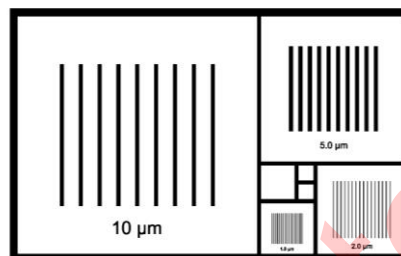
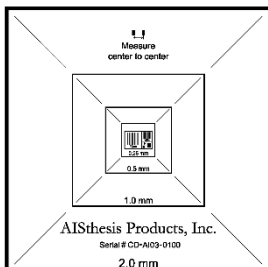


AISthesis Products

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



Certificate of Calibration for Pelcotec™ Critical Dimension Magnification Standard



Product Number: **Pelcotec™** 695-1 CDMS-1C-ISO

Product Description: 2.5x2.5mm, **Pelcotec™** 2mm-1µm Critical Dimension Magnification Standard

Product Serial Number: CD-AI03-xxxx

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-AI03-xxxx 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 Accredited Certified 10 µm Pitch Measurements unique to Serial Number CD-AI03-xxxx and traceable to NIST Certified Standard CD-PG01-0211.

Line	ISO 17025:2017 Accredited Certified Pitch	Position of Measurement
0-10 µm	10.004 µm	± 7.5 µm from center
10-20 µm	10.000 µm	± 7.5 µm from center
20-30 µm	10.002 µm	± 7.5 µm from center
30-40 µm	10.002 µm	± 7.5 µm from center
40-50 µm	10.004 µm	± 7.5 µm from center
50-60 µm	10.000 µm	± 7.5 µm from center
60-70 µm	10.004 µm	± 7.5 µm from center
70-80 µm	10.002 µm	± 7.5 µm from center
Sum	80.018 µm	
Average	10.0023 µm	
2-Sigma *	0.0039 µm	

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

Measurements are reported with an uncertainty ($k=2$)** of $\pm 0.012 \mu\text{m}$. 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 $25^\circ\text{C} \pm 5^\circ\text{C}$ 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 Certified Pitch Measurements unique to Serial Number CD-AI03-xxxx and traceable to NIST Certified Standard CD-PG01-0211.

Line	Number of Lines	Position of Measurement	Non-ISO 17025:2017 Accredited Measured Distance (first to last line)	Average Pitch
2.0 mm	2	$\pm 1.00\text{mm}$ from center	2.000 mm	2.000 mm
1.0 mm	2	$\pm 0.5\text{mm}$ from center	1.000 mm	1.000 mm
0.5 mm	2	$\pm 0.25\text{mm}$ from center	0.500 mm	0.500 mm
0.25 mm	2	$\pm 0.125\text{mm}$ from center	0.250 mm	0.250 mm
5.0 μm	12	$\pm 20 \mu\text{m}$ from center	55.056 μm	5.005 μm
2.0 μm	16	$\pm 10 \mu\text{m}$ from center	30.054 μm	2.004 μm
1.0 μm	17	$\pm 5 \mu\text{m}$ from center	16.032 μm	1.002 μm

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 Apreo 2	9958357	0.9nm	0.030%	$22.4 \pm 0.1^\circ\text{C}$	$37.0 \pm 3.2\%$	CD-PG01-0211

Location: AISthesis Products, Inc., PO Box 1950, Clyde NC 28721, USA.

Notes:

D.S. Finch
Certified by

Signature

H. Haehlen
Authorized by

Signature

December 2nd, 2024
Date report issued.

This certificate shall not be reproduced without the permission of AIStthesis Products, Inc.
P.O. Box 1950, Clyde, North Carolina 28721 Tel: 828.627.6555 E-mail: CDMS@aistthesisproducts.com

Non-ISO 17025:2017 Accredited Supplemental Material.

