

NANOMETRICS



Specifications #4000/2

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Model 4000 NanoSpec[®]/AFT Automated Film Thickness Measurement System Part Number 7100-0054

DESCRIPTION:

The Model 4000 is a table top automated film thickness and reflectivity measurement system.

TYPICAL MEASUREMENT SPECIFICATIONS:

<u>Standard Film Types Measured</u>	<u>Typical Range (Å) *</u>	<u>Typical Repeatability**</u>	<u>Notes</u>
1. Single Layer Films Visible UV	500-50,000Å 25-500Å	2Å <1Å	9
2. Double Layer Films Visible - Top Layer - Bottom Layer	100-30,000Å 100-10,000Å	2Å 8Å	1,2,3,4 1,2,3,4
3. Triple Layer Films Consult Factory			
4. Single Layer Thick Films Visible	4 - 75 microns	1%	5
5. Double Layer Thick Films Consult Factory			
6. Reflectance Visible UV	400-850nm 200-400nm	0.4% 0.2%	6 6
7. Oxide on Poly UV	150-10,000Å	2Å	7, 8
8. Oxide on Metal Visible UV	3,000-20,000Å 500-5,000Å	3Å 3Å	8 8

* Typical ranges based on sampling of customer wafers. Ranges should not be considered limits. Consult factory if sample exceeds range.

** 1 Sigma based upon measurement of the same spot 15 times in succession on standard semiconductor films.

Note 1 Bottom layer Oxide thickness must be entered with an accuracy of $\pm 100\text{\AA}$ when only measuring top layer.

Note 2 Assumes undoped Poly top layer and minimal haze. Performance may vary under other conditions.

Note 3 For the 5X and 10X objectives, $1,000\text{\AA} < \text{total optical thickness of the stack} < 60,000\text{\AA}$. For the 50X objective, $1,000\text{\AA} < \text{total optical thickness of the stack} < 27,000\text{\AA}$. (The total optical thickness of a film with thickness T and refractive index N_f is $T \times N_f$.)

Note 4 Assumes Nitride with $n_{ref} = 2.00 \pm 0.04$. Performance may vary under other conditions.

Note 5 Specification is based on Oxide; however, this program has proven very useful for other films and substrates whose refractive index has low dispersion as a function of wavelength.

Note 6 Measurement time at 2.5 seconds.

Note 7 Polysilicon thickness must exceed 500\AA .

Note 8 Assumes good surface and smoothness; rough surface will degrade the repeatability, and minimum measurable Oxide thickness.

Note 9 Typical PT ratios will be less than 15% on 150\AA Silicon Dioxide.