



PosiTector 200

Coating Thickness on Non-Metals

EMIN
Testing & Measuring Everything

Why Measure Coating Thickness?

Arguably the single most important measurement made during application and inspection of protective coatings

Affects the appearance and performance of the coating system:

- Color
- Surface profile
- Flexibility
- Hardness
- Gloss
- Adhesion
- Impact resistance

Helps control material costs, manage application efficiency, maintain finish quality and ensure compliance with contract specifications

PosiTector® 200 – History

For over 25 years, DeFelsko has been the market leader in Ultrasonic coating thickness measurement



First Generation
PosiTector 100 (1993)
Primarily Intended for thicker
coatings on concrete and wood



Second Generation
PosiTector 100 (1999)
Individual layer
thicknesses, thinner
coatings



Third Generation
PosiTector 200 (2003)
Simpler to operate, more
affordable



Fourth Generation
PosiTector 200 (2006)
More advanced capabilities,
graphing



Fifth Generation
PosiTector 200 (2012)
Probe interchangeability

PosiTector[®] 200 – Overview

Ideal for measuring up to three layers of coatings on concrete, wood, plastic, and more

- Proven non-destructive technique conforms to ASTM D6132, ISO 2808 and SSPC-PA9
- Ready to measure- no adjustment required to measure most coatings
- Measures the total thickness of the coating system, or up to three individual layer thicknesses in a multi-layer system (Advanced models only)
- Features a graphical readout, useful for troubleshooting challenging applications (Advanced models only)



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PosiTector® 200 – Probes

- Three probe models available for a variety of applications
- Consider range AND typical applications- probes use different frequencies designed for different applications.

Select from a variety of measurement ranges

Probes	200B	200C	200D
Typical Applications	Polymer coatings on wood, plastic, etc.	Coatings on concrete, fiberglass, etc.	Thick, soft coatings such as polyurea, asphaltic neoprene, very thick polymers, etc.
Measurement Range	13 – 1000 µm 0.5 – 40 mils	50 – 3800 µm 2 – 150 mils	50 – 7600 µm 2 – 300 mils
Accuracy	+/- (2 µm + 3% of reading) +/- (0.1 mil + 3% of reading)		+/- (20 µm + 3% of reading) +/- (1 mil + 3% of reading)
Minimum layer Thickness	13 µm 0.5 mil	50 µm 2 mil	500 µm 20 mil

PosiTector 200 B



Measuring Range

13 to 1000 μm (0.5 to 40 mils)



PosiTector 200 B Common Applications

- **Paint and varnish coatings on wood/veneer**
 - Furniture
 - Musical Instruments
 - Airplane cabinets and other interior components
 - Coatings on MDF and other fiberboard
 - Dry adhesives applied to wood
 - UV cure coatings on wood
- **Paint on drywall/gypsum board**
- **Thin paint application on composites**
 - Automotive composites
 - Airplane radomes and other aerospace parts
 - Conformal coatings
- **Paint applied to plastics**
 - Automotive plastics (including over ADAS sensors), non-textured interior components
 - Measurement of coatings on plastics in manufacturing environments

200

PosiTector 200 C

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Measuring Range

50 to 3800 μm (2 to 150 mils)

Common Applications

- Paint applied to concrete/masonry
 - Concrete floor coatings
 - Liquid-applied waterproofing membranes
 - Paint applied to stucco
- Thicker paint applied to composites like fiberglass

A white PosiTector 200 D probe with a black cable and a black cylindrical sensor at the end. The number '200' is printed in white on a red background on the white body.

200

PosiTector 200 D

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Measuring Range

50 to 7600 μm (2 to 300 mils)

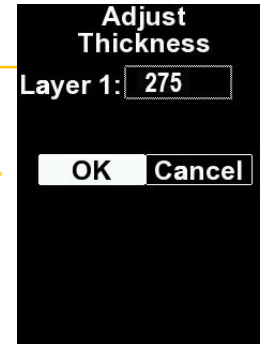
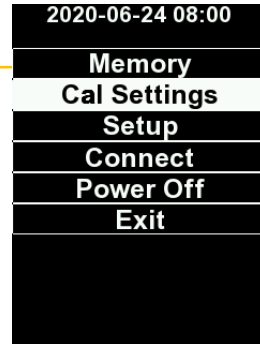
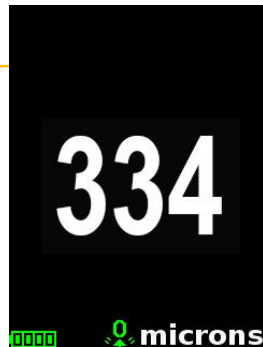
Special Feature – Polyurea Mode: specifically designed for the acoustically attenuative characteristics associated with polyurea

