

Medical Device Coating Thickness

Filmetrics® F-Series Thin Film Metrology Tools



Coatings and Thickness in Medical Device Applications

There are many types of devices used in the medical industry. Often, coatings protect a part or device from corrosion, while other biocompatible coatings protect the host from unfortunate complications such as tissue trauma, infection, or even bodily rejection. Some devices, including angioplasty balloons, are freestanding membranes that must be of uniform and fixed thickness in order to function properly.

Measurement methods of these coating thicknesses can vary, but one thing is certain – the commonly-used techniques of measuring monitor samples or weighing a part before and after deposition do not detect many coating flaws. Incomplete coverage or thickness non-uniformity can cause failure with serious implications.

The Filmetrics® Advantage

Filmetrics® offers a broad range of solutions for measuring devices and their coating. Whether measuring large spot samples with the F20 Series (shown in Figure 1) or targeting small features with the microscope-based F40 Series (shown in Figure 2), Filmetrics can deliver the capabilities to measure coatings on ...

- Stents
- Implants
- Guide wires, needles, etc.
- Catheter and angioplasty balloon wall thickness
- Wall thickness of membranes, vials, etc.



Figure 1. The F20 Thin-Film Analyzer.

FILMeasure® User Interface

Filmetrics tools offer precise and consistent results from user to user, unlike manual measurement techniques. Our easy-to-use FILMeasure® thin-film analysis software is a proven, robust package that determines film thickness from the reflectance spectrum of the area of interest. The fit in the graphical display provides visual confirmation of high-confidence results.

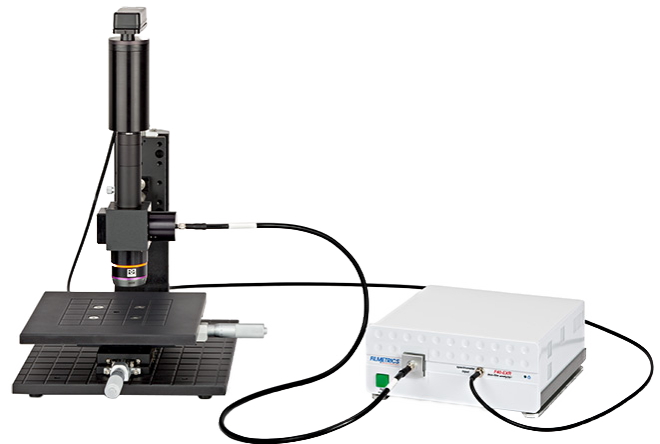


Figure 2. The F40-EXR with optical microscope.

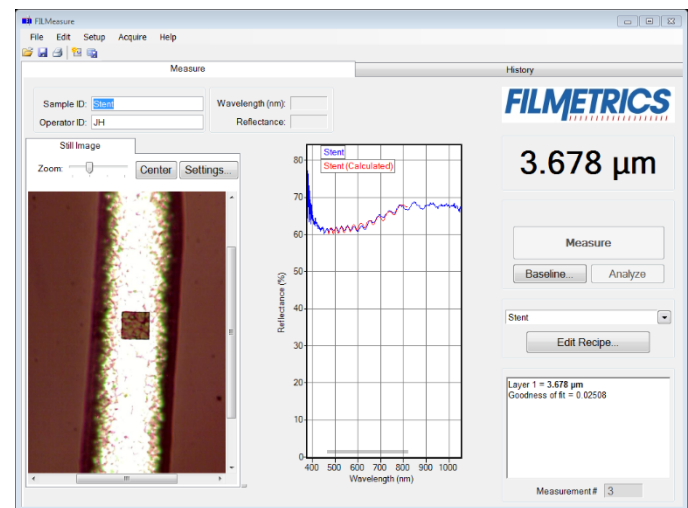


Figure 3. The thickness of a pharmacological coating on a stent as measured by the Filmetrics F40.

Dependable Results

Filmetrics tools are based upon spectral reflectance, where light is reflected off the sample and analyzed over a range of wavelengths. Light reflected from the top and bottom interfaces of the film can be in-phase so that reflections add, or out-of-phase so that reflections subtract. The result is characteristic intensity oscillations in the reflectance spectrum. Simply put, the thicker the film, the more oscillations that will be present in the reflectance spectrum.

