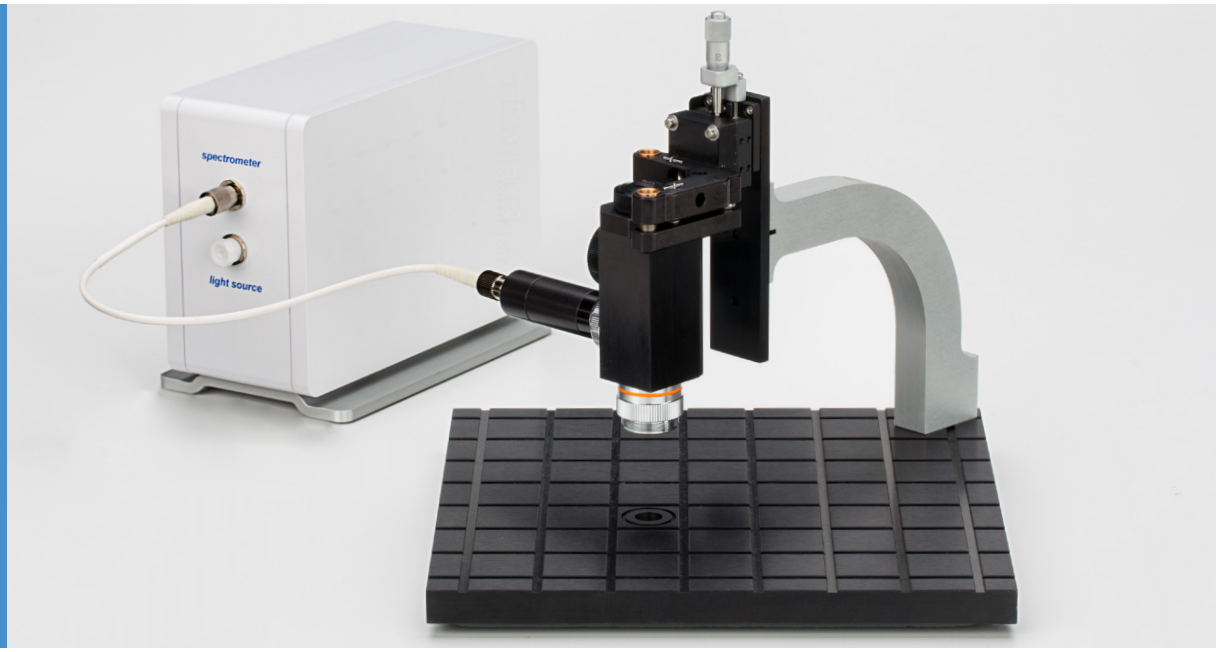
F3-sX Series

Film Thickness Analyzers



F3-s1310

Advanced Thickness Measurement Tools for Films 15 nm to 3 mm Thick

The F3-sX family of spectral reflectance instruments measure semiconductor and dielectric layers up to 3 mm thick. Such thick layers tend to be rougher and less uniform than thinner layers, which the F3-sX counters with a 10-µm-diameter measurement spot. With it the F3-sX easily measures materials that are impossible with other instruments - and it does so in fractions of a second.

Wavelength Options

The F3-sX uses near-infrared (NIR) light to measure layer thickness - even many layers that are opaque to the eye (such as semiconductors). The 980 nm wavelength version, the F3-s980, is designed for cost-sensitive applications. The F3-s1310 is optimized for heavily-doped-silicon applications, while the F3-s1550 is intended for the thickest of layers.

Accessories

Accessories include automated mapping stages, a video camera with measurement-spot visualization, and visible-wavelength options that extend thickness measurement capabilities down to 15 nm. Furthermore, acquisition rates up to 1 kHz also make the F3-sX a top choice for many in-line applications (e.g., roll-to-roll processes).

Applications:

- Si Wafer Thickness
- Conformal Coatings
- IC Failure Analysis
- Thick Photoresist (e.g., SU-8)

The Filmetrics Advantage

- World's leader in tabletop thin-film measurement
- 24 hr phone, e-mail, and online support
- Intuitive analysis software standard with every system

Additional Features

- Built-in online diagnostics
- Standalone software included
- Sophisticated history function for saving, reproducing, and plotting results