Common Applications

- Polyurea
 - Water containment systems (applied to geotextile)
 - Used in some parking structures
 - Roofing systems
- Asphaltic neoprene

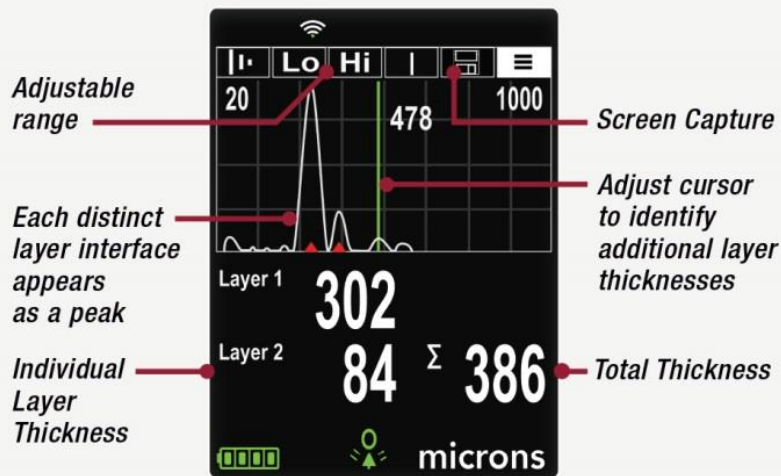
PosiTector 200 – Thickness Adjustment

- The PosiTector 200 measures most polymer coatings out-of-box with no adjustment required.
- Determine if a thickness adjustment is necessary by taking an average of several readings of a known thickness reference mirroring characteristics the application.
- If results are consistent but inaccurate, adjust the gage to account for the differing velocity of your coating.



PosiTector 200 – Graphics Mode

Graphic display provides detailed analysis of coatings



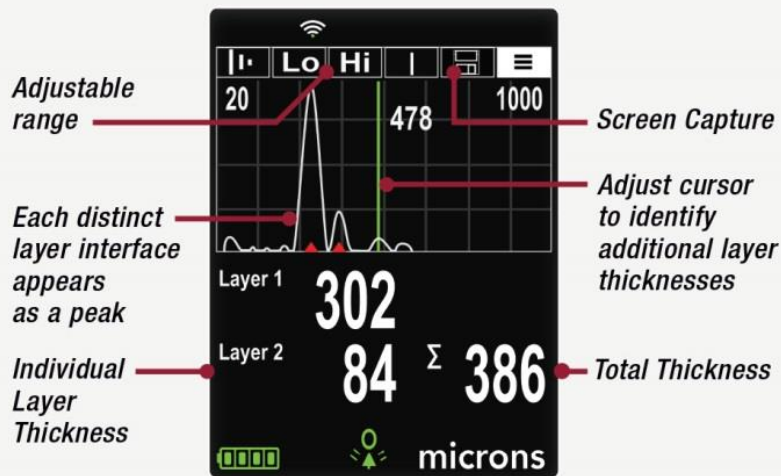
Advanced Model shown in Graphics mode

Graphical Representation of ultrasonic pulse as it travels through the coating system

- The 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 PosiTector 200 chooses the highest peak (single layer) or peaks (multi-layer) within the Set Range

