PosiTector® 200

Ultrasonic Coating Thickness Gage

Instruction Manual v. 3.2

Built-In Probe
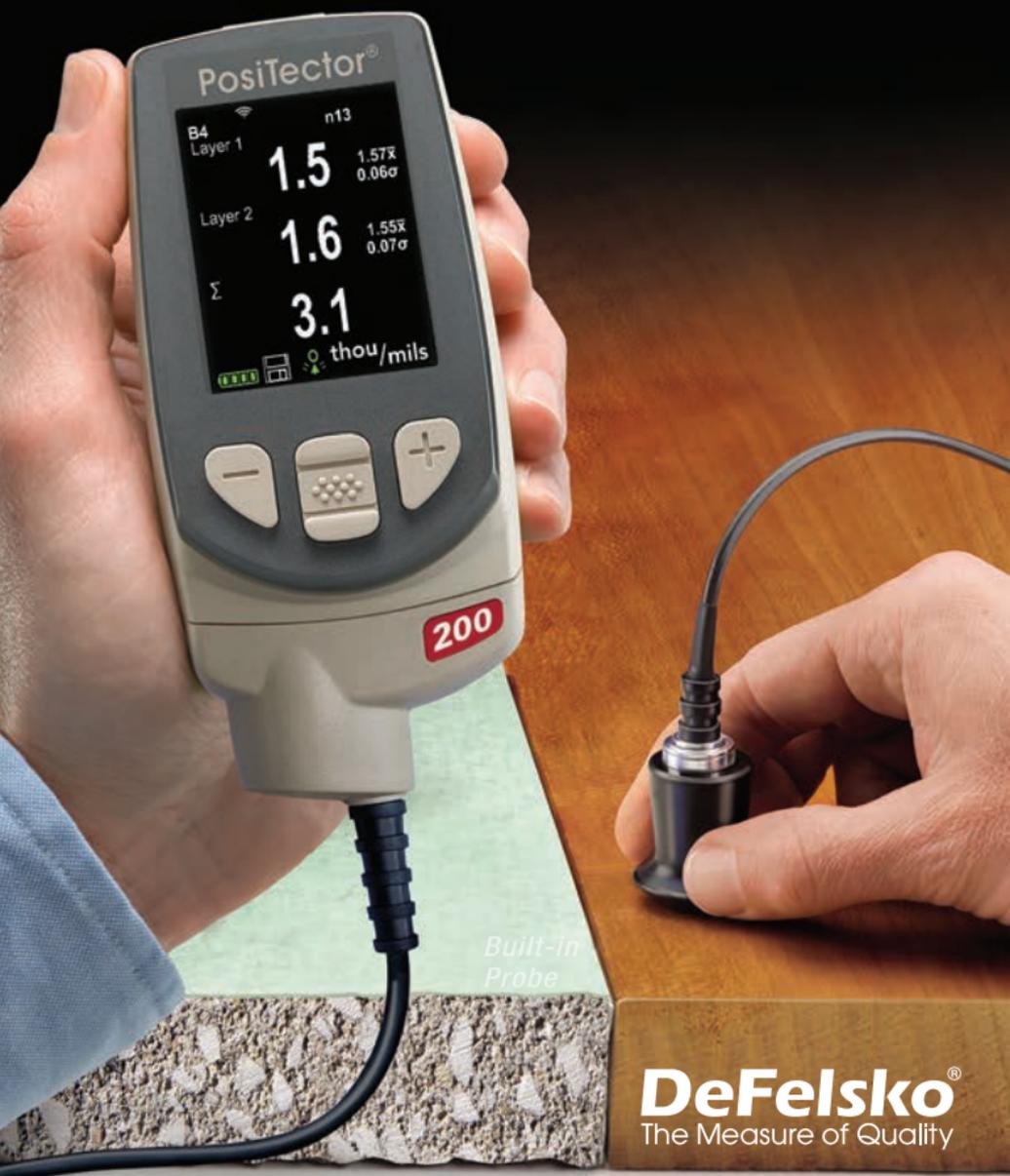
DeFelsko®
The Measure of Quality

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Introduction

The *PosiTector 200* is a hand-held Coating Thickness Gage that uses a non-destructive ultrasonic principle to measure coating thickness on a wide variety of substrates. It consists of a body (Standard or Advanced) and a probe (see **Probes** pg. 7).

PosiTector 200 Kit Contents

- PosiTector body (*Standard* or *Advanced*)
- PosiTector probe (200 B, C or D)
- Protective rubber cap for Probe
- Protective lens shield
- Wrist strap
- 3 AAA alkaline batteries
- Quick Guide instruction booklet
- Protective rubber holster
- Nylon carrying case with shoulder strap
- Belt clip for rubber holster and carrying case
- USB Cable
- 4 ounce (118 ml) bottle ultrasonic couplant
- Precision Plastic Shims
- 2500 microns (100 mils) Polystyrene Block (C & D Probe only)
- Certificate of Calibration traceable to NIST
- PosiSoft.net account
- Two (2) year warranty on Body and Probe

Quick Start

The **PosiTector *200*** powers-up when the center navigation button 🎯 is pressed. To preserve battery life, the Gage powers down after approximately 5 minutes of no activity. All settings are retained.

1. Remove the protective rubber cap from the probe.

2. Power-up Gage by pressing the center navigation button. 🎯

3. Zero the probe. (see pg. 11)

4. Adjust to a known thickness, if necessary. (see pg. 12)

5. Measure the part. (see pg. 8)

Protective Cap

PosiTector *200* gages ship with a protective rubber cap over the probe. Remove this cap prior to use. Replace it when the Gage is not in use to protect the probe.

Wrist Strap

We recommend attaching and wearing the supplied wrist strap.

Protective Lens Shield

The LCD is covered with a thin plastic film for protection against fingerprints and other marks during shipment. This film, while usually removed before using the Gage, can be left in place to protect against paint overspray or debris. Replacements can be purchased.

