



**GELLER
MICROANALYTICAL
LABORATORY**

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Certified to ISO-9001 and

CERTIFICATION OF MEASUREMENT

MRS4-XY R21-134

	X-Traverse		Y-Traverse			X-Traverse		Y-Traverse	
	Left	Right	Top	Bottom		Left	Right	Top	Bottom
500µm pitch					1µm pitch				
1	499.97	499.98	499.98	500.08	1	1.019	1.015	1.011	1.031
2	499.99	499.89	499.91	500.11	2	0.997	1.012	1.002	0.996
3	500.20	500.00	499.93	500.05	3	0.990	1.006	1.001	1.000
4	500.00	500.02	499.99	500.10	4	1.016	0.999	0.998	1.003
5	499.97	499.97	500.04	500.05	5	0.990	0.985	1.003	0.997
6	<u>500.20</u>	<u>499.98</u>	<u>500.06</u>	<u>500.09</u>	6	1.014	1.008	1.002	0.995
Average	500.06	499.97	499.99	500.08	7	0.986	0.998	1.000	1.000
2-Sigma	0.10	0.04	0.05	0.02	8	<u>1.003</u>	<u>0.998</u>	<u>0.992</u>	<u>1.002</u>
50µm pitch					Average	1.002	1.003	1.001	1.003
1	50.02	50.04	49.99	49.99	2-Sigma	0.013	0.010	0.005	0.012
2	50.06	50.07	50.01	49.99	0.50µm pitch				
3	50.06	50.00	50.01	50.02	1	0.497	0.508	0.493	0.507
4	50.03	50.02	50.05	50.03	2	0.519	0.501	0.501	0.502
5	49.98	49.96	49.96	49.99	3	0.495	0.508	0.505	0.499
6	49.96	49.96	50.03	50.02	4	0.491	0.492	0.499	0.499
7	50.00	49.96	50.00	50.02	5	0.502	0.485	0.507	0.503
8	<u>49.90</u>	<u>49.95</u>	<u>49.95</u>	<u>50.01</u>	6	0.504	0.506	0.491	0.499
Average	50.00	50.00	50.00	50.01	7	0.501	0.507	0.500	0.497
2-Sigma	0.05	0.04	0.03	0.02	8	0.496	0.492	0.514	0.502
2µm pitch					9	0.501	0.509	0.498	0.502
1	2.026	2.006	2.006	2.007	10	<u>0.490</u>	<u>0.492</u>	<u>0.492</u>	<u>0.496</u>
2	1.990	2.001	2.006	2.000	Average	0.499	0.500	0.500	0.501
3	2.009	2.002	1.994	2.000	2-Sigma	0.008	0.009	0.007	0.003
4	1.994	1.989	2.000	2.004					
5	2.007	2.009	2.000	2.002					
6	1.996	2.003	1.999	1.998					
7	1.997	1.995	2.004	1.995					
8	<u>2.006</u>	<u>2.003</u>	<u>2.001</u>	<u>2.000</u>					
Average	2.003	2.001	2.001	2.001					
2-Sigma	0.011	0.006	0.004	0.003					

Pitch	Uncertainty	Traceable to:
500µm	±0.250µm	MRS-4 S/N R21-145
50µ	±0.052µm	MRS-4 S/N R21-145
2µm	±0.016µm	MRS-4 S/N R21-145

Pitch	Uncertainty	Traceable to:
1µm	0.013µm	MRS-4 S/N R21-145
1/2µm	0.020µm	MRS-4 S/N R21-145

XY Working Standard: MRS-4 S/N R20-113

The "ruler" is not traceable.

Certified by
Chuck Herrington