PosiTector 200 – Graphics Mode

Graphic display provides detailed analysis of coatings



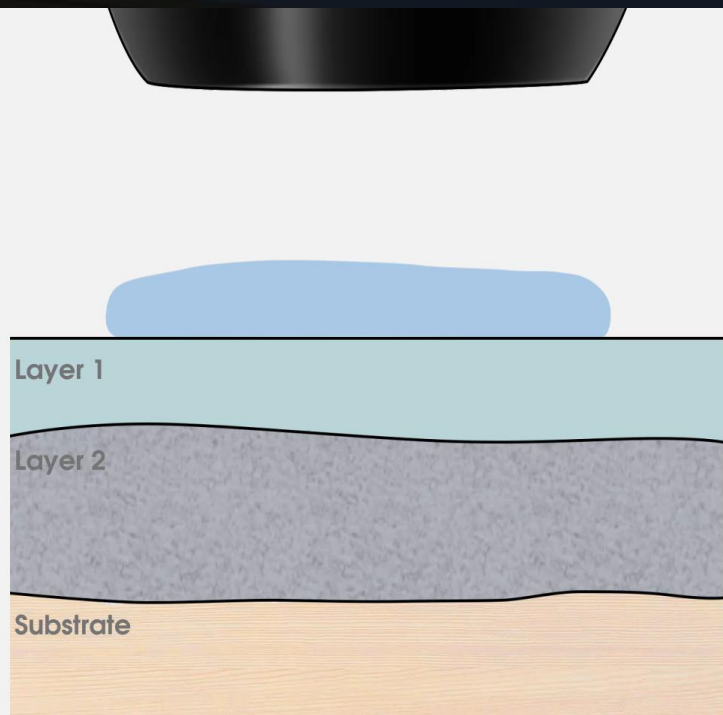
Advanced Model shown in Graphics mode

- Zoom – magnifies the waveform of the displayed peaks for greater visibility
- Lo/Hi - The measuring range of each probe can be changed depending on the specific application or the expected thickness range of the coating system
- 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
- Screen Capture – Save an image copy of the current display (up to 10 images)
- Menu – Access the gage menu

PosiTector[®] 200 – The Principle of Measurement

Reads the largest “echo”
within user-specified
range

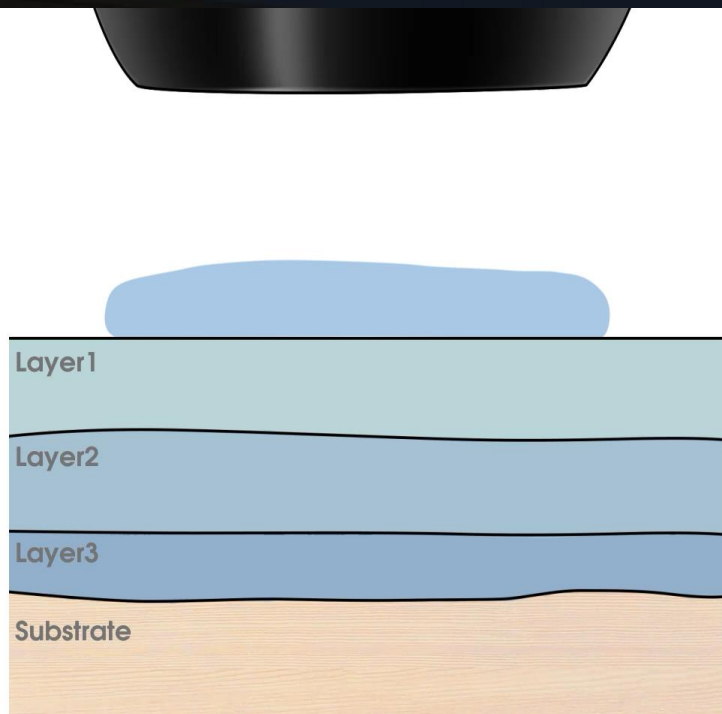
Dominant echo is usually
the coating/substrate
interface



