

Thickness and Profile Inspection for Gelatine

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Precitec:

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MICRONISE

THICKNESS AND PROFILE INSPECTION FOR GELATINE

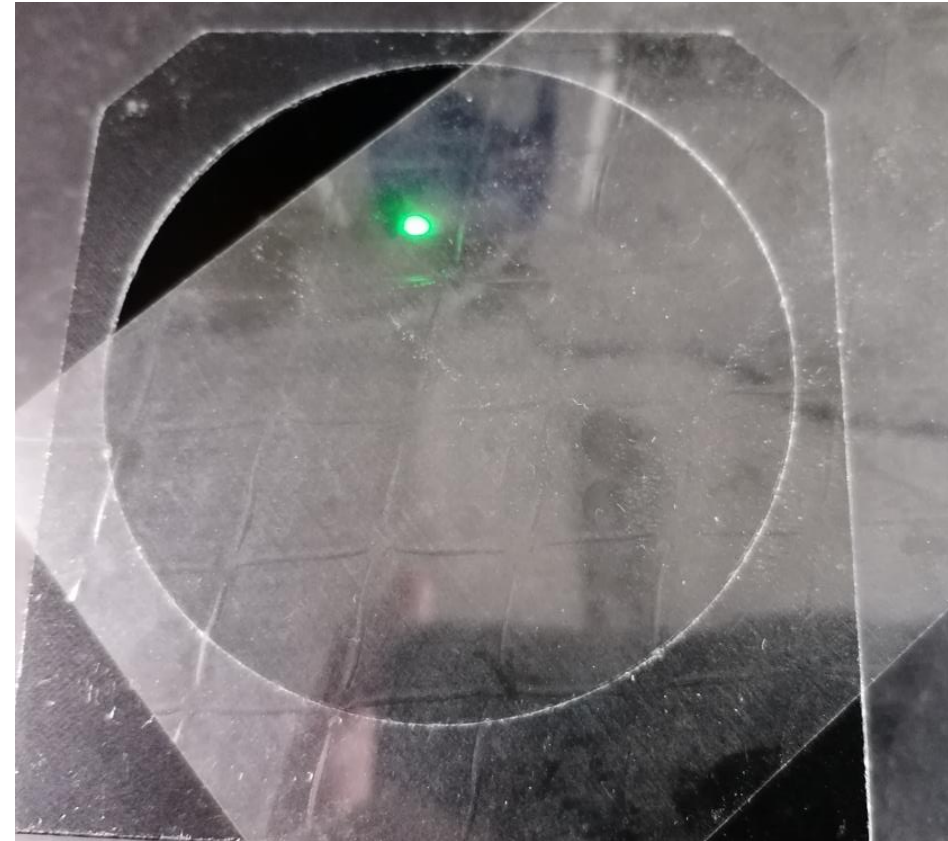
SAMPLE DESCRIPTION AND GOAL

- Sample:

One 100 mm x 80 mm Gelatine

Goal:

