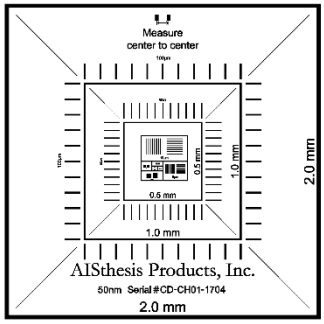
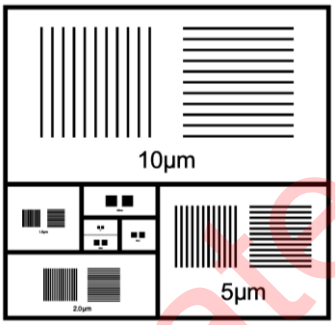
AISthesis Products
Advanced Imaging Products for Nanotechnology, Engineering and Life Sciences
PO Box 1950, Clyde NC 28721

ACCREDITED CERT #4904.01

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





Product Number: **Pelcotec™** 710-01 CDMS-XY-0.1T-ISO-Etched

Product Description: 2.5x2.5mm, **Pelcotec™** 2mm-50nm Critical Dimension Magnification Standard.

Product Serial Number: CD-CH02

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 Wafer Identifier CD-CH02 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 CP 01 FE-SEM Imaging of Critical Dimension Magnification Standards (CDMS) and CP 02 Certification of Critical Dimension Magnification Standards. Die were sampled according to method SOP 07 Sampling Die. The data applies only to the CDMS products identified in this report. All results are “as-is”. Repair and/or adjustments are not possible.

Below are the ISO 17025:2017 Accredited Average 10 µm Pitch Measurements unique to Die with Wafer Identifier CD-CH02 and traceable to NIST Certified Standard CD-PG01-0211.

X-Direction

Line	ISO 17025:2017 Accredited Average Pitch on Wafer	Position of Measurement
0-10 µm	9.998 µm	± 7.5 µm from center
10-20 µm	10.000 µm	± 7.5 µm from center
20-30 µm	10.003 µm	± 7.5 µm from center
30-40 µm	10.000 µm	± 7.5 µm from center
40-50 µm	9.999 µm	± 7.5 µm from center

50-60 µm	9.998 µm	± 7.5 µm from center
60-70 µm	10.000 µm	± 7.5 µm from center
70-80 µm	9.998 µm	± 7.5 µm from center
80-90 µm	9.996 µm	± 7.5 µm from center
90-100 µm	9.996 µm	± 7.5 µm from center
Sum	*99.988 µm*	

Average	9.9988µm
2-Sigma *	0.0050 µm

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

Y-Direction

Line	ISO 17025:2017 Accredited Average Pitch on Wafer	Position of Measurement
0-10 µm	9.998 µm	± 7.5 µm from center
10-20 µm	10.000 µm	± 7.5 µm from center
20-30 µm	10.003 µm	± 7.5 µm from center
30-40 µm	10.000 µm	± 7.5 µm from center
40-50 µm	9.999 µm	± 7.5 µm from center
50-60 µm	9.998 µm	± 7.5 µm from center
60-70 µm	10.000 µm	± 7.5 µm from center
70-80 µm	9.998 µm	± 7.5 µm from center
80-90 µm	9.996 µm	± 7.5 µm from center
90-100 µm	9.996 µm	± 7.5 µm from center
	99.988 µm	

Average	9.9988 µm
2-Sigma *	0.0050 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%.

Below are the Non-ISO 17025:2017 Accredited Average Pitch Measurements unique to Die with Wafer Identifier CD-CH02 and traceable to NIST Certified Standard CD-PG01-0211.

X-Direction

Line	Number of Lines	Position of Measurement	Non-ISO 17025:2017 Accredited Average Measured Distance (first to last line)	Average Pitch of Wafer
2.0 mm	2	± 1.00mm from center	2.000 mm	2.000 mm
1.0 mm	2	± 0.5mm from center	1.000 mm	1.000 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
0.10 mm	11	± 50 µm from center	1.001 mm	100.076 µm
50 µm	11	± 50 µm from center	0.500 mm	50.018 µm

5.0 µm	12	± 20 µm from center	55.021 µm	5.002 µm
2.0 µm	16	± 10 µm from center	30.042 µm	2.003 µm
1.0 µm	17	± 5 µm from center	16.021 µm	1.001 µm
500 nm	21	± 4 µm from center	9.973 µm	498.7 nm
250 nm	21	± 2.5 µm from center	4.991 µm	249.5 nm
100 nm	51	± 2.5 µm from center	4.997 µm	99.9 nm
50 nm	51	± 1.25 µm from center	2.493 µm	49.9 nm

Y-Direction

Line	Number of Lines	Position of Measurement	Non-ISO 17025:2017 Accredited Average Measured Distance (first to last line)	Average Pitch of Wafer
2.0 mm	2	± 1.00mm from center	2.000 mm	2.00 mm
1.0 mm	2	± 0.5mm from center	1.000 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
0.10 mm	11	± 50 µm from center	1.001 mm	100.076 µm
50 µm	11	± 50 µm from center	0.500 mm	50.018 µm
5.0 µm	12	± 20 µm from center	55.021 µm	5.002 µm
2.0 µm	16	± 10 µm from center	30.042 µm	2.003 µm
1.0 µm	17	± 5 µm from center	16.024 µm	1.001 µm
500 nm	21	± 4 µm from center	9.973 µm	498.7 nm
250 nm	21	± 2.5 µm from center	4.991 µm	249.5 nm
100 nm	51	± 2.5 µm from center	4.997 µm	99.9 nm
50 nm	51	± 1.25 µm from center	2.493 µm	49.9 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: December 2nd, 2024

Equipment used:

Instrument	Model	Serial #	Resolution	Repeatability	Temperature	Humidity	Reference
FE-SEM	FEI Apreo2	9958357	0.9nm	0.030%	21.9 ± 0.1 °C	33.3 ± 0.8%	CD-PG01-0211

Location: AISthesis Products, Inc., PO Box 1950, Clyde North Carolina 28721.

Notes:

D.S. Finch
Certified by

Signature

H. Haehlen
Authorized by

Signature

December 2nd, 2024
Date report issued.

P.O. Box 1950, Clyde, North Carolina 28721 Tel: 828.627.6555 E-mail: CDMS@aisthesisproducts.com

End of report.