Couplant

Couplant is required to propagate ultrasound into the coating. Water is a good couplant for smooth coatings. Use the supplied glycol gel for rougher coatings. While it is unlikely that the couplant will damage the finish or leave a stain on the surface, we suggest testing the surface by using the couplant on a sample. If testing indicates that staining has occurred, a small amount of water can be used instead of couplant. Consult the Material Safety Data Sheet available on our website and your coating supplier if you suspect the couplant may damage the coating. Other liquids such as liquid soap may also be used.

Certification

All **PosiTector *200*** probes include a Certificate of Calibration. For organizations with re-certification requirements, instruments may be returned at regular intervals for calibration.

DeFelsko recommends that customers establish calibration intervals based upon their own experience and work environment. Based on our product knowledge, data and customer feedback, a one year calibration interval from either the date of calibration, date of purchase, or date of receipt is a typical starting point.

PosiTector Body

USB Port

LCD Display

Probe Connector

200 B probe

200 C probe

200 D probe

<u>**Typical Display**</u>

Battery Icon

Current Measurement

Factory Calibration settings in use.

Unit of Measurement
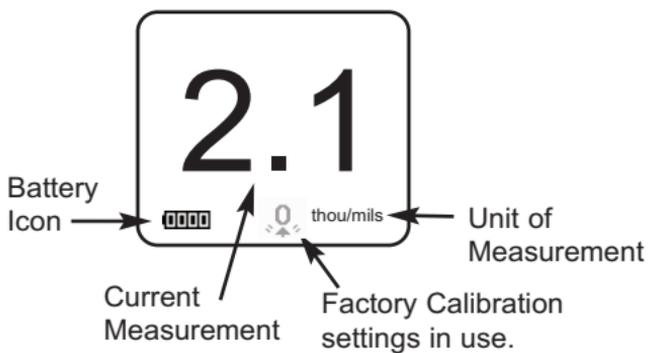
Probes

To disconnect a probe from a body, power-down the Gage and slide the plastic probe connector horizontally (in the direction of the arrow) away from the body. Reverse these steps to attach a new probe.

When powered-up the **PosiTector** automatically determines what type of probe is attached and does a self-check.

PosiTector 200 probes are available for measuring a wide variety of coating thickness applications.

■ *B probe* - 13 to 1000 microns (0.5 to 40 mils)
   Ideal for polymer coatings on wood, plastic, composites, etc.
■ *C probe* - 50 to 3800 microns (2 to 150 mils)
   Ideal for thicker coatings on concrete, fiberglass, etc.
■ *D probe* - 50 to 5000 microns (2 to 200 mils) - Polyurea
                - 50 to 7600 microns (2 to 300 mils) - Other Coatings
   Ideal for thick or soft (attenuative) coatings

NOTE: *Range limits apply to polymer coatings only.*

Additionally, the *PosiTector* accepts a number of probe types including magnetic and eddy current coating thickness, surface profile, environmental and ultrasonic wall thickness probes. Perform the latest software **Updates** (pg. 32) to ensure probe compatibility with your Gage. For the latest information on probe interchangeability see www.defelsko.com/probes


PosiTector® body accepts all PosiTector
200, SPG, DPM, 6000 and *UTG* probes

Ultrasonic Thickness
Theory of Operation

The **PosiTector 200** probe emits a high frequency sound pulse that travels into the coating via a coupling gel and reflects from ANY surface that is different in density. Coating thickness readings are obtained by measuring the time taken for the ultrasonic signal to propagate from the probe to the coating/substrate interface and back. The travel time is divided by two and multiplied by the velocity of sound in the coating to obtain the thickness of the coating.

The **PosiTector 200** interprets the largest "echo" within the selected range as the coating/coating or coating/substrate echo.
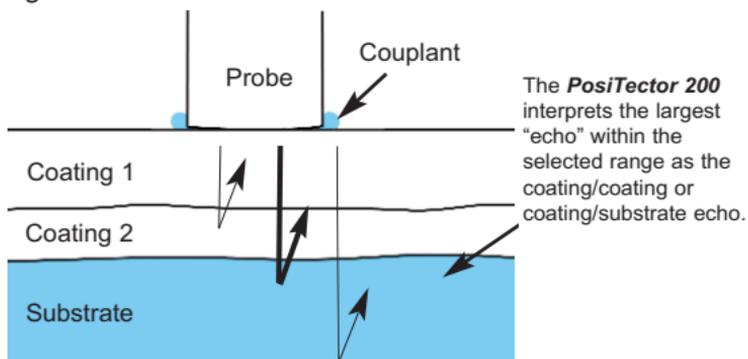
How to Measure

1. Remove the protective rubber cap from probe.

2. Power-up Gage by pressing the center navigation button.

3. Apply couplant (see pg. 5) to the surface of the part.

4. Place the probe FLAT on the surface and press down.

5. Lift the probe when you hear a double BEEP, - OR - leave probe on the surface in the same location for continuous measurements.

6. When completely finished, wipe the probe clean of couplant then return the Gage to the protective pouch. There is no need to disconnect the probe from the **PosiTector** during storage.

Calibration, Verification and Adjustment

Three steps ensure best accuracy…

1. **Calibration** - typically done by the manufacturer. All probes include a Certificate of Calibration.

2. **Verification of Accuracy** - typically done by the user on known reference standards such as plastic shims or coated thickness standards.

3. **Adjustment** - to a known thickness

Calibration

Calibration is the high-level, controlled and documented process of measuring traceable calibration standards over the full operating range of the probe, and verifying that the results are within the stated accuracy of the probe. Calibrations are performed by the manufacturer, their authorized agent, or by an accredited calibration laboratory in a controlled environment using a documented process.

Verification

Verification is an accuracy check performed by the user on known reference standards. A successful verification requires the Gage to read within the combined accuracy of the probe and the reference standards.

Adjustment

Adjustment, or Cal Adjustment, is the physical act of aligning the probe's thickness readings to match those of a known thickness sample (removal of bias) in order to improve the accuracy of the probe on a specific coating. See *Thickness* pg. 12.

Menu Operation

Gage functions are menu controlled. To access the Menu, power-up the Gage, then press the center navigation button. 🎮

Below is a sample menu for a **PosiTector** *200* Advanced model:

Memory
Cal Settings
Setup
Connect
Help
Power Off
Exit

Some buttons have a tick box to their right to indicate current status. An empty box indicates that feature is not active.