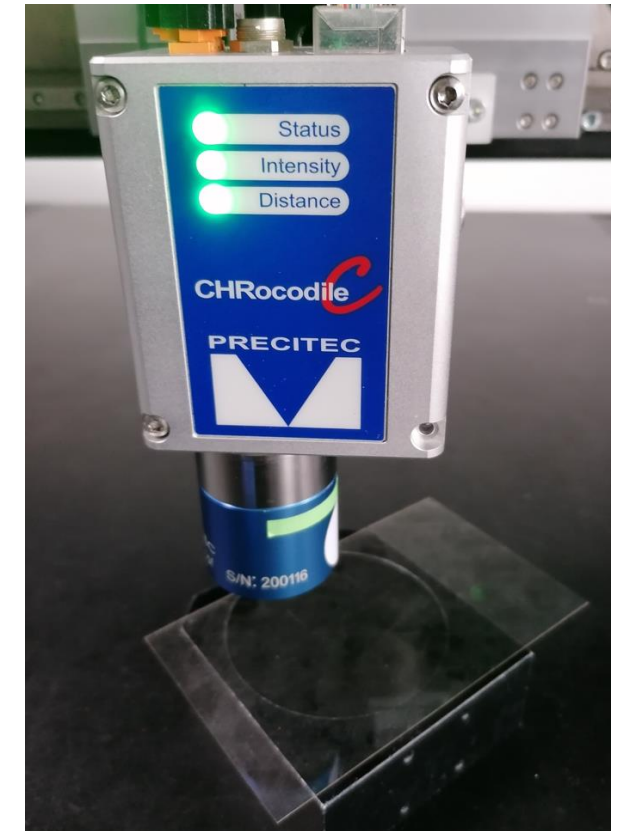
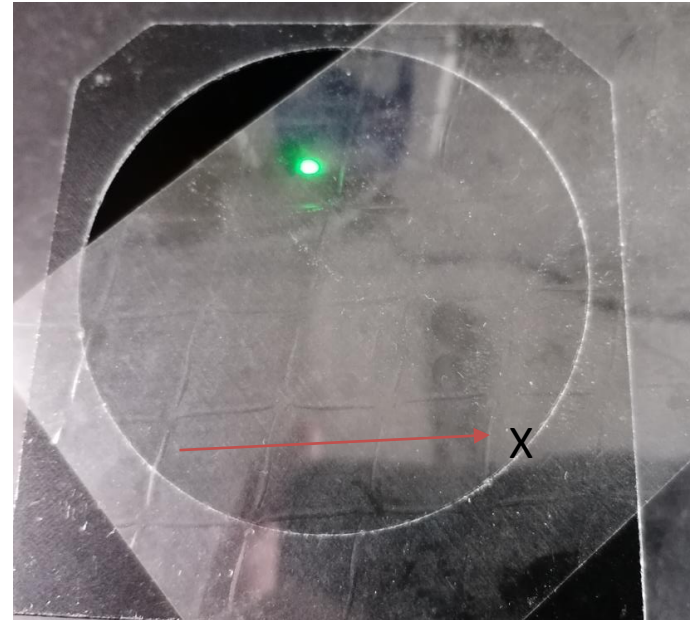
- **Thickness, profile**
- Measurement location: Anywhere on the sample; just do some line scans.
- Requested resolution: CHR C with 10mm (axial resolution: 22nm, lateral resolution: 12 μ m)



THICKNESS AND PROFILE INSPECTION FOR GELATINE

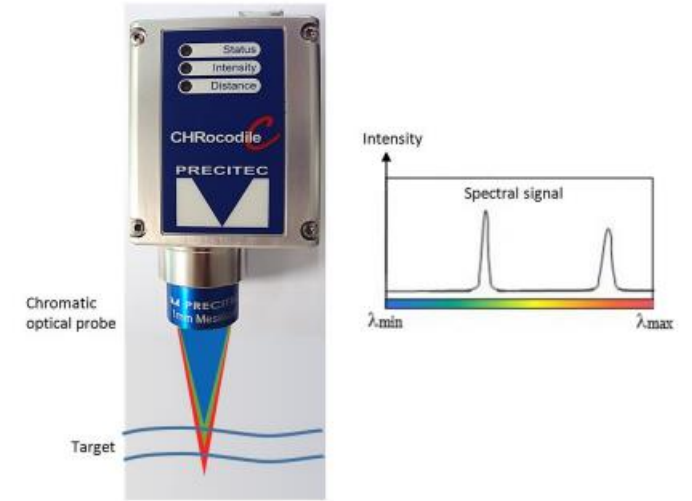
SETUP, MEASUREMENT DESCRIPTION AND PARAMETERS

- Setup:
 - The sensor is installed on a holder, which is moveable in x, y and z direction.
 - The sample is placed on a stable stage.
- Measurement Description:
 - Start the sensor and scan a line on the sample along x direction.



