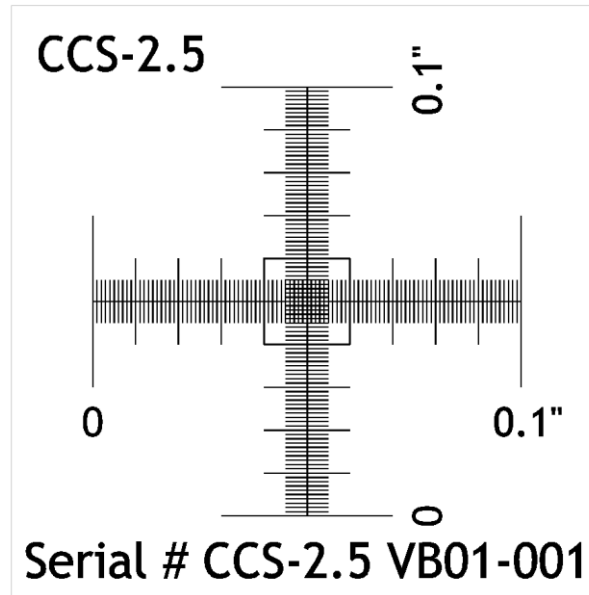




Wafer Level Certificate of Traceability for Micro-Tec CCS-2.5 Imperial Magnification Calibration Standard



Product Numbers: 31-T33500-U, 31-T33500-10 and 31-T33500-11

Product Description: Micro-Tec CCS-2.5 1inch cross scale, 0.001inch div., Si/Cr, opaque

Product Serial Number: CCS-2.5 VB01-xxx

The accuracy of these products was determined by reference comparison to working standards traceable to the National Institute of Standards and Technology (NIST), Test No. 861/280822-11.

The following applies to both horizontal and vertical fiducial lines:

Line	Average certified distance with (1 σ range)	Standard Deviation (1 σ)	Total expanded uncertainty (3 σ)
0-0.05"	0.0500 (0 to 0.04985-0.05015)"	$\pm 0.30\%$	$\pm 0.90\%$
0-0.1"	0.1000 (0 to 0.0997-0.1003)"	$\pm 0.30\%$	$\pm 0.90\%$
0-0.01"	0.0100 (0 to 0.00996-0.01004)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.02"	0.0200 (0 to 0.01992-0.02008)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.03"	0.0300 (0 to 0.02988-0.03012)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.04"	0.0400 (0 to 0.03984-0.04016)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.05"	0.0500 (0 to 0.0498-0.05020)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.06"	0.0600 (0 to 0.05976-0.06024)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.07"	0.0700 (0 to 0.06972-0.07028)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.08"	0.0800 (0 to 0.07968-0.08032)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.09"	0.0900 (0 to 0.08964-0.09036)"	$\pm 0.40\%$	$\pm 1.20\%$
0-0.001"	0.0010 (0 to 0.000994-0.001006)"	$\pm 0.60\%$	$\pm 1.80\%$





0-0.002"	0.0020 (0 to 0.001988-0.002012)"	±0.60%	±1.80%
0-0.003"	0.0030 (0 to 0.002982-0.003018)"	±0.60%	±1.80%
0-0.004"	0.0040 (0 to 0.003976-0.004024)"	±0.60%	±1.80%
0-0.005"	0.0050 (0 to 0.004970-0.005030)"	±0.60%	±1.80%
0-0.006"	0.0060 (0 to 0.005964-0.006036)"	±0.60%	±1.80%
0-0.007"	0.0070 (0 to 0.006958-0.007042)"	±0.60%	±1.80%
0-0.008"	0.0080 (0 to 0.007952-0.008048)"	±0.60%	±1.80%
0-0.009"	0.0090 (0 to 0.008946-0.009054)"	±0.60%	±1.80%

The average pitch was determined using ten randomly sampled die. 80 center-to-center measurements were taken across each of the ten die. The total expanded uncertainty includes both Type A and Type B uncertainties corrected for sample size using an appropriate Student t-factor.

Equipment used:

Instrument	Manufacturer	Serial #	Objective Lenses	NIST Certified CD/Recalibration	Repeatability
Light Microscope	Motic BA310MET	117000 0170	10x, 0.25N.A, 20x 0.4N.A. & 50x 0.55N.A. Plan Achromat	CD-PG01-0518 / June 2016	0.07%

Dudley S Finch
Certified by

Signature

August 14th 2015
Date

This certificate shall not be reproduced without the permission of Vof Micro to Nano.