Sync Now	
USB Drive	☐
Auto SYNC	☑
Bluetooth	
WiFi	
Updates	
Exit	

Current selection is displayed with darkened background
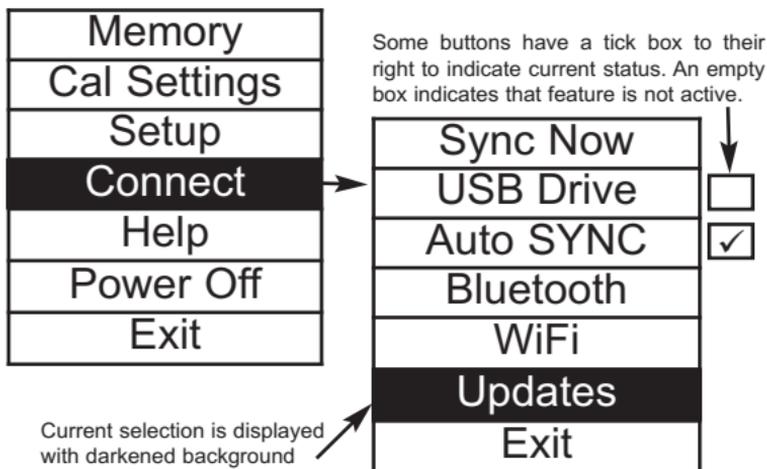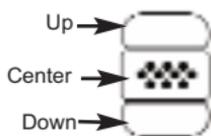
Navigation Button

To navigate, use the **Up** and **Down** buttons to scroll and 🎮 to **SELECT**.

Select **Exit** to exit from any menu.

NOTE: The center 🎮 button is purposely recessed to help eliminate unintentional powering-up of the Gage.

Cal Settings Menu

Zero

PosiTector 20*0* probes must be periodically zeroed using the **ZERO** menu option to compensate for both extreme temperature and probe wear effects. Before using, allow the probe to reach ambient temperature.

If measurements will be made in extreme hot or cold temperatures, it is recommended to **ZERO** the probe in the working environment.

If measurements will be made on rough substrates, it is recommended to periodically **ZERO** the probe to compensate for wear.

1. Make sure the Gage is on and the probe is wiped clean.

2. Hold probe in air, away from substrate.

3. Select the **Zero** menu option.

4. When complete, Gage will double beep and display "----".

Set Range

The measuring range of each probe can be changed depending on the specific application or the expected thickness range of the coating system.

For most applications, the default range values do not have to be adjusted. But some conditions, like surface roughness, may cause the Gage to display very low or non-repeatable readings. In this case, the low range may be increased to cause the Gage to only display readings above the Lo value set by the user.

To adjust **Set Range** values...

1. Select $\boxed{\text{Lo}}$ or $\boxed{\text{Hi}}$ with the **Up** and **Down** buttons.

2. Use the **(-)(+)** buttons to decrease/increase the displayed value.

IMPORTANT:

The *PosiTector 200* interprets the largest "echo" or "echoes" within the selected range as the coating/coating or coating/substrate echo. If the coating thickness is outside this range, incorrect or dashed readings may occur.

Here are some typical Range settings...

Expected paint thickness	Lo Range	Hi Range
500μm (20 mils) on concrete	130μm (5 mils)	1000μm (40 mils)
50μm (2 mils) on wood	25μm (1 mil)	250μm (10 mils)

Thickness

The *PosiTector 200* measures most polymer coatings accurately out-of-box with no adjustment required.

To determine if an adjustment is necessary, select a coating sample of known thickness as close as possible in composition to the intended application. For best results, the thickness of the sample should be equal to or slightly greater than the maximum expected thickness of the coating to be measured.

Measure the coated sample. If the average of a series of measurements on the sample is not close to the known thickness...

1. Select the **Thickness** menu option.

2. Use **(-)** or **(+)** to decrease/increase the displayed measurement thickness value to match the known thickness of the sample.

3. For *Advanced models* with multiple layers selected, use the **Down** navigation button to select the next layer and adjust as necessary.

4. To save adjustments, use **Down** navigation button to highlight **OK** and press the center navigation [▦] button.

Polyurea [✓] *(PosiTector 200 D probes only)*

When checked, the Gage loads a pre-programmed calibration adjustment optimized for measurement of polyurea coatings. "Polyurea" will appear on the upper right corner of the display.

NOTE: D Probe Measuring Range: 2 - 200 mils (50 - 5000 um)

Cal Lock [✓]

When checked, the [🔒] icon appears and the current calibration settings are "locked" to prevent further user adjustments.

Cal Reset

Restores the Gage back to factory calibration and range settings. The [0] icon will appear on the display.

Setup Menu

| Reset |

Reset (soft reset) restores factory settings and returns the Gage to a known condition. The following occurs:

- All batches, stored measurements, images, batch names and screen captures are erased.
- All calibration and range adjustments are cleared and returned to the Gage's factory settings.
- The $\mathcal{Q}$ icon will appear on the display.

- Menu settings are returned to the following:

Memory = OFF	**Bluetooth** = OFF	**Layers** = 1
Graphics = ON	**Display** = None	**Layer Name** = Layer 1
Cal Lock = OFF		**Layer Color** = blue

Perform a more thorough **Hard Reset** by powering down the Gage, waiting several seconds, then simultaneously holding both the center [⚙] and **(+)** buttons until the **Reset** symbol ↺ appears. This returns the Gage to a known, "out-of-the-box" condition. It performs the same function as a menu **Reset** with the addition of:

- Bluetooth Pairing info is cleared.
- Menu settings are returned to the following:

Units = microns	**Battery Type** = Alkaline
Flip Display = Normal	**Backlight** = Normal
Language = English	**USB Drive** = ON
Auto Sync = OFF	**Polyurea** = OFF

NOTE: Date, Time and WiFi settings are not affected by either **Reset**.