PosiTector[®] 200 – Multiple Layers

Set the instrument to read the number of anticipated layers

Each layer thickness is reported along with a total thickness

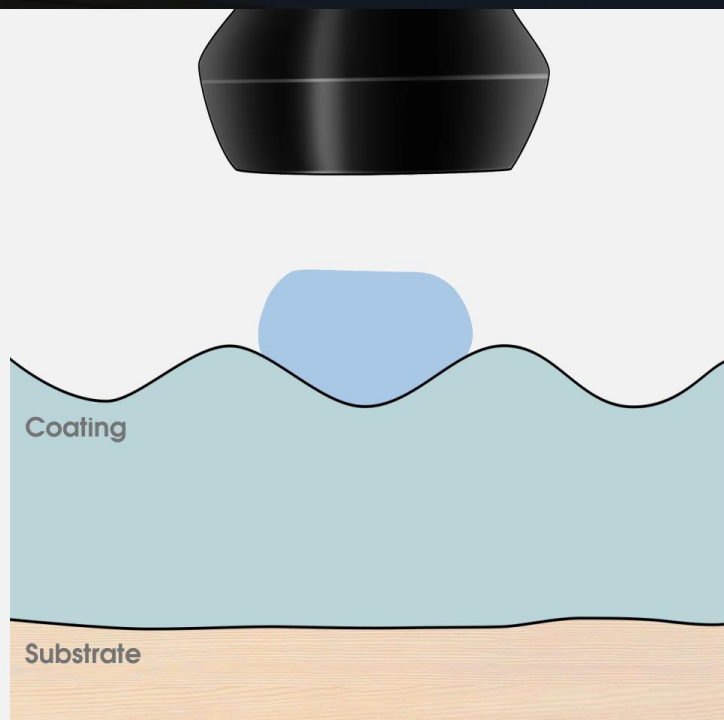


PosiTector® 200 – Application Note: Surface Roughness

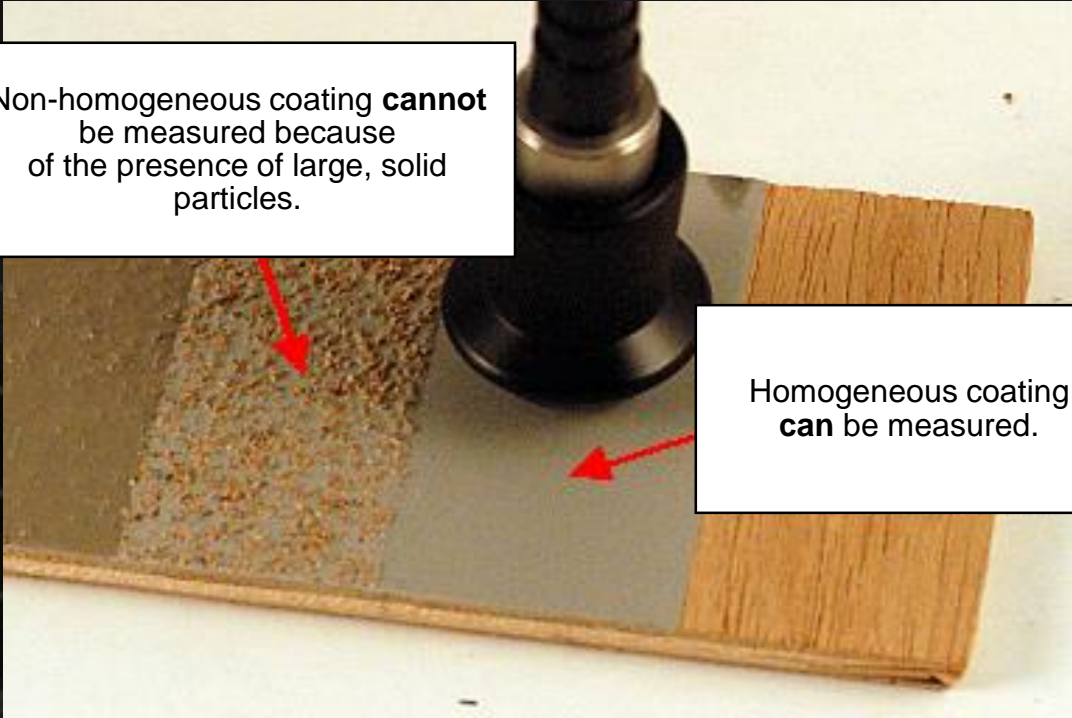
For performance or aesthetics, many coatings are designed to have a rough surface finish

The loudest echo sometimes comes from the surface roughness

Solution: Change the low-range value to ignore that echo



PosiTector 200 – Application Note: Non-Homogeneous Coatings



Non-homogeneous coating **cannot**
be measured because
of the presence of large, solid
particles.

Homogeneous coating
can be measured.