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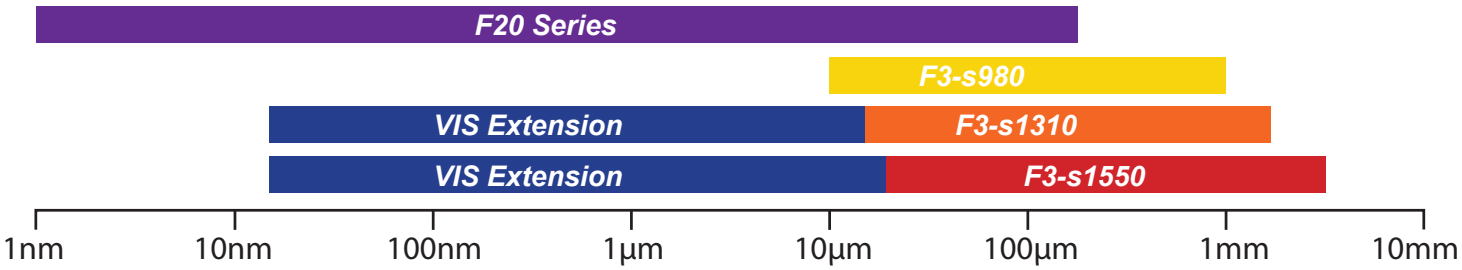

Thickness Measurement Range (n=1.5)

General Specifications	F3-s980	F3-s1310	F3-s1550	VIS Extension
Spectrometer Wavelength Range:[1]	960 - 1000 nm	1280 - 1340 nm	1520 - 1580 nm	380 - 1050 nm
Light Source:	200K Hrs MTBF SLED	200K Hrs MTBF SLED	200K Hrs MTBF SLED	40K Hrs MTBF Hybrid
SLED Output Power:	<0.1 mW	0.1 mW	0.1 mW	—
Measurement Specifications[2]				
Thickness Measurement Range, n=1.5:	10 µm - 1 mm	15 µm - 2 mm	25 µm - 3 mm	15 nm - 70 µm
Thickness Measurement Range, n=3.5 (silicon):	4 µm - 350 µm	7 µm - 1 mm	10 µm - 1.3 mm	6 nm - 25 µm
Accuracy: The greater of	0.4% or 50 nm	0.4% or 50 nm	0.4% or 50 nm	0.2% or 2 nm
Precision:	5 nm [3]	5 nm [3]	5 nm [3]	0.02 nm [4]
Stability:	5 nm [5]	5 nm [5]	5 nm [5]	0.05 nm [6]
Spot Size:	10 µm	10 µm	10 µm	8 µm [7]
Nominal Working Distance:[8]	53 mm	53 mm	53 mm	53 mm
Working Distance Tolerance,[8] 100 µm thickness:	4 mm	4 mm	4 mm	—
Working Distance Tolerance,[8] 500 µm thickness:	1.2 mm	1.2 mm	1.2 mm	—

Operating System	
PC:	Windows XP (SP2) - Latest Windows (64-bit)
Mac:	OS X Lion - Latest Mac OS running Parallels

General Requirements	
Computer Interface:	USB 2.0
Power:	USB supplied

1 Nominal range. Actual central wavelength range may vary by +/- 30 nm.
2 With UPG-RT-to-Thickness option
3 1σ of 100 measurements of 100 µm SiO_2-on-Si. Average of 1σ over 20 successive days.
4 1σ of 100 measurements of 1 µm SiO_2-on-Si. Average of 1σ over 20 successive days.
5 2σ of daily average of 100 measurements of 100 µm SiO_2-on-Si over 20 successive days.
6 2σ of daily average of 100 measurements of 1 µm SiO_2-on-Si over 20 successive days.
7 For 6X objective lens
8 For 2X objective lens, other objectives and working distances available

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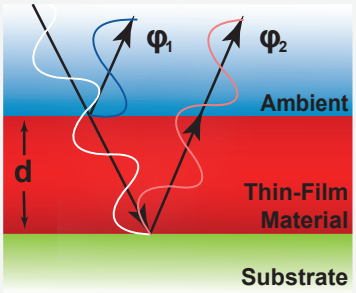
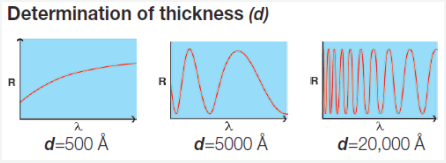
Film Thickness Analyzers

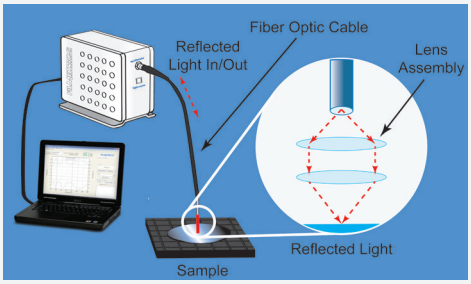
How Does It Work?



When light encounters an interface between two materials, it is partially reflected. The wave-like nature of light causes reflections from multiple interfaces to interfere with each other, resulting in oscillations in the wavelength spectrum of the reflected light.