Gage Info

Displays the model number & serial number, probe type & serial number, PosiSoft.net registration key, the amount of remaining memory for storage of readings, date and time and software packages.

For security purposes, the registration key is required to add the Gage to your PosiSoft.net account.

Graphics ☑ *(Advanced models only)*

When selected, the Gage displays a graphical representation of the ultrasonic pulse as it travels through the coating system.

As the probe is depressed and the ultrasonic pulse travels through the coating system, the pulse encounters changes in density at the interfaces between coating layers and between the coating and the substrate.
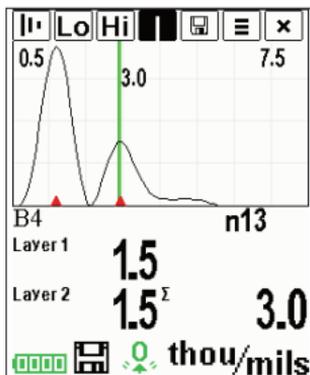
These interfaces are depicted by a "peak". The greater the change in density, the higher the peak. The more gradual the change in density, the greater the width of the peak. For example, two coating layers made of essentially the same material and "blended" would result in a low, wide peak. Two materials of very different density and a well-defined interface would result in a high, narrow peak.

The *PosiTector 200* chooses the highest peak (single layer) or peaks (multi-layer) within the **Set Range**. For example, if the number of layers is set to 3, the three highest peaks would be identified with small red triangles. The peak values are also displayed numerically as thickness measurements.

NOTE:

The Graphics display can also be accessed using the

|I·|Lo|Hi| I |🖫|≡|✖|

Use the navigation **Up** (move left) and **Down** (move right) buttons to highlight icons on the graphic display.

|I·| **Zoom** - Visually magnifies the waveform of the displayed peaks for more visibility. Pressing the **(+)** or **(-)** button repeatedly will increase/decrease the zoom.

|Lo| |Hi| **Set Range** - Press the **(-)** or **(+)** buttons to adjust the Gage's **Lo** or **Hi** measuring range (See pg. 11).

| I | **Cursor** - The Cursor allows for further analysis of displayed waveform. Use the **(-)(+)** buttons to move the green cursor line left or right over the waveform. The thickness value is displayed at the top right of the cursor line. This feature is particularly useful in multi-layer applications where there are more than 3 distinct layers.

|🖫| **Screen Capture** - Press |✺| to capture and save an image copy of the current display. The last 10 screen captures are stored in memory and can be accessed when connected to a computer (See examples pg. 22 and *PosiSoft USB Drive* pg. 23).

Shortcut: Press and hold the **(-)(+)** buttons simultaneously to capture any screen.

|≡| **Menu** - Press |✺| to access the Gage's main menu.

|✖| **Exit** - Press |✺| to close the Graphics display. Press the **Up** button to return to the Graphics display.

15

| Layers | *(Advanced models only)* |

Advanced models of the **PosiTector *200*** are capable of numerically displaying up to three individual layer thicknesses in a multi-layer system.

Example:
Two Layer Application

Couplant
Probe
Layer 1
Layer 2
Substrate

Total thickness
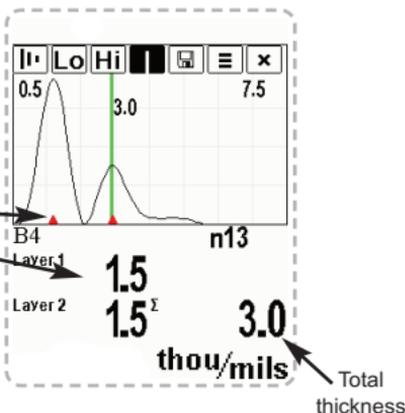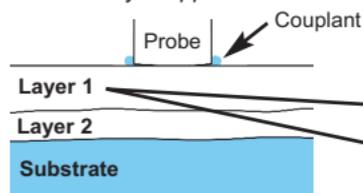
From the **Layers** menu option...

Select up to three individual layer thickness values:

```
        Select Layers
    ┌──────────────────┐
    │        1        □ │
    │        2        □ │
    │        3        ☑ │
    │       Exit         │
    └──────────────────┘
```
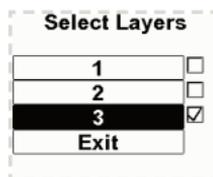
Edit:
- Edit **Layer Names** (up to 7 characters)
- Edit **Layer Color** (blue, green or red) - *See Display, pg. 21.*

```
        Edit Layers
    Name     Color
  1: Layer 1   blue
  2: Layer 2   green
  3: Layer 3   red
   [ OK ]  [ Cancel ]
```
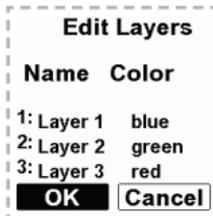
NOTES:

- Before setting up the Gage for multi-layer measurement, it is recommended that you first take measurements in single layer mode and interpret the results using the **Graphics** option (See pg. 14).
- When a batch is **Open**, press the **Up** button to view the Batch Chart.

Flip Display

Enables right-side-up viewing.

Backlight (Advanced models only)

Selects display brightness (Sun, Normal or Night). All settings will dim slightly after a period of no activity to conserve battery life. Press the **Down** button to brighten the display.

Set Clock

All measurements are date and time stamped (24 hour format) when stored into memory. It is therefore important to keep both the date and time current using this menu option. Use the **Up** and **Down** buttons to scroll, and the **(-)** and **(+)** buttons to adjust a value. The Gage's date and time can also be viewed in **Gage Info** (pg. 14).

Battery Type

Selects the type of batteries used in the Gage from a choice of "Alkaline", "Lithium" or "NiMH" (Nickel-metal hydride rechargeable). If NiMH is selected, the Gage will trickle charge the batteries while connected via USB to a PC or optional AC charger (Gage must be powered ON). The battery state indicator icon is calibrated for the selected battery type. No damage will occur if the wrong battery type is selected.

DeFelsko recommends *eneloop* (NiMH) rechargeable batteries (pg. 36).

Units

Converts the display from inch to metric or vice versa. Stored measurements in memory are not converted.
Switching units will turn off Statistics view and closes Memory.