PosiTector® 200 – Application Note: Coatings on Metals

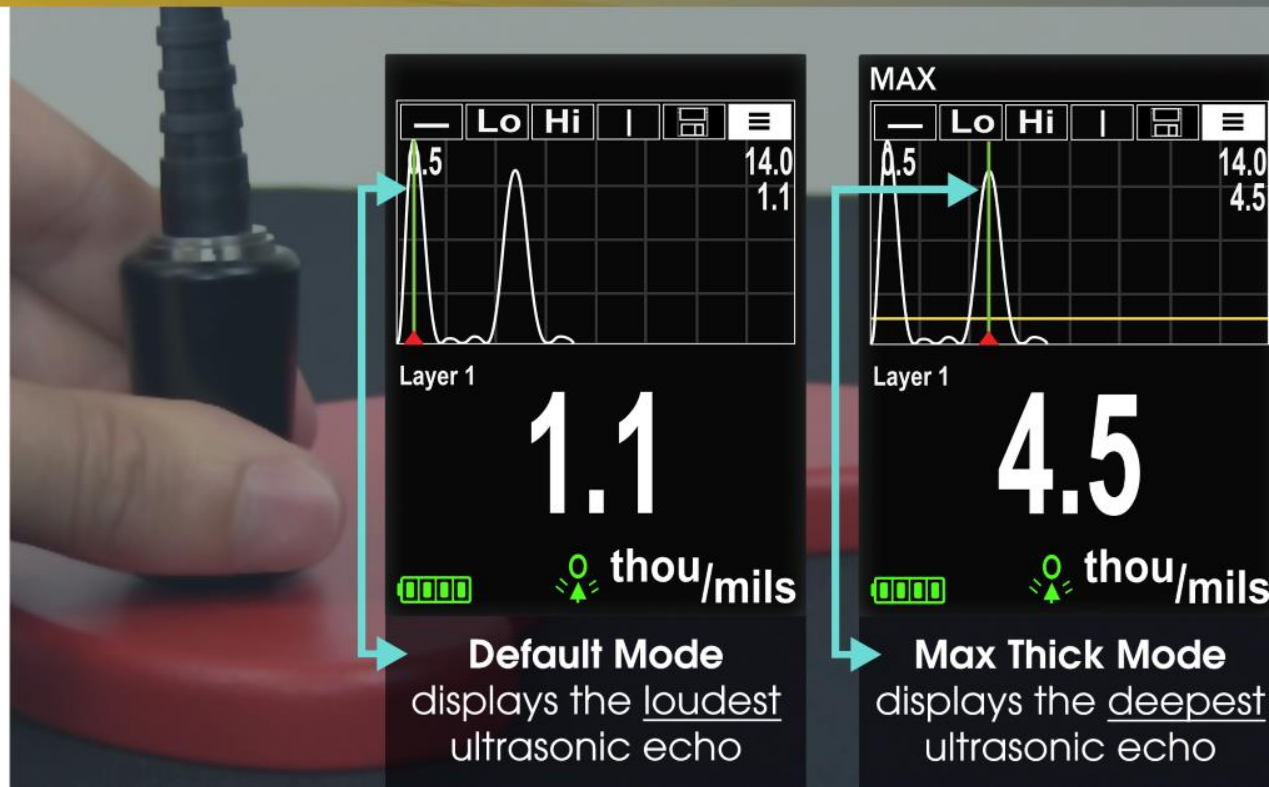
- In general, the PosiTector 200 is not ideal for metal substrates
 - There are no test methods for the ultrasonic measurement of coatings on metal substrates
 - PosiTector 6000 probes are less expensive, designed for the application, and don't require couplant
- For a single layer of coating on metal substrates, the PosiTector 200 generally works well
 - The PosiTector 200 coating thickness standards have metal substrates
- Multiple layer applications are challenging- the loud echo off the metal substrate 'overwhelms' the smaller echoes between the layers, making them unreadable.
 - Application dependent
 - Increased minimum layer thickness of $> 125 \mu\text{m}$ (4.9 mils)



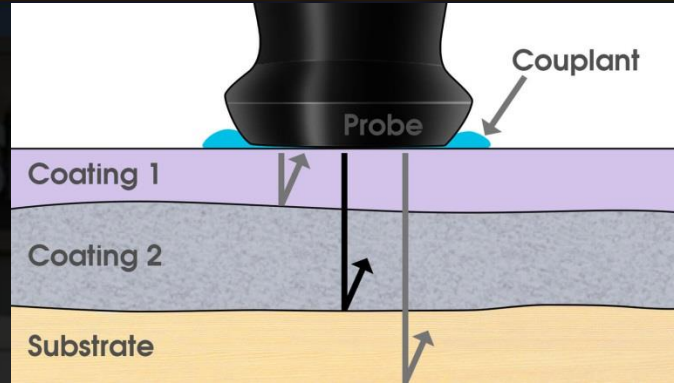
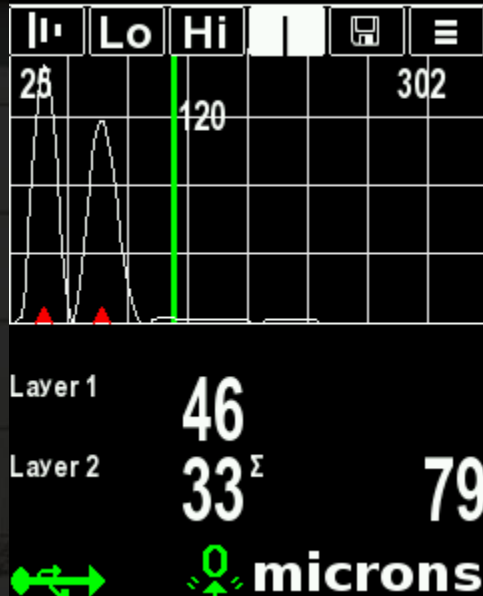
Certified Coated Metal Plates

New – Max Thick Mode

Ideal for ignoring unwanted surface echoes and eliminates the need to adjust the Lo Range when measuring rough coatings



PosiTector 200 – Example: Automotive Plastic



PosiTector 200 – Frequently Asked Questions

Q: Why doesn't the gage measure accurately on the un-coated part?