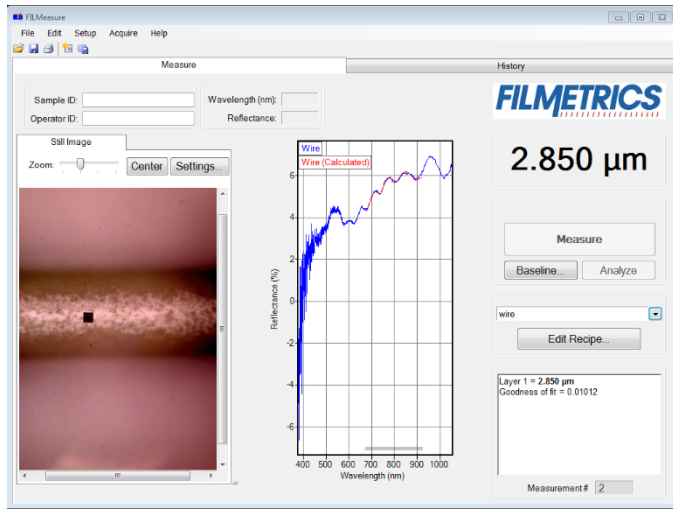


Figure 4. The thickness of a polymer-coated wire as measured by the Filmetrics F40.

About the Filmetrics F20

[Filmetrics F20s](#) are general-purpose film thickness measurement instruments that are used in thousands of applications worldwide. Thickness and refractive index can be measured in less than a second. Like all of our thickness measurement instruments, the F20 connects to your computer's USB port and sets up in minutes.

The different F20 instruments are distinguished primarily by the thickness measurement range, which in turn is determined by the instrument's wavelength range. The standard F20 is our most popular product.

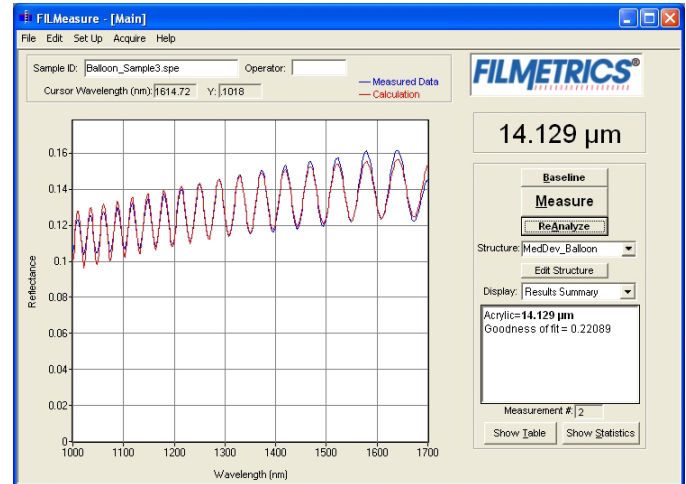


Figure 5. Angioplasty balloon wall thickness as measured by the Filmetrics F20.

About the Filmetrics 40

The [F40 product family](#) is for applications that require a spot size as small as 1μ. For most microscopes, the F40 simply attaches to the Cmount adapter, which is the industry standard for video camera mounting.

The F40 thickness measurement instrument comes complete with an integrated color video camera that allows exact monitoring of the film thickness measurement spot. Thickness and index can be measured in less than 1s. Like all of our tabletop film thickness measurement instruments, the F40 connects to your computer's USB port and sets up in minutes.

Contact Us to Measure Your Sample

[Please contact us](#) with questions, or to schedule thickness measurement on your medical devices, or 3D surface topography using the [Filmetrics Profilm3D® optical profiler](#), which quickly and easily generates surface measurements of roughness, step height, or other features of interest.

KLA SUPPORT

Maintaining system productivity is an integral part of KLA's yield optimization solution. Efforts in this area include system maintenance, global supply chain management, cost reduction and obsolescence mitigation, system relocation, performance and productivity enhancements, and certified tool resale.