall not exceed a +/-7.1% deviation from the Standard before return shipment to the customer. Contributing factors to a radiometer that will not calibrate are damage to the detector sensor, and/or damage to the meter.

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- **Spectral Response Curve:** Included with the purchase of a new ACCU-CAL™ series radiometer is a graph which represents the spectral response of the UV detector. This graph is like the “fingerprint” for each detector and illustrates how the detector responds to the range of wavelengths. Natural variations in the detector will give it unique properties, which are then accounted for and corrected during the calibration process. When the radiometer has been calibrated to function with a specific detector’s “fingerprint”, changing the detector to a un-matched detector will change the calculation and drastically alter the displayed measurements.

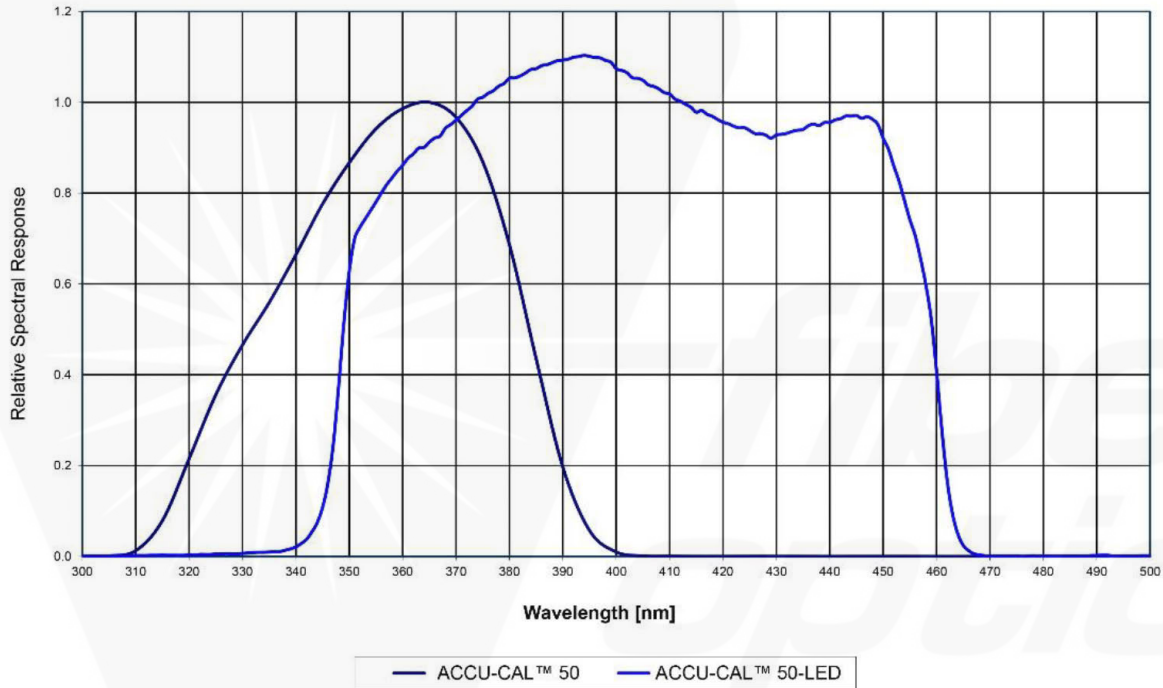


Figure 3. Typical spectral response for an ACCU-CAL™ 50-LED radiometer (350 - 450 nm) and ACCU-CAL™ 50 UVA radiometer (320 - 395 nm)

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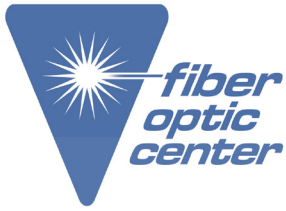
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## Radiometer Calibration Schedule

Radiometer	Calibration Period	Turn Around
<b>ACCU-CAL™ 20 Calibration (For Spots)</b>		
PN 36629 – Measures UVA up to 20 W/cm <sup>2</sup>	6 Months	1-2 Weeks
PN 38970 – Measures UVA up to 36 W/cm <sup>2</sup>		2-3 Weeks
<b>EIT - UVICURE Plus Calibration (For Conveyors)</b>		
PN 37970 – Measures UVA	6 Months	2-3 Weeks
<b>ACCU-CAL™ 30 and ACCU-CAL™ 50 Calibration (For Spots, Floods, and Conveyors)</b>		
PN 38301 – Measures UVA; for floods and conveyors PN 38302 – Measures UVA; for spots PN 38377 – Measures blue light; for floods and conveyors PN 39561 – Measures UVA; for floods and conveyors PN 39560 – Measures UVA; for spots PN 40044 – Measures visible energy; for floods and conveyors PN 40043 – Measures visible energy; for spots PN 40505 – Measures LED; for spots PN 40519 – Measures LED; for floods and conveyors	12 Months	1-2 Weeks
<b>EIT - Power Puck Calibration (For Conveyors)</b>		
PN 38129 – Measures UVA, UVB, UVC, and UVV	6 Months	2-3 Weeks
<b>ACCU-CAL™ 100 and ACCU-CAL™ 150 Calibration (For Floods and Conveyors)</b>		
PN 39677 – Measures UVA PN 40550 – Measures UVA	6 Months	2-3 Weeks
<b>ACCU-CAL™ 160 Calibration</b>		
PN 41590 – Measures UVA PN 41585 – Measures LED	12 Months	1-2 Weeks

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