THICKNESS AND PROFILE INSPECTION FOR GELATINE

TECHNICAL EQUIPMENT



CHROCODILE C

Maximum frequency	Technology	Interface	Light source	Dimensions without probe (w x h x d)	Weight
4 kHz	Chromatic-confocal	Ethernet	LED	99 mm x 65 mm x 47 mm	430 g

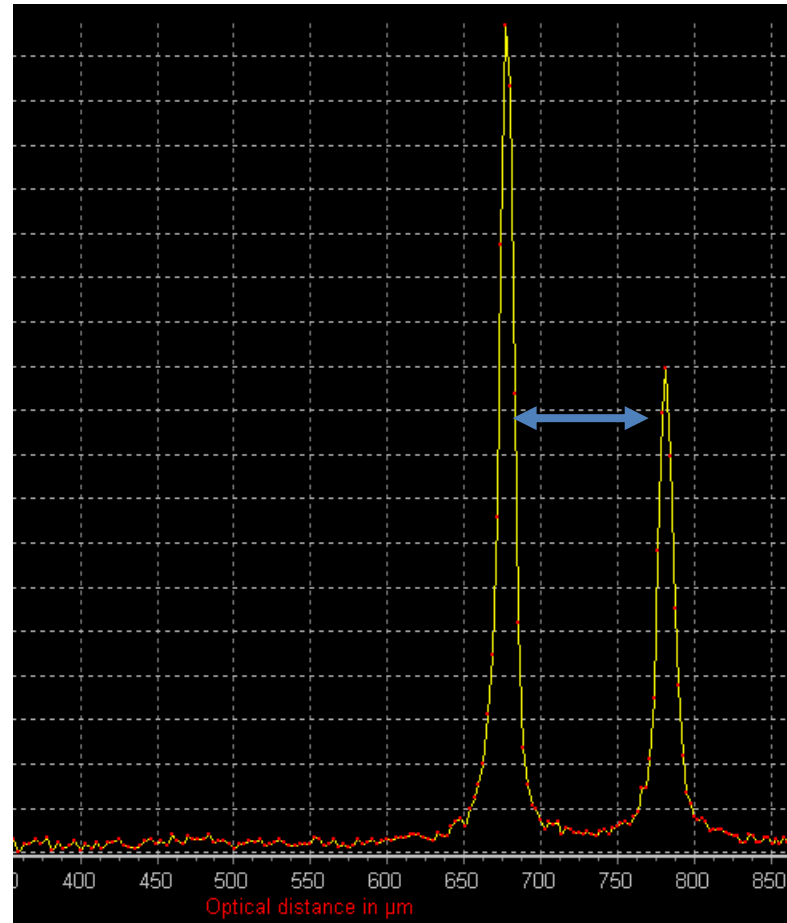
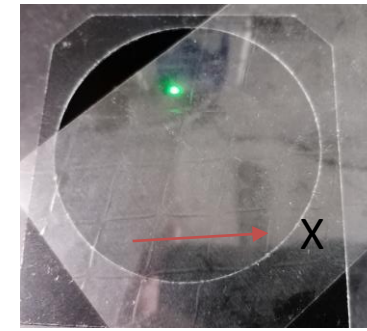
Probe 1 mm

Measuring Range	Working distance	Axial resolution	Lateral resolution	Linearity	Measurement angle to surface	Length	Diameter
1 mm	15.5 mm	40 nm	2.5 μm	400 nm	90° ± 28°	17 mm	28 mm

THICKNESS AND PROFILE INSPECTION FOR GELATINE

MEASUREMENTS

- Measurement Parameters:
 - Scan Rate: 4 kHz
 - Lamp Intensity: 100%
 - Threshold: 100
 - Refractive Index n set as 1
 - Scan Speed in X direction: 10 mm/s
(customer can set this speed freely)
 - Scan Time for a line (40mm): 4s
(considering our scan speed 10 mm/s)

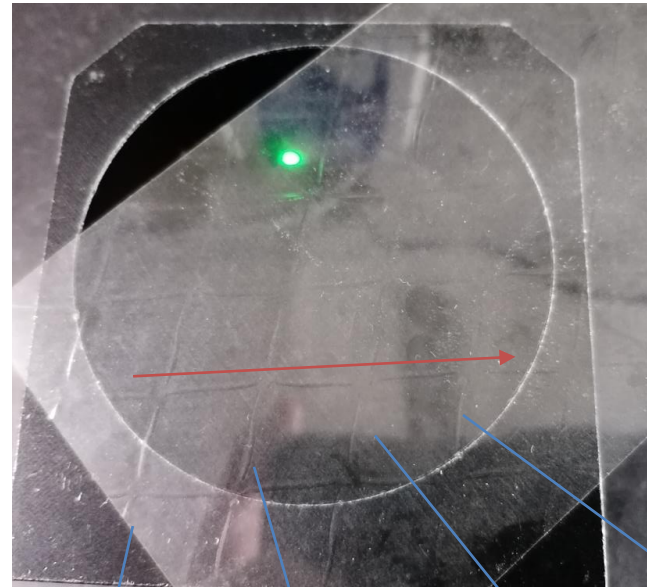


Optical Thickness of Gelatine is ca. 104 μm.