Language

Converts displayed and printed words to the selected language.

Memory Management

The **PosiTector** *200* has internal memory storage for recording measurement data. Stored measurements can be reviewed on-screen or accessed via computers, tablets and smart phones. Measurements are date and time-stamped.

Button functions with **Memory** ON:

Scroll through display modes *(Advanced only)*

Create a new batch *(Advanced only)*

Delete last reading

Access the Menu

Restore brightness after dimming *(Advanced only)*

Standard models store up to 250 readings in one batch.

The **Memory** Menu includes the following options...

On: turns memory on and begins recording

Off: stops recording (stored readings remain in memory)

Clear: removes all readings from memory

View: lists group statistics and all stored readings on the display. It will begin by showing statistics based on all readings in memory. Use the **Up** and **Down** buttons to scroll through all readings. Press 👐 to exit.

Standard Model display with **Memory** ON shows measurement statistics:

Mean (average)

# of readings in memory

Standard Deviation

n28

35.76X̄   0.44σ

Maximum measurement

36.4↑   34.5↓

Minimum measurement

35.9

Last reading

thou/mils

18
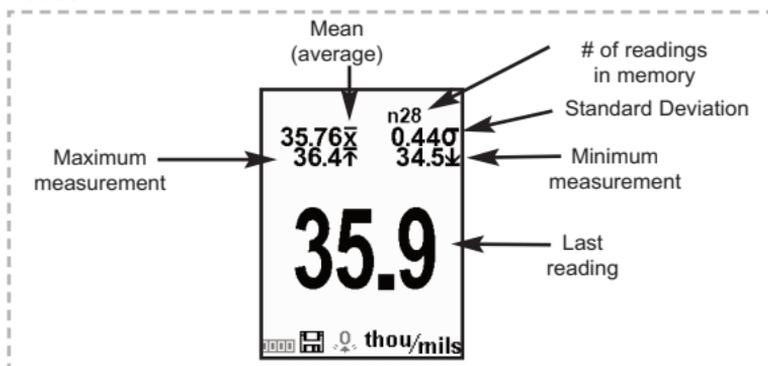
Advanced models store 100,000 readings in up to 1,000 batches. The **Memory** Menu includes the following options...


New Batch

Closes any currently opened batch and creates a new batch name using the lowest available number. For example, if only **Batch 1** and **Batch 3** exist, then **Batch 2** would be created and made the current batch. The 💾 icon appears and basic statistics are displayed. Each measurement will be displayed and stored into this new batch. On screen statistics are immediately updated with each measurement. New batch names are date stamped at the time they are created. Each reading is also data/time stamped.

Shortcut: When a batch is open, press **(+)** to create a new batch
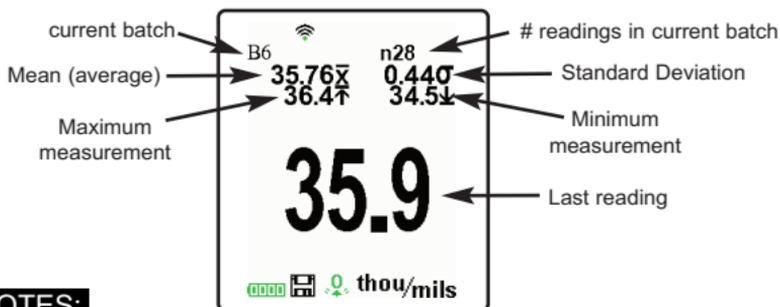
current batch — B6 — # readings in current batch (n28)

Mean (average) — 35.76x̄ — 0.44σ — Standard Deviation

Maximum measurement — 36.4↑ — 34.5↓ — Minimum measurement

35.9 — Last reading

🔋 💾 thou/mils

NOTES:

- Remove the last reading from the current open batch by pressing **(-)**.

- Calibration adjustments cannot be made if readings are stored in memory.

- If memory is ON, continuous measurements can be taken but results will not be stored in memory.

Open

Selects a previously created batch name to open and make current. If it contains measurements, onscreen statistics will immediately reflect values calculated from this batch.

Close

Stops the recording process, closes the current batch, and removes batch information from the display.

Delete

Removes a batch completely from memory. The name is deleted and all measurements are erased.

View

Scroll using the **Up** or **Down** buttons through information, statistical summary, and a list of each reading in the currently opened batch.

Press [⚙] to exit.

Annotate

Create meaningful batch names and enter notes directly on the Gage using a familiar onscreen *QWERTY* keyboard.

Use the Gage's navigation and **(-)(+)** buttons to enter annotations.

Annotations can be synchronized with PosiSoft.net and are included in all PosiSoft reports (see **Accessing Stored Measurement Data**, pg. 23).

NOTE: Annotations can also be created using PosiSoft.net (pg. 24) or PosiSoft Mobile (pg. 25).

Print

Sends a statistical summary and individual measurements to the optional Bluetooth wireless printer (see pg. 29).

NOTE: To cancel printing, press and hold the **(-)** and **(+)** buttons simultaneously.

Display *(appears only if a batch is currently open)*

The following user selectable display options are available:

📈 *Chart:* A real-time chart of batch readings

x-y Chart for Single Layer Application
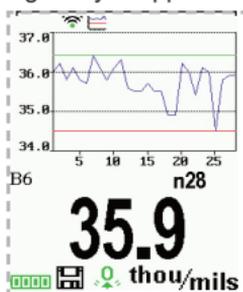
Stack Chart for Multi-Layer Application
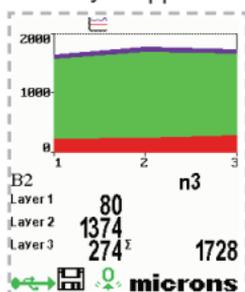
None: Default screen shows statistics

NOTE: PosiSoft.net (pg. 24) and the PosiSoft App (pg. 25) are used to insert an *Image* and *Notes* into a batch.

NOTES: Remove the last reading from the current open batch by pressing **(-)**.

Calibration adjustments cannot be made if any measurements were taken with that Cal setting and stored into a batch.