From the frequency of these oscillations, we determine the distance between the different interfaces and thus, the thickness of the materials (with more oscillations meaning greater thickness). Other material characteristics are also measured, such as refractive index and roughness.



FILMeasure Software - The Building Blocks of Thin-Film Analysis

FILMeasure is the analysis software that comes with every Filmetrics single-spot measurement instrument. It follows a modular approach so you can customize to fit your measurement needs:

F3-sX Base Systems
Reflectance Measurements

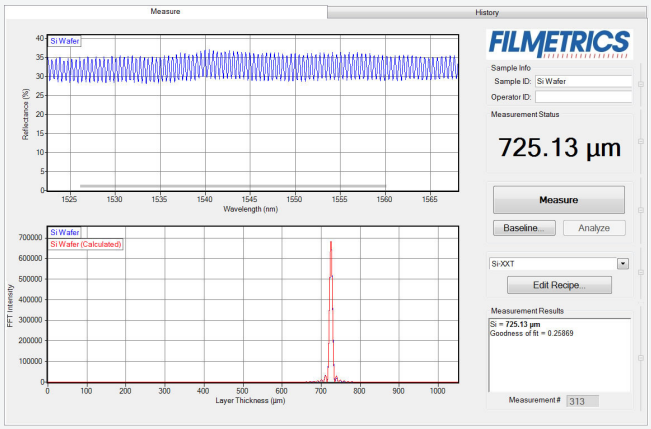
➤

UPG-RT-to-Thickness
Thickness Measurements
(FFT and Spectrum Matching)

➤

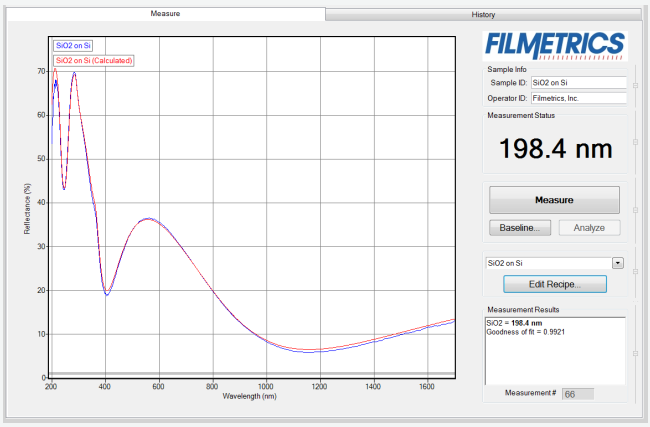
UPG-Thickness-to-n&k
Refractive Index Measurements

FFT (Fast Fourier Transform) Analysis



If your sample layers are 10 µm or greater, the FFT analysis makes quick work of your thickness measurements. Real quick. Like 1kHz quick. Therefore, the FFT analysis excels at in-line applications - one of the great strengths of the F3-sX base systems.

Spectrum-Matching Analysis



With Spectrum Matching, you can analyze thickness from 1 nm to 70 µm and do so in a split second. It also enables you to measure the refractive index of your samples.* Spectrum-Matching analysis is the power behind the F3-sX VIS extension.

*UPG-Thickness-to-n&k needed

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Optional Accessories

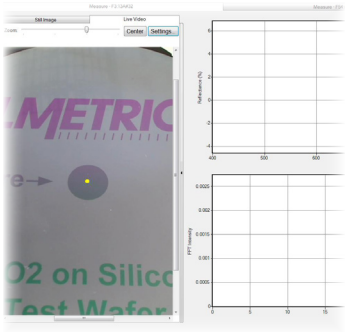
Automate Your Day

The XY10 Stage adds mapping capabilities to the F3-sX series. Measure film thickness or refractive index uniformity over an area as large as 100 mm x 100 mm at speeds up to 0.2 seconds per point.

Measure Down to 15 nm with an 8 µm Spot

The VIS-sX-8µmSpot option allows measurement of thin film thickness down to 15 nm by adding a visible wavelength spectrometer and sophisticated optical system.

An Extra Eye on Your Sample



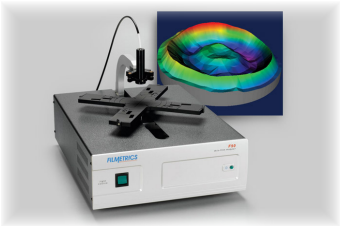
The SampleCam-sX (shown above) enables you to visualize the measurement spot as a yellow dot as well as store images of your samples.

Looking to Do More?

Extend your capabilities even further with these related products:

F3-UV for layers as thin as 1 nm thick

F20-UVX for layers 1 nm - 250 µm thick



F50 for automated mapping of samples up to 1200 mm in size

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