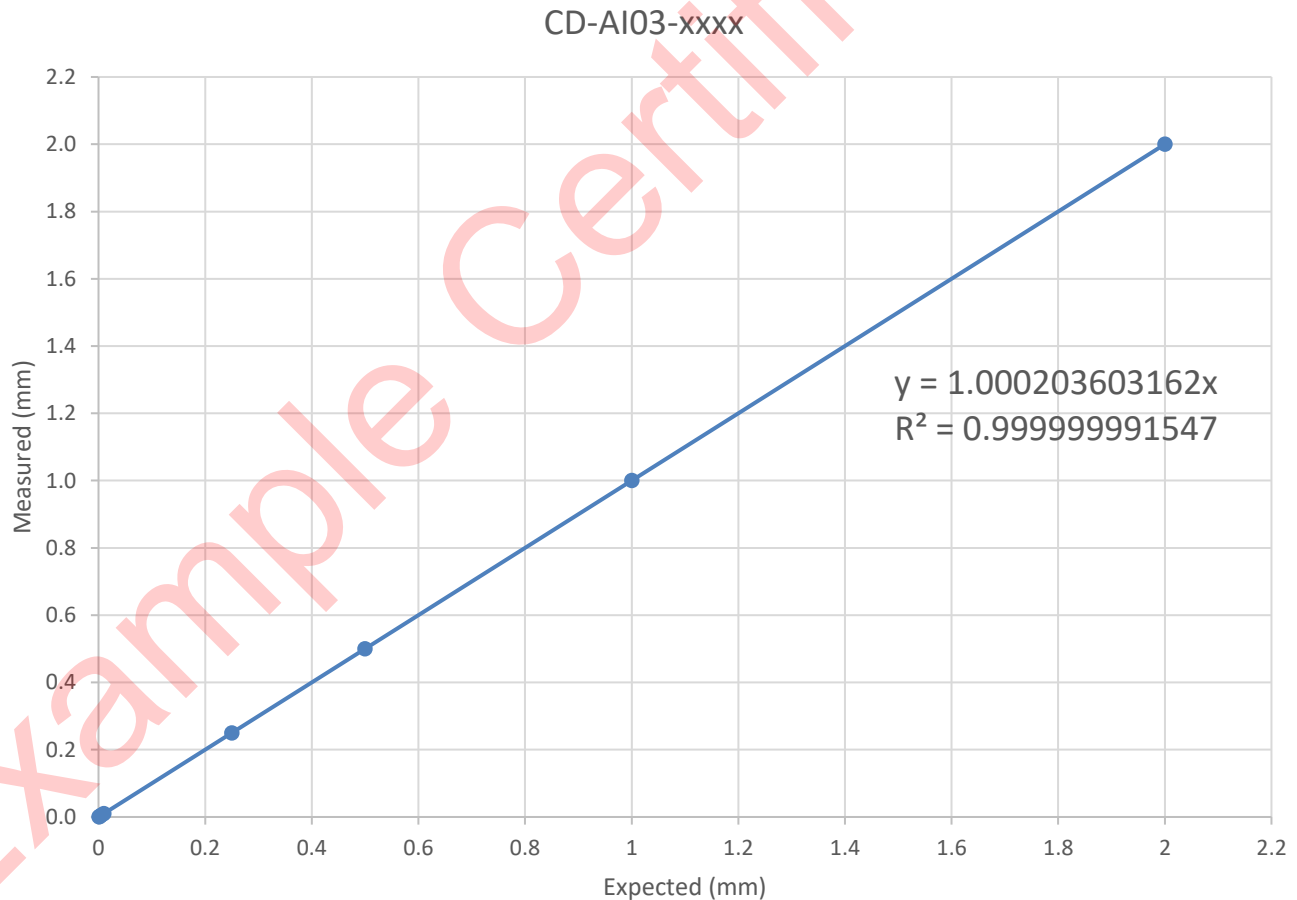


Figure 1. Expected versus actual measurements including all lines with linear regression and R^2 values reported.