Each batch can contain a maximum of 10,000 readings.

Summaries (Advanced models only)

Displays a summary of all stored batches including the name, probe type, number of readings and type.

In the following example, Batch 3 (**B3**) indicates an "**F**" *6000* coating thickness probe was used to record a total of "**6**" readings in "**PA2**" mode.

Batch Summaries
Page 1/1

Batch Name	Probe Type	#	Type
B4	SPG	20	
B3	F	6	PA2
B2	F	10	
B1	UTG-C	5	

OK

Screen Capture

Press both **(-)(+)** buttons at any time to capture and save an image copy of the current display. The last 10 screen captures are stored in memory and can be accessed when connected to a computer (see *PosiSoft USB Drive* pg. 23).

Sample Screen Captures

B4   n13
Layer 1
1.5 1.57x̄
0.060σ
Layer 2
1.5 1.55x̄
0.070σ
Σ
3.0
thou/mils

37.0
36.0
35.0
34.0
5 10 15 20 25
B6   n28
35.9
thou/mils
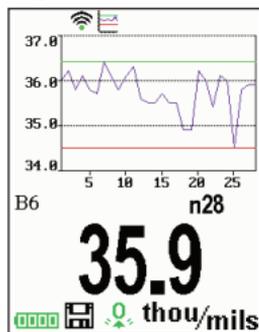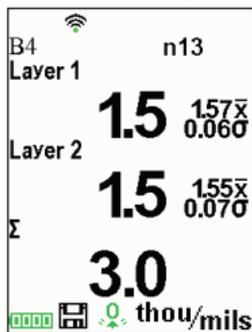
Accessing Stored Measurements Data

DeFelsko offers the following free solutions for viewing, analyzing and reporting data:

PosiSoft USB Drive - Connect the Gage to a PC/Mac using the supplied USB cable. View and print readings and graphs using universal PC/Mac web browsers or file explorers. No software or internet connection required. **USB Drive** must be selected in the Gage's "**Connec**t > **USB**" menu (pg. 24).

PosiSoft Desktop - Powerful desktop software (PC/Mac) for downloading, viewing, printing and storing measurement data. Includes a customizable, templated PDF Report Generator. No internet connection required.

PosiSoft.net - Web-based application offering secure, centralized storage of measurement data. Access your data from any web-connected device.

PosiTector App - (*Advanced models only, s/n 784000+*) App for compatible iOS and Android smart devices. Permits users to create, save and share professional PDF reports. Add images and notes using the smart device's camera and keyboard.

Learn more at http://www.defelsko.com/posisoft/posisoft.htm

Connect Menu

$(((\text{\scriptsize\textbullet})))$

WiFi (Advanced models only)

Allows connection to your local wireless network or mobile hot spot. Ideal for using your network's internet connection for synchronizing stored measurements with PosiSoft.net (pg.24). See www.defelsko.com/wifi

Enable ✓

Turns WiFi functionality **ON**. When selected, the $(((\text{\scriptsize\textbullet})))$ icon will appear on the display. To deactivate WiFi, uncheck the Enable box.

Access Point ✓

Connect your smart device/computer to a PosiTector Advanced body wirelessly without the need for a separate network. Wirelessly import readings into PosiSoft Desktop v4.0 Software whenever a WiFi network is not available or out-of-range.

To enable, select **Access Point** from the **Connect > WiFi** menu. The Access Point icon $(((\text{\scriptsize\textbullet})))$ will display in the upper left of the PosiTector display.

Securing your Access Point -

To ensure the PosiTector is only accessible to authorized devices, it is important that you enter a passphrase (password) for the Access Point. The default Passphrase is **password**.

In the **Connect > WiFi > Setup** menu, select **AP Passphrase.**

Press 🔳 button to display on-screen keyboard. Enter a Passphrase for the Access Point. The Passphrase will be required for all devices connecting to the PosiTectors Access Point.

The PosiTector is now visible to all WiFi enabled devices. Simply connect your devices WiFi to the new PosiTector Access point. All PosiTectors are uniquely identified by their respective gage body serial numbers.

AP Channel - Default Channel: 6

For most users the default channel will not have to be altered. If you are experiencing poor connection or are unable to connect, try another channel.

In the **Connect > WiFi > Setup** menu, select **AP Channel**.

Press the **UP** center navigation button to highlight the channel. Use the (-) or (+) buttons to change the channel. Press the **DOWN** navigation button and select **OK**. Press the   button.

Networks: With WiFi Enabled (pg. 11) the Gage will allow the user to add a new network and will automatically check for available local networks. Available networks detected by the Gage are listed on the screen along with any networks that the Gage has previously been connected to that are not currently within connection range.

Information: Gage displays information about the local WiFi network connection including...

• **SSID**: the network's name

• **State**: displays if the Gage is connected to the network or not

• **IP Address**: the network's IP Address

Setup: Allows user to setup a WiFi connection

• **IP Settings**: enter the IP information as follows...

    IP Type (DHCP or Static), IP Address,
    Gateway, Netmask, DNS1, DNS2

• **Server Enable**: enables a connection between the network and the Gage

• **Gage Name**: enter a name for the Gage (up to 14 Characters).

AP Channel: The access point channel corresponding to a frequency range. (Default Channel: 6)

AP Passphrase: A series of characters, numbers or symbols used to log on to a WiFi network.   (Default Passphrase: password)

• **WiFi Reset**: erases all WiFi settings

```
USB
```

When **USB Drive** is checked ✓ the **PosiTector** gage uses a USB mass storage device class which provides users with a simple interface to retrieve stored data in a manner similar to USB flash drives, digital cameras and digital audio players.

USB Drive is also required to import stored measurements into PosiSoft Desktop software (pg.24). Once connected, any computer can view measurements stored in memory by navigating a virtual drive labeled "PosiTector" using the included USB cable.

A formatted HTML report is viewed by selecting the "index.html" or "START_HERE.html" file found in the root directory. Optionally, text ".txt" files located in each batch folder provide access to measurement values. Stored datasets and graphs can be viewed or copied using universal PC/Mac web browsers or file explorers.