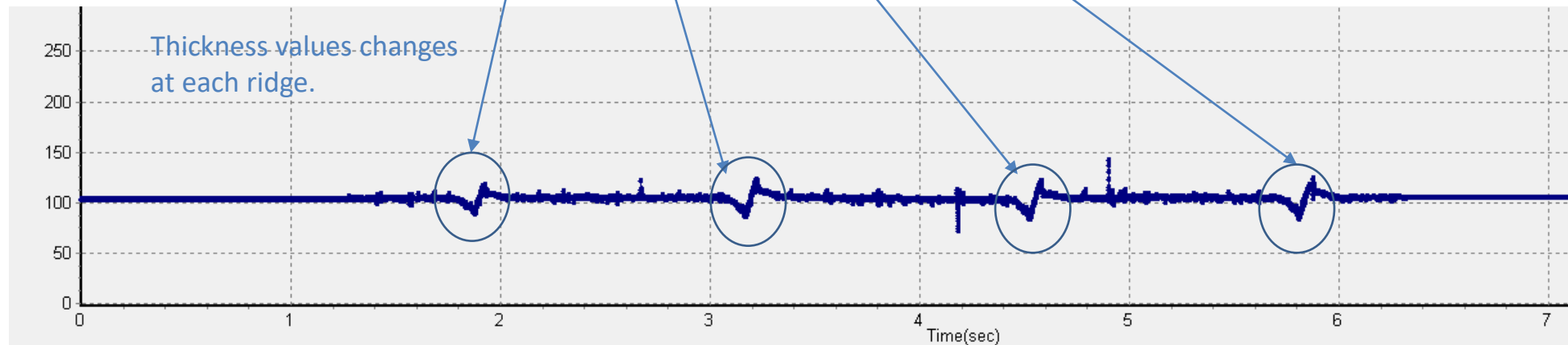
Geometric thickness of Gelatine is optical thickness multiplied by refractive index.

