Michigan Metrology, LLC®

BRUKER

Certificate of Compliance

Customer Name: Michigan Metrology, LLC Date: 5/23/23

System Model: NP Flex System S/N: NPFLA-11-101

Next Certification Due: 5/24/26

This is to certify that the above system has been inspected, serviced and calibrated to ensure optimal operating performance.

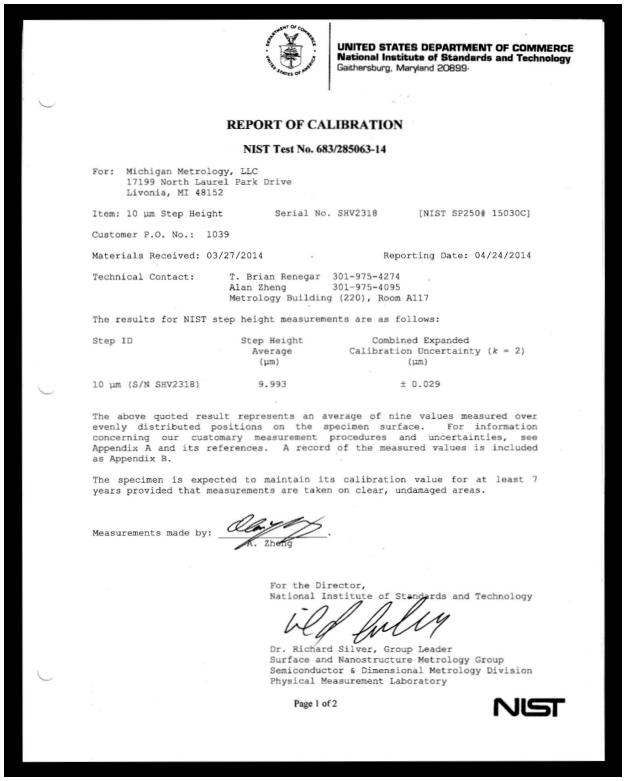
The system calibration was conducted in accordance to the procedure outlined in the Bruker manual and was performed utilizing a certified standard which is traceable to NIST.

Thomas Coakley
Senior Field Service Engineer

Figure 1. Certificate of Compliance for the NPFlex used by Michigan Metrology, LLC.

17199 N. Laurel Park Drive, Suite 51, Livonia, Michigan 48152
Tel: 734-953-5030 | Fax: 734-953-5611 | www.michmet.com
Email: doncohen@michmet.com

Step Height Standard Measurement Statement of Uncertainty Table	
Standard Information	
Step Height Standard Serial Number	SHV2318
Step Height Standard Nominal Value (µm)	9.993
Step Height Standard 2 sigma uncertainty (µm)	0.029
Measurement Conditions	
NPFlex LA Serial Number	NPFLA-11-101
Scan Speed	1X
Objective Lens Magnification	2.5X
Objective Lens Serial Number	632194-2
Filters	None
Date	5/30/2023
Time	1:57 PM
Operator	DKC
Measurement Results	
	Measured Step Height (um)
Measurement 01	9.992
Measurement 02	9.990
Measurement 03	9.993
Measurement 04	9.996
Measurement 05	9.997
Measurement 06	9.991
Measurement 07	9.992
Measurement 08	9.990
Measurement 09	9.984
Measurement 10	9.990
Average	9.991
1 Sigma (standard deviation)	0.004
Percent Error from Calibrated Step Height	**0.0%**
Step Height Stated Uncertainty (Coverage Factor of 2) (um)	**0.007**
Signature	
Title	Managing Member
Date	5/30/2023



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899

REPORT OF CALIBRATION

NIST Test No. 683/285063-14

For: Michigan Metrology, LLC
17199 North Laurel Park Drive
Livonia, MI 48152

Item: 10 µm Step Height Serial No. SHV2318 [NIST SP250# 15030C]

Customer P.O. No.: 1039

Materials Received: 03/27/2014 Reporting Date: 04/24/2014

Technical Contact: T. Brian Renegar 301-975-4274
Alan Zheng 301-975-4095
Metrology Building (220), Room A117

The results for NIST step height measurements are as follows:

Step ID	Step Height Average (µm)	Combined Expanded Calibration Uncertainty (k = 2) (µm)
10 µm (S/N SHV2318)	9.993	± 0.029

The above quoted result represents an average of nine values measured over evenly distributed positions on the specimen surface. For information concerning our customary measurement procedures and uncertainties, see Appendix A and its references. A record of the measured values is included as Appendix B.

The specimen is expected to maintain its calibration value for at least 7 years provided that measurements are taken on clear, undamaged areas.

Measurements made by: A. Zheng.

For the Director,
National Institute of Standards and Technology

Dr. Richard Silver, Group Leader
Surface and Nanostructure Metrology Group
Semiconductor & Dimensional Metrology Division
Physical Measurement Laboratory

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NIST

Figure 2. Measurement of NIST Traceable step standard is performed throughout the year for system verification and calibration.

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