When your **PosiTector** is first connected to your Windows PC via a USB cable, an enumeration process is started that installs device drivers without re-booting your computer. You may see several pop-up windows in the taskbar at the bottom right of your screen. Wait for the entire process to be completed before proceeding.

Serial Streaming via USB (Advanced models only, serial numbers 784000 and greater)
Advanced gage bodies have the ability to serial stream live readings from the USB port

The following document links will help operators use this feature:

PosiTector Advanced USB Serial Streaming Instructions --
http://www.defelsko.com/usb/PosiTectorAdvanced-USBserial.pdf

Required driver (referenced in above document) --
http://www.defelsko.com/usb/gserial.zip

Retrieving stored screen captures:
The last 10 screen captures stored in memory can be accessed by navigating to the "screen capture" directory within the "PosiTector" virtual drive.

NOTE: When connected, power is supplied through the USB cable. The batteries are not used and the body will not automatically power down. If rechargeable (NiMH) batteries are installed, the instrument will trickle charge the batteries.

Sync .net Now

The below **WiFi**, **USB** and **Bluetooth** menus contain a **Sync .net Now** option. When selected, the Gage immediately synchronizes stored measurement data via its respective communication method (internet connection required).

Alternatively, select **Auto Sync .net** from within the **USB** connect menu to automatically synchronize upon connection to a PC. Additional measurements added to memory while connected are synchronized only when the USB cable is disconnected and reconnected, or when the **Sync .net Now** option is selected.

WiFi connected gages automatically attempt synchronization upon power-up.

NOTE: PosiSoft Desktop (pg. 24) is required when using **USB** or **Bluetooth** connections to synchronize measurements with PosiSoft.net.

Bluetooth Smart (Advanced models only, serial numbers 784000 and greater) **Bluetooth**®

When **Enabled** ☑, allows communication with a smart device running the PosiTector App (pg. 24) via auto-pairing Bluetooth Smart (BLE) wireless technology.

Select ☑ batches to flag them for synchronization to the PosiTector App. New batches created while **Bluetooth Smart** is enabled are automatically selected.

Sync Batches

With **Bluetooth Smart** enabled, select **Sync Batches** to transfer selected batches to the PosiTector App. This is useful when switching between smart devices, as only readings and batches that have yet to be synchronized with any smart device are synchronized automatically.

NOTE: If **Bluetooth Smart** is disabled, data from batches selected in the **Sync Batches** menu are held in a queue until communication with the PosiTector App is re-established.

Send Batches

Transfers selected ✓ batches to the PosiTector App (useful when switching between devices).

The **Send Batches** option is visible in the menu when the Gage is connected to a smart device running the PosiTector App.

Bluetooth (Advanced models only)   **❸ Bluetooth**®

Allows individual readings to be sent to a computer, printer or compatible device as they are taken using Bluetooth wireless technology. See www.defelsko.com/bluetooth

Pairing

The instrument and receiving device must be paired before stored or streamed datasets can be transmitted. For pairing instructions, see http://www.defelsko.com/bluetooth

Info

Lists information about your current Bluetooth connection, including the currently paired device and MAC address.

Stream

When checked, the instrument will stream datasets to the paired Bluetooth Device as they are taken. Datasets can be streamed as they are taken to the optional Bluetooth printer or third-party computer software.

Powder Probes

Displays menu options that enable the PosiTector Advanced body to communicate with wireless PosiTector PC probes. See http://www.defelsko.com/pc

Updates

Determines if a software update is available for your Gage. If an update is available, a prompt will appear allowing the user to choose to perform the update at this time or not.

To perform an update the Gage must be connected to an internet connected computer with *PosiSoft Desktop* (pg. 24), or **WiFi** network (pg. 24).

NOTE: Ensure that stored measurements are backed up to a PC or *PosiSoft.net*. The Gage may perform a **Hard Reset** (pg. 14) after completion of the update and ALL readings in memory will be erased.

Updates - Sample Screen

Currently installing update 2 of 3 total

2 / 3

Progress bar
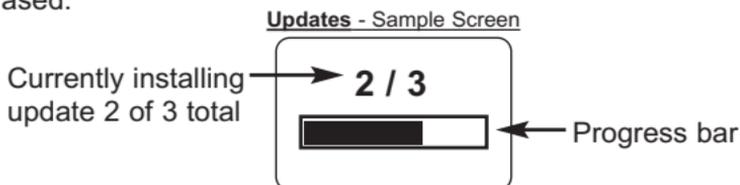
⚠ **DO NOT** unplug the Gage during the update operation.

Application Notes

The *PosiTector 200* uses an ultrasonic principle to measure coating thickness of most coatings on most substrates. An ultrasonic signal is a very high frequency sound wave. Like the echoes you hear when you shout in a large hall or canyon the *PosiTector 200* listens for echoes from acoustic boundaries within your application.

The *PosiTector 200* probe emits a high frequency sound pulse that travels into the coating via a coupling gel and reflects from ANY surface that is different in density. Coating thickness readings are obtained by measuring the time taken for the ultrasonic signal to propagate from the probe to the coating/substrate interface and back. The travel time is divided by two and multiplied by the velocity of sound in the coating to obtain the thickness of the coating. The strength of the reflected signal from the coating/substrate interface determines the ability of the Gage to measure the thickness of the coating. Since most applications are not homogeneous the Gage will "hear" many echoes when placed on a coating/substrate. The Gage "hears" ALL reflections within the measurement limits of the Gage and assumes the largest "echo" is the coating/substrate echo (single coating applications only). Adjustable measurement Ranges have been provided for the user to force the Gage to ignore echoes from unwanted boundaries within the sample. Several examples below help to illustrate the use of the **Set Range** (pg. 11) feature for specific applications.

