



**National Voluntary  
Laboratory Accreditation Program**



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005**

**VLSI Standards, Inc.**  
3087 North First Street  
San Jose, CA 95134-2006  
Mr. Yu Guan  
Phone: 408-428-1800 x149 Fax: 408-428-9555  
E-mail: yu.guan@vlsistd.com  
URL: http://www.vlsistandards.com

**CALIBRATION LABORATORIES**

**NVLAP LAB CODE 200302-0**

*NVLAP Code:* 20/A01                      ANSI/NCSL Z540-1-1994; Part 1                      Compliant

**DIMENSIONAL**

*NVLAP Code:* 20/D05  
Length & Diameter

Nano Lattice Standards (NLS)

<i>Nominal Pitch in nm</i>	<i>Best Uncertainty (±) in nm</i> <sup>note 1</sup>	<i>Percentage Uncertainty in %</i> <sup>note 2</sup>
100	0.51	0.51
200	1.02	0.51
400	2.04	0.51
800	4.08	0.51
1000	5.10	0.51

*NVLAP Code:* 20/D12  
Surface Texture

Step Height Standards (SHS) - Thin

<i>Nominal Height</i>	<i>Best Uncertainty (±)</i> <sup>note 1</sup>	<i>Percentage Uncertainty (±)</i> <sup>note 2</sup>
8 nm	0.3 nm	3.4
18 nm	0.6 nm	3.5
44 nm	0.5 nm	1.1
88 nm	1.0 nm	1.1

2009-07-01 through 2010-06-30

*Effective dates*

*Sally S. Bruce*

*For the National Institute of Standards and Technology*



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180 nm	1.7 nm	0.9
450 nm	2.3 nm	0.5
940 nm	4.7 nm	0.5

Step Height Standards (SHS) - Thick

1.8 μm	0.01 μm	0.5
4.5 μm	0.05 μm	1.1
8.0 μm	0.06 μm	0.7
14.5 μm	0.08 μm	0.5
19.5 μm	0.10 μm	0.5
24 μm	0.12 μm	0.5
41 μm	0.19 μm	0.5
50 μm	0.23 μm	0.5
76 μm	0.35 μm	0.5
100 μm	0.46 μm	0.5

*NVLAP Code: 20/D17*

Film Thickness Standards (FTS)

SiO<sub>2</sub> films

<i>Nominal Thickness in nm</i>	<i>Best Uncertainty (±) in nm</i> <sup>note 1</sup>	<i>Percentage Uncertainty (±)</i> <sup>note 2</sup>
2.0	0.05	2.6
4.5	0.05	1.2
7.5	0.05	0.68
12	0.07	0.59
25	0.10	0.40
50	0.14	0.28
100	0.3	0.30
125	0.3	0.24
200	0.3	0.15
400	0.3	0.08
675	0.4	0.06
1010	0.7	0.07

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Si<sub>3</sub>N<sub>4</sub> Films

<i>Nominal Thickness in nm</i>	<i>Best Uncertainty (±) in nm</i> <sup>note 1</sup>	<i>Percentage Uncertainty (±)</i> <sup>note 2</sup>
20	0.15	0.73
90	0.13	0.14
120	0.17	0.14
200	0.14	0.07

*NVLAP Code:* 20/O07  
Optical Radiation

Photovoltaic Devices  
DC Current

<i>Range</i>	<i>Best Uncertainty (±)</i> <sup>note 1</sup>	<i>Remarks</i>
(3 to 10) mA	6.8% of rdg	Keithley 2420 Source, Thermocouples
(>10 to 50) mA	2.5% of rdg	Keithley 2420 Source, Thermocouples
>50 mA to 1 A	1.5% of rdg	Keithley 2420 Source, Thermocouples
(>1 to 3) A	1.9% of rdg	Keithley 2420 Source, Thermocouples

DC Voltage – (0.3 to 60)V

<i>Range</i>	<i>Best Uncertainty (±)</i> <sup>note 1</sup>	<i>Remarks</i>
(3 to 10) mA	2.6% of rdg	Keithley 2420 Source, Thermocouples
(>10 to 50) mA	1.1% of rdg	Keithley 2420 Source, Thermocouples
>50 mA to 1 A	0.90% of rdg	Keithley 2420 Source, Thermocouples
(>1 to 3) A	1.0% of rdg	Keithley 2420 Source, Thermocouples

Power – (0.3 to 180) W

<i>Range</i>	<i>Best Uncertainty (±)</i> <sup>note 1</sup>	<i>Remarks</i>
(3 to 10) mA	7.3% of rdg	Keithley 2420 Source, Thermocouples
(>10 to 50) mA	2.7% of rdg	Keithley 2420 Source, Thermocouples
>50 mA to 1 A	1.8% or rdg	Keithley 2420 Source, Thermocouples
(>1 to 3) A	2.2% or rdg	Keithley 2420 Source, Thermocouples

Fill Factor – (0 to 100)%

<i>Range</i>	<i>Best Uncertainty (±)</i> <sup>note 1</sup>	<i>Remarks</i>
(3 to 10) mA	12% of rdg	Keithley 2420 Source, Thermocouples

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(>10 to 50) mA	3.8% of rdg	Keithley 2420 Source, Thermocouples
>50 mA to 1 A	1.2% of rdg	Keithley 2420 Source, Thermocouples
(>1 to 3) A	1.1% of rdg	Keithley 2420 Source, Thermocouples

Area

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)<sup>note 1</sup></b>	<b>Remarks</b>
(1.0 to 400) cm <sup>2</sup>	0.35%	Measuring Microscope

Efficiency – (0 to 100)%

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)<sup>note 1</sup></b>	<b>Remarks</b>
(3 to 10) mA	7.3% of rdg	Keithley 2420 Source, Thermocouples
(>10 to 50) mA	2.8% of rdg	Keithley 2420 Source, Thermocouples
>50 mA to 1 A	1.8% of rdg	Keithley 2420 Source, Thermocouples
(>1 to 3) A	2.2% of rdg	Keithley 2420 Source, Thermocouples

1. Represents an expanded uncertainty using a coverage factor,  $k = 2$ , at an approximate level of confidence of 95 %.
2. Normalized to the nominal value.

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