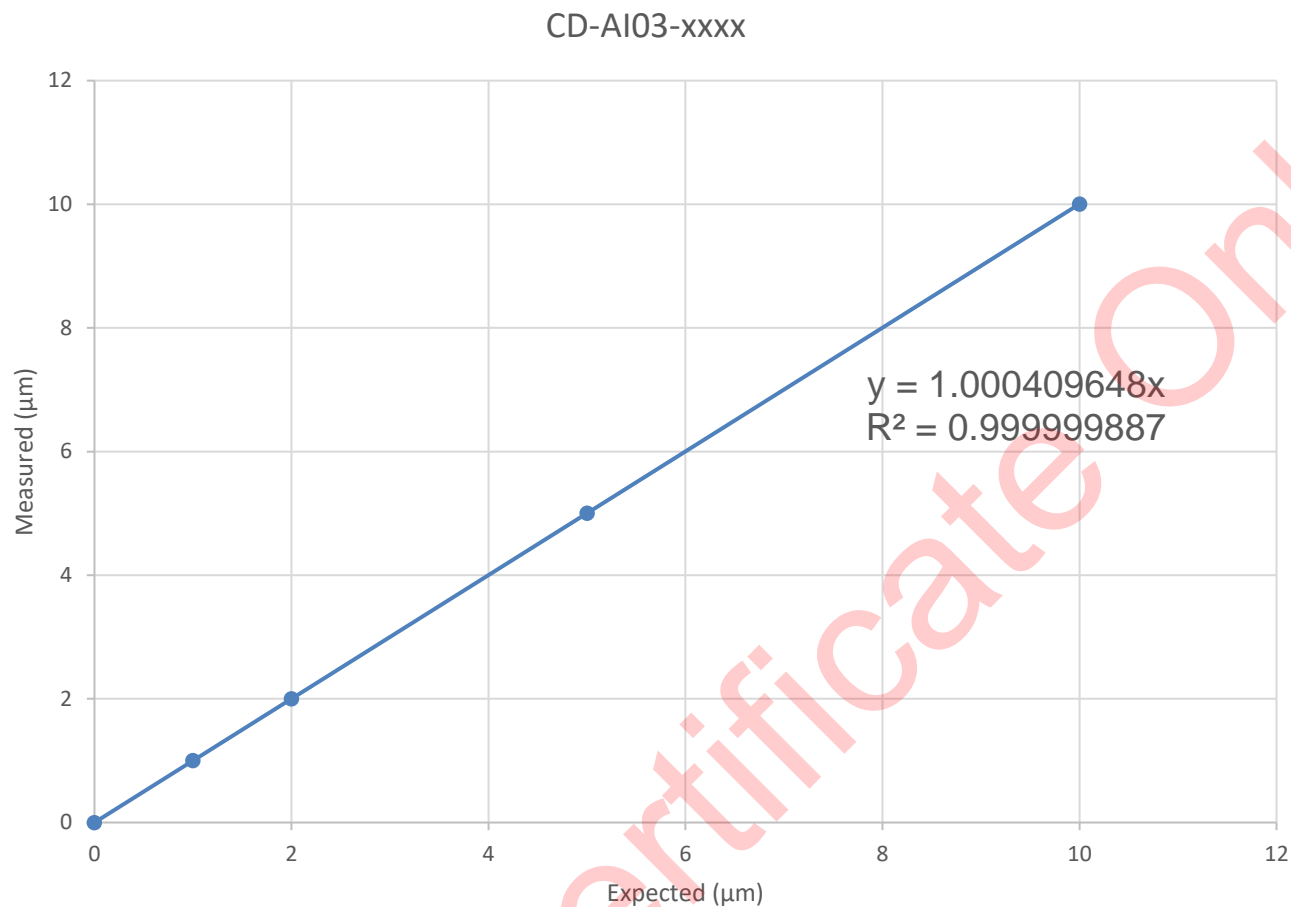


Figure 2. Expected versus actual measurements for the 10μm, 5μm, 2μm and 1μm pitch lines with linear regression and R^2 values reported.

5 μm Line	Pitch
0-5 μm	5.005 μm
5-10 μm	5.005 μm
10-15 μm	5.005 μm
15-20 μm	5.010 μm
20-25 μm	5.010 μm
25-30 μm	5.005 μm
30-35 μm	5.005 μm
35-40 μm	5.003 μm
40-45 μm	5.000 μm
45-50 μm	5.008 μm
50-55 μm	5.000 μm
Sum	55.056 μm
Average	5.0051 μm
2-Sigma *	0.0075 μm

2 μm Line	Pitch
0-2 μm	2.031 μm
2-4 μm	2.003 μm
4-6 μm	2.001 μm
6-8 μm	2.003 μm
8-10 μm	2.001 μm
10-12 μm	2.001 μm
12-14 μm	2.003 μm
14-16 μm	1.998 μm
16-18 μm	2.003 μm
18-20 μm	2.001 μm
20-22 μm	2.001 μm
22-24 μm	2.001 μm
24-26 μm	2.003 μm
26-28 μm	2.001 μm
28-30 μm	2.003 μm
Sum	30.054 μm
Average	2.0036 μm
2-Sigma *	0.0165 μm

Excluding 1 st and last lines	
Average	2.0015 μm
2-Sigma *	0.0032 μm

1 μm Line	Pitch
0-1 μm	1.005 μm
1-2 μm	1.001 μm
2-3 μm	1.002 μm
3-4 μm	1.002 μm
4-5 μm	1.001 μm
5-6 μm	1.002 μm
6-7 μm	1.001 μm
7-8 μm	1.001 μm
8-9 μm	1.004 μm
9-10 μm	1.001 μm
10-11 μm	1.000 μm
11-12 μm	1.002 μm
12-13 μm	1.001 μm
13-14 μm	1.001 μm
14-15 μm	1.004 μm
15-16 μm	1.004 μm
Sum	16.032 μm
Average	1.0020 μm
2-Sigma *	0.0031 μm

Excluding 1 st and last lines	
Average	1.0016 μm
2-Sigma *	0.0025 μm

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

End of report.