Measurement of coatings with rough surfaces.
When rough coatings are measured, the Gage typically identifies the thickness from the top of the coating peaks down to the substrate (#1). Couplant fills the voids between the probe and the coating (#2) creating an additional interface. If echoes from the couplant/coating interface (#2) are stronger than the coating/substrate interface (#1), an adjustment (increase) of *Lo* Value may be required for the Gage to display the weaker (#1) echo.
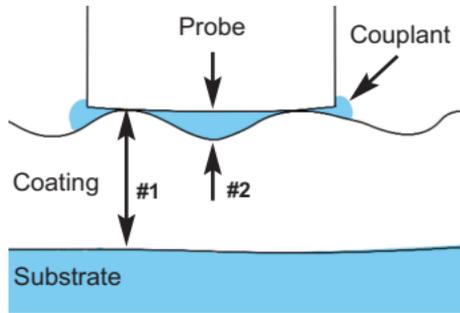
Measurement of dense (hard) coatings.
A significant echo occurs at the probe/coating interface. The relative strength of this echo compared to the coating/substrate echo requires that *Lo* Value be increased.

Measurement of total thickness in multi-layer coating applications.
Multiple coating/coating/substrate interfaces may generate several echoes. The user may need to adjust the Gage's **Set Range** (pg. 11) to ignore echoes from coating/coating interfaces.

Troubleshooting

Some common reports received by our Service Department along with possible causes. Most conditions however can be cleared with a **Reset** (pg. 13).

Gage does not turn on
Make sure the + and - battery terminals are positioned properly and that fresh batteries are being used.

Gage powers up but fails to stay on
Replace batteries with fresh batteries. If problem persists return Gage for service.

Gage readings are much lower than expected
Gage may be measuring surface roughness. Raise the value of **Lo** Range (See pg. 11).

Gage readings are much higher than expected
Gage may be measuring both the coating and substrate. Lower the value of **Hi** Range (See pg. 11).

Gage does not yield accurate or consistent results
See the **Set Range** (pg. 11) and **Thickness** Adjustment (pg. 12) sections to ensure the Gage has been optimized for your application. Check the Gage on traceable standards.

Gage displays an error message while attempting probe ZERO

```
ZERO FAILED
   OK
```

Make sure to hold the probe in the air and ensure the probe is free of couplant and the probe tip area is clean. If problem persists, note the error message and contact our technical support department.

Gage displays dashed line "----" and emits low-tone buzz while attempting to obtain measurement
This occurs when the Gage is unable to obtain a measurement result. Ensure sufficient couplant (gel) has been applied to the surface of the coating and repeat measurement.

When the Gage is set up for multiple layers, "----" will be displayed for each layer the Gage is unable to obtain a measurement result for. The most common reasons for this is that the individual layers are too acoustically similar or are too thin for the Gage to distinguish between them. Reduce the number of layers the Gage is set up for and repeat measurement.

Power Supply / Battery Indicator

Power Source: 3 AAA alkaline, Lithium or optional Nickel-metal hydride (NiMH) rechargeable batteries. For best battery indicator results, ensure the appropriate **Battery Type** is selected in the **Setup** > **Battery Type** menu (pg. 17).

The battery indicator ▮▮▮▮ displays a full bar with fresh alkaline or fully charged batteries installed. As the batteries weaken, the bar will be reduced. When the battery symbol is low ▯▯▯▮ the Gage can still be used, but the batteries should be changed or recharged at the earliest opportunity. The Gage will turn off automatically when batteries are very low, preceded by a Low Battery Warning on the display.

⚠ To retain all user settings and stored memory readings, only replace the batteries after the Gage has powered-down.

Battery performance decreases at low temperatures.

Technical Data

PosiTector 200 Model	B/Std	B/Adv	C/Std	C/Adv	D/Std	D/Adv
Measures total thickness	X	X	X	X	X	X
Measures Individual Layers		X		X		X
Graphic Display		X		X		X
Typical Applications	Polymer coatings on wood, plastic, etc.		Coatings on concrete, fiberglass, etc.		Thick, soft coatings like polyurea, asphaltic neoprene, very thick polymers, etc.	
Range*	13 – 1000 microns 0.5 – 40 mils		50 – 3800 microns 2 – 150 mils		50 – 7600 microns 2 – 300 mils	
Accuracy	+/- (2 microns + 3% of reading) +/- (0.1 mils + 3% of reading)				+/-(20um + 3% of reading) +/- (1 mil + 3% of reading)	
Minimum Individual Layer Thickness**	-	13 microns 0.5 mils	-	50 microns 2 mils	-	500 microns 20 mils
Thickness Standard	DeFelsko STDA3		DeFelsko STDP6		DeFelsko STDP1	

* Range limits apply to polymer coatings only.

** For multiple layer applications only. Dependent on material being measured.

Gage Size:
135 x 61 x 28 mm
(5.25" x 2.4" x 1.1")

Weight:
140 g (4.9 oz.)
without batteries

Temperature Range:
0 to 40°C
(+32° to +104°F)

200 B and C probes
Probe Details

43mm / 1.7"
Ø8mm / 0.3"
Ø22mm / 0.9"
Ø30mm / 1.2"
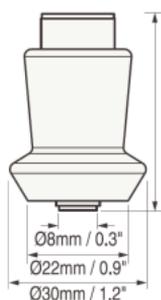
200 D probe
Probe Details

59mm/2.3"
Ø12.5mm/0.5"
Ø22mm/0.9"
Ø30mm/1.2"

Conforms to: ASTM D6132 and ISO 2808
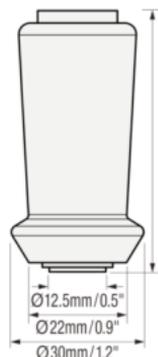
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Returning for Service

Before returning the instrument for service…

1. Install new batteries in the proper alignment as shown within battery compartment.

2. Examine the sensor for debris or damage.

3. Perform a **Hard Reset**. (see pg. 14)

4. If issue is not resolved, **Update** (pg. 30) your **PosiTector** gage body and re-attempt measurements.

IMPORTANT: If you must return the Gage for service, please fill out and include the Service Form located at www.defelsko.com/support with the Gage. Be sure to also include the probe, your company name, company contact, telephone number and fax number or email address.

Limited Warranty, Sole Remedy and Limited Liability

DeFelsko's sole warranty, remedy, and liability are the express limited warranty, remedy, and limited liability that are set forth on its website:

www.defelsko.com/terms

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