THICKNESS AND PROFILE INSPECTION FOR GELATINE

MEASUREMENTS



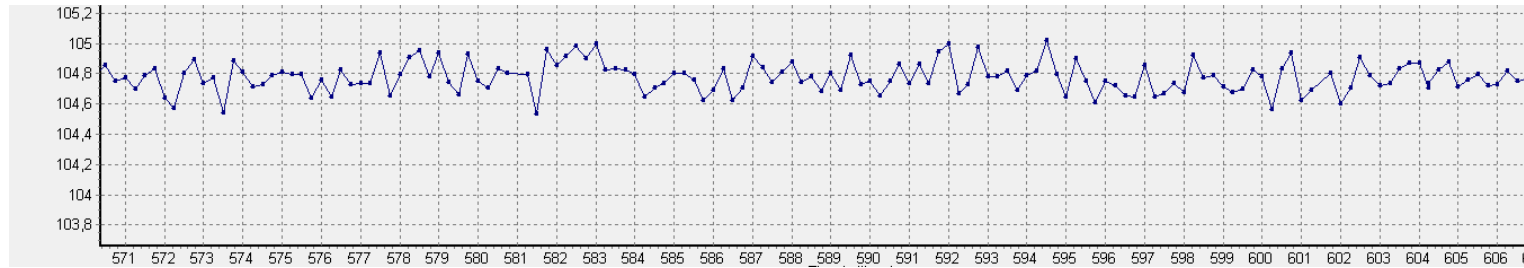
X



THICKNESS AND PROFILE INSPECTION FOR GELATINE

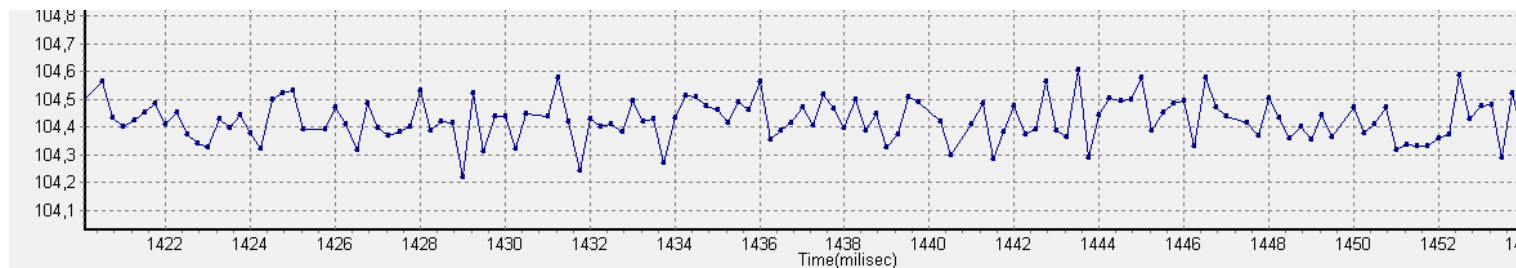
MEASUREMENTS

Measurements of gelatine with a little difference in z height:



Optical thickness of gelatine is between 104.4 µm to 105 µm

Measurements on other side of gelatine:

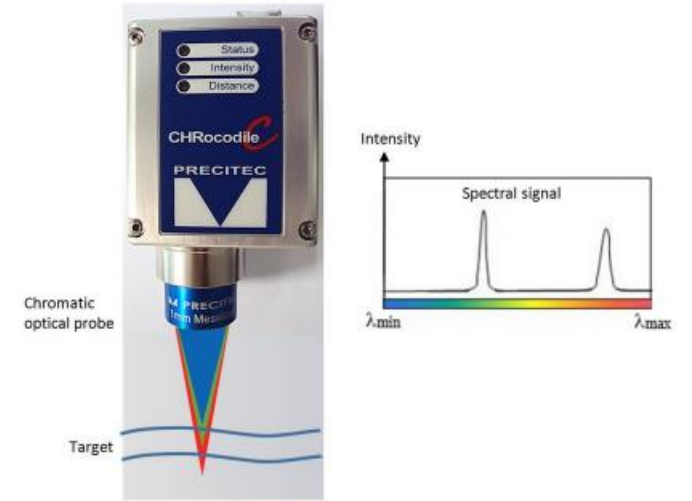


Optical thickness of gelatine is between 104.2 µm to 104.6 µm

Therefore, the optical thickness of Gelatine is very stable with ca. 104 µm ± 1 µm.

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TECHNICAL EQUIPMENT



CHRocodile C

Maximum frequency	Technology	Interface	Light source	Dimensions without probe (w x h x d)	Weight
4 kHz	Chromatic-confocal	Ethernet	LED	99 mm x 65 mm x 47 mm	430 g

