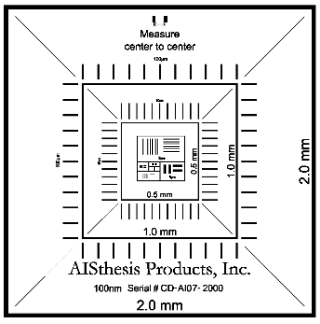
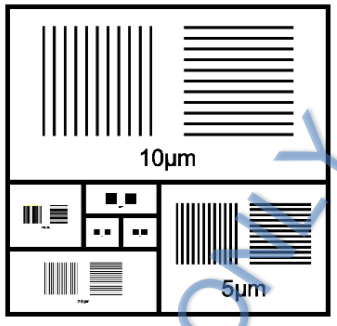
AISthesis Products
Advanced Imaging Products for Nanotechnology, Engineering and Life Sciences
PO Box 1950, Clyde NC 28721

ACCREDITED CERT #4904.01

Wafer Level Certificate of Traceability for Pelcotec™ Critical Dimension Magnification Standard





Product Number: **Pelcotec™** 694-01 CDMS-XY-0.1T-ISO

Product Description: 2.5x2.5mm, **Pelcotec™** 2mm-100nm Critical Dimension Magnification Standard.

Product Serial Number: CD-AI07-1234

As Received Condition: New

As Returned Condition: N/A

Date of Receipt: N/A

Customer name and contact information:

TED PELLA, INC.
Microscopy Products for Science and Industry

P.O. Box 492477
Redding, CA 96049-2477
Tel: 530.243.2200
www.tedpella.com

The accuracy of this product with Serial Number CD-AI07-1234 was determined using a Field Emission Scanning Electron Microscope (FE-SEM) by reference comparison to working standards traceable to the National Institute of Standards and Technology (NIST), using methods in CP 01 FE-SEM Imaging of Critical Dimension Magnification Standards (CDMS) and CP 02 Certification of Critical Dimension Magnification Standards. The data applies only to the CDMS identified in this report. All results are “as-is”. Repair and/or adjustments are not possible.

Below are the ISO 17025:2017 compliant Certified 10 µm Pitch Measurements unique to Serial Number CD-AI07-1234 and traceable to NIST Certified Standard CD-PG01-0211.

X-Direction

Line	ISO 17025:2017 Compliant Certified Average Pitch on Wafer	Position of Measurement
0-10 µm	9.993 µm	± 7.5 µm from center
10-20 µm	9.980 µm	± 7.5 µm from center
20-30 µm	9.980 µm	± 7.5 µm from center
30-40 µm	9.999 µm	± 7.5 µm from center
40-50 µm	10.007 µm	± 7.5 µm from center
50-60 µm	10.014 µm	± 7.5 µm from center

60-70 µm	9.999 µm	± 7.5 µm from center
70-80 µm	9.999 µm	± 7.5 µm from center

Average	9.996 µm
2-Sigma *	0.029 µm

* Corrected for sample size using the appropriate Student t-factor.

Y-Direction

Line	ISO 17025:2017 Compliant Certified Average Pitch on Wafer	Position of Measurement
0-10 µm	9.993 µm	± 7.5 µm from center
10-20 µm	9.980 µm	± 7.5 µm from center
20-30 µm	9.980 µm	± 7.5 µm from center
30-40 µm	9.999 µm	± 7.5 µm from center
40-50 µm	10.007 µm	± 7.5 µm from center
50-60 µm	10.014 µm	± 7.5 µm from center
60-70 µm	9.999 µm	± 7.5 µm from center
70-80 µm	9.999 µm	± 7.5 µm from center

Average	9.996 µm
2-Sigma *	0.029 µm

* Corrected for sample size using the appropriate Student t-factor.

Measurements are reported with an uncertainty (k=2)** of ± 0.012 µm. Statements of Conformity are not provided in this report. Review the results and verify that they meet the requirements for the intended use. Physical damage to or contamination of the CDMS occurring after calibration may invalidate the reported measurements. Use this product at 25ºC ± 5ºC and at less than 80% RH.

** Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2. The reported expanded measurement uncertainty is stated as the standard measurement uncertainty multiplied by the coverage factor K such that the coverage probability corresponds to approximately 95%.

X-Direction

Line	Number of Lines	Position of Measurement	Non-ISO 17025:2017 Compliant Measured Distance (first to last line)	Average Pitch of Wafer
2.0 mm	2	± 1.00mm from center	2.00 mm	2.00 mm
1.0 mm	2	± 0.5mm from center	1.00 mm	1.00 mm
0.5 mm	2	± 0.25mm from center	0.500 mm	0.500 mm
0.25 mm	2	± 0.125mm from center	0.250 mm	0.250 mm
10.0 µm	9	± 7.5 µm from center	79.97 µm	10.00 µm
5.0 µm	12	± 20 µm from center	55.02 µm	5.00 µm
2.0 µm	16	± 10 µm from center	30.04 µm	2.00 µm
1.0 µm	17	± 5 µm from center	16.02 µm	1.00 µm
500 nm	20	± 4 µm from center	9.52 µm	500.9 nm
250 nm	21	± 2.5 µm from center	5.01 µm	250.7 nm
100 nm	52	± 2.5 µm from center	5.11 µm	100.3 nm

Y-Direction

Line	Number of Lines	Position of Measurement	Non-ISO 17025:2017 Compliant Measured Distance (first to last line)	Average Pitch of Wafer
2.0 mm	2	± 1.00mm from center	2.00 mm	2.00 mm
1.0 mm	2	± 0.5mm from center	1.00 mm	1.00 mm
0.5 mm	2	± 0.25mm from center	0.500 mm	0.500 mm
0.25 mm	2	± 0.125mm from center	0.250 mm	0.250 mm
10.0 µm	9	± 7.5 µm from center	79.97 µm	10.00 µm
5.0 µm	12	± 20 µm from center	55.02 µm	5.00 µm
2.0 µm	16	± 10 µm from center	30.04 µm	2.00 µm
1.0 µm	17	± 5 µm from center	16.02 µm	1.00 µm
500 nm	20	± 4 µm from center	9.52 µm	500.9 nm
250 nm	21	± 2.5 µm from center	5.01 µm	250.7 nm
100 nm	52	± 2.5 µm from center	5.11 µm	100.3 nm

The average pitch is derived from the stated length that was determined using measurements (taken center-to-center) over the stated number of lines (i.e., length divided by the number of lines minus one).

Date of Analysis: January 29th, 2023

Equipment used:

Instrument	Model	Serial #	Resolution	Repeatability	Temperature	Humidity	Ref.
FE-SEM	FEI Verios 460L	9922551	0.9nm	0.030%	23.3 ± 0.3 °C	42.5 ± 1.5%	CD-PG01-0211

Location: Analytical Instrumentation Facility, NC State University, Raleigh NC 27695-7531.

Notes:

D.S. Finch _____ _____
Certified by Signature

H. Haehlen _____ _____ January 29th, 2023 _____
Authorized by Signature Date report issued.

End of report.