A: Unlike magnetic or eddy-current principle gages, an uncoated substrate is not required to Zero the PosiTector 200. Instead, the probe is held in the air away from the substrate when the Zero is performed. The PosiTector 200 will not provide a meaningful measurement on an uncoated part.

PosiTector 200 – Frequently Asked Questions

Q: Can I use the instrument without couplant?

A: The PosiTector 200 requires the use of a liquid couplant to propagate sound in to the coating.

PosiTector 200 – Frequently Asked Questions

Q: What can I use if I run out of couplant?

A: Most liquids will suffice as a substitute. We supply a glycol-based gel because it's shelf-stable and provide adequate viscosity for measuring on vertical surfaces.

PosiTector 200 – Frequently Asked Questions

Q: Why are all of my readings much lower than expected?

A: Abnormally low readings are typically the result of a “surface reflection.” When the probe face bridges the roughness of the coating, the sound can bounce off of the coating surface. The gage can eliminate this undesired reflection in one of two ways.

- 1. Activate “Max Thick Mode” within the Settings menu.
- 2. Increase the Lo Range setting beyond the reflection.

PosiTector 200 – Frequently Asked Questions

Q: I applied my coating in several layers, why is the gage failing to read when in 2 or 3 layer mode?

A: The PosiTector 200 reports a new layer when it detects a difference in density. If multiple layers of the same coating is applied, the gage may not sense an interface between the layers.

PosiTector 200 – Frequently Asked Questions

Q: Can I use the PosiTector 200 on metal surfaces?

A: The PosiTector 200 can measure coatings applied to metals in some circumstances but measurement with a magnetic induction/eddy current gage like the PosiTector 6000 will provide more accurate results.

PosiTector 200 – Frequently Asked Questions

Q: What is the shelf life of the couplant gel?

A: The couplant should be replaced when it's no longer a homogenous gel. The shelf life of the gel typically exceeds 8 years.

Note: Prolonged exposure to sunlight (UV) will cause the couplant to discolor. It still can be used, provided it has the necessary viscosity for the job.

PosiTector 200 – Frequently Asked Questions

Q: Why do my readings sometimes vary greatly when measuring a coating applied to the concrete?

A: The surface of concrete can be quite rough, which can create significant variations in thickness of the actual coating.



PosiTector 200 – Resources

- PosiTector 200 videos – youtube.com/defelsko
- Safety Data Sheet for couplant
- Instruction Manual
- Calibration procedures
- Application Articles
 - Overview - <https://www.defelsko.com/resources/using-ultrasonic-coating-thickness-gages>
 - Concrete - <https://www.defelsko.com/resources/coating-thickness-measurement-on-concrete-masonry-substrates>
 - Drywall - <https://www.defelsko.com/resources/paint-thickness-measurement-drywall>
 - Wood - <https://www.defelsko.com/resources/dry-film-thickness-measurement-on-wood-substrates>

PosiTector 200 – Resources

- Plastic - <https://www.defelsko.com/resources/ultrasonic-paint-thickness-measurement-on-plastic-substrates>
- Polyurea - <https://www.defelsko.com/resources/measurement-of-polyurea-coatings>

PosiTector[®] 200 – Selling Points

No equal- some competitive attempts, but none feature the range, resolution, ease of use, or multi-layer capability of the PosiTector 200

PosiTector Platform

- Fully interchangeable probes
- Often, competitive 'interchangeable' probes require specific body models
- Free software, and USB, WiFi, and Bluetooth

Included Certificate of Calibration Traceable to NIST

- More than a 'Certificate of Accuracy'- contains measurements from the probe on traceable standards
- An extra charge (and delay) from most competitors

Full two year warranty on body **and** probe

- Many competitors offer a much shorter warranty on the probe- the most important part

DeFelsko service- quick shipping, recalibration, and repair