Probe 4 mm

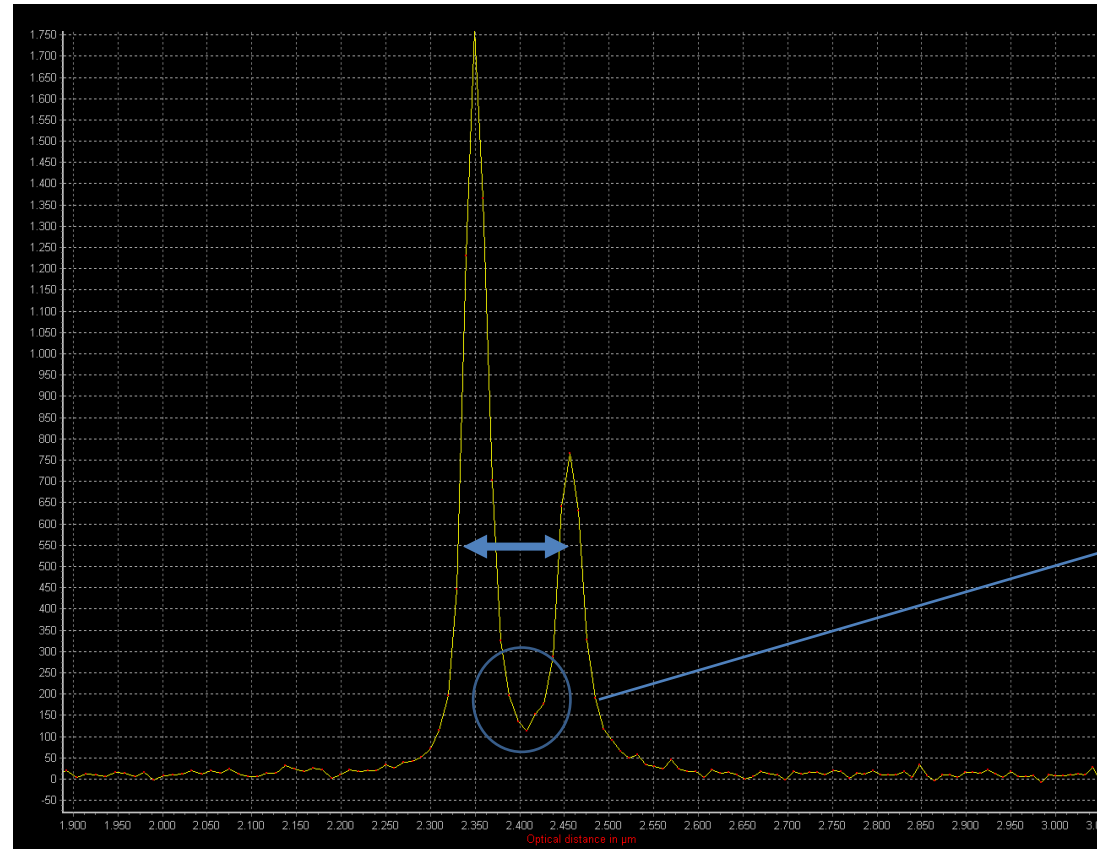
Measuring Range	Working distance	Axial resolution	Lateral resolution	Linearity	Measurement angle to surface	Length	Diameter
4 mm	37.5 mm	160 nm	4 μm	1.6 μm	90° ± 20°	34 mm	26.6 mm

THICKNESS AND PROFILE INSPECTION FOR GELATINE

MEASUREMENTS

■ Measurement Parameters:

- Scan Rate: 4 kHz
- Lamp Intensity: 100%
- Threshold: 100
- Refractive Index n set as 1
- Scan Speed in X direction: 10 mm/s
(customer can set this speed freely)
- Scan Time for a line (40mm): 4s
(considering our scan speed 10 mm/s)



Comparing with 1mm probe, there is a slight overlap between the two peaks. Therefore, the measurement using 1mm probe is more accurate.

- Optical Thickness of Gelatine is ca. 105 μm .
- Geometric thickness of Gelatine is optical thickness multiplied by refractive index.

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CONCLUSION

- **CHRcodile C 4 mm and 1 mm probe can** both measure the thickness of gelatine.
- Compare 1mm and 4mm Probe:
 - **4mm probe has a relative larger measuring range.** Therefore, it is easier to place the sample in the measuring range comparing to 1mm probe.
 - Comparing with 1mm probe, there is a slight overlap between the two peaks by using 4mm probe. Therefore, the **measurement using 1mm probe is more accurate.**
- The scan speed depends on how fast the Crocodile C moves. In our measurement, the scan speed is 10mm/s. The customer can adjust this speed based on the real application.
- The optical thickness of Gelatine was measured at ca. $104 \mu\text{m} \pm 1 \mu\text{m}$.

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THEORY OF CHROMATIC CONFOCAL DISTANCE MEASUREMENTS

White light travels via fiber from the CHRcodile control unit to an optical probe which focuses the different wavelengths with different focal lengths. An object reflects light back into the probe, but only light of the wavelength that is in focus on the surface is perfectly imaged back into the fiber and reaches the detector.

The optical probe determines the measuring range, or focal depth of the spectrum. Because of the high numerical aperture of the probes and dynamic range of the sensor, it is possible to measure nearly all materials.

