GELLER
MICROANALYTICAL
LABORATORY
426e BOSTON ST., TOPSFIELD, MA 01983-1216
TEL 978 887-7000 FAX 978-887-6671
Jg@gellermicro.com http://www.gellermicro.com

ACCREDITED
CALIBRATION
Cert #AC-1236

Certification of Measurement

Magnification Reference Standard

As Received Condition:	**Returned Condition**:
☐ New	☐ New
☐ Like New	☐ Recertified as New
☐ Contaminated (needs cleaning)	☐ Cleaned
☐ Damaged (comments below)	☐ Recoated for conductivity
☐ Cannot be certified (comments below)	☐ Rejected (cannot be certified, comments below)
Comments:_____	Comments:_____
_____	_____
_____	_____

Test Method: (in compliance with ISO/IEC-17025)
All measurements are performed in vacuum with a modified scanning electron microprobe. The 500μm, 50μm, 2μm pitch measurements are made between the horizontal and vertical tracks through the center of the device. For the MRS-4 the 1μm and ½μm pitch measurements are made through the center of the northwest patterns. For the 500μm through 1μm pitch patterns the measurements start at the inside edge of the left most bar (left column) and the left side of the first bar to the right of center (right column) of the center pattern. The vertical measurements are made the same way starting at the top pattern. For the ½μm pattern twenty measurements are made on the left side and top side of center, starting with the inside of the first bar. Measurements are made through direct comparison with a MRS that has been calibrated against a similar device measured by the National Physical Laboratory (NIST counterpart in the U.K.) thereby establishing an unbroken link of traceability. Each measurement is reported as a "pitch" value, which is the sum of an adjacent bar and space (edge-to-edge) on the pattern. Optional Z-axis measurements (step height) are provided by referencing the measured value against a NIST measured MRS using a Dektak 3030 stylus profilometer. The Z measurements are taken in 5 locations between the tracks in the southernmost 500μm pitch lines. The X & Y data was measured in vacuum while Z measurements are performed in air. For usage: 25°C ± 10°C, humidity <90%. Expanded uncertainties are reported with a coverage factor of k=2.

Notice:
Results reported here relate only to the specific device measured. Physical damage to the device incurred after calibration may invalidate the reported measurements. This certification shall not be reproduced except in full, without prior written approval of Geller MicroAnalytical Laboratory.

Handling Instructions:
1. If ordering without retainer- handle by tweezers being careful not to contact the top surface. The fused silica substrate is highly stressed and chips easily. If you later decide to order a retainer, we suggest returning the standard to us. We will, at no extra charge, re-mount your MRS.
2. To clean the MRS, use an ultrasonic bath at low power with solvents such as isopropanol, methanol or ethanol for a short time. DO NOT use acetone. It weakens the silver epoxy. Do not "scrub" the surface.
3. It has been reported that oil immersion techniques can be used when followed by solvent cleaning.
4. For SEM applications, do not exceed 5 X 10^{-8} amperes beam current in a stationary & focused beam!

Please be sure to return your registration form. We will advise you of product updates as they become available. If you have any questions about MRS applications, don't hesitate to call.