

# Interpreting Tektronix Gage Block Thickness Certificates



GEX Doc #100-216

## SCOPE

P4355 Gage Block Sets used for the P4350 Metralight MX2 Laser Micrometer that are certified by Tektronix Service Solutions and included calibration certificate.

## PURPOSE

This document serves to explain the certified values provided by Tektronix when calibrating P4355 GEX Evolution 220 Gage Block Sets. This document should help customers to understand the values listed on the Tektronix Certificate of Calibration.

## METHOD

### Analysis of Calibration Certificate:

The second page of the Tektronix Calibration Certificate contains the data that is of interest. For each gage block in the set, a unique ID and nominal thickness is listed. Length values are given for the Reference Position as well as positions 1-4.

**NOTE:** The term "Length" is used by Tektronix to mean thickness, and all values are listed in microns (1µm is equivalent to ±0.001mm).

Block Number	Nominal In millimeters	VIL Tolerance	Length Tolerance	Ref Position	Position 1	Position 2	Position 3	Position 4	VIL	Result	Units	Length Uncertainty
<b>Length and Variation in Length (VIL) Calibration</b>												
2-106	2.00000	Report of	Value	-4.272	2.143	-1.507	-1.429	-5.007	7.150	Report of Value	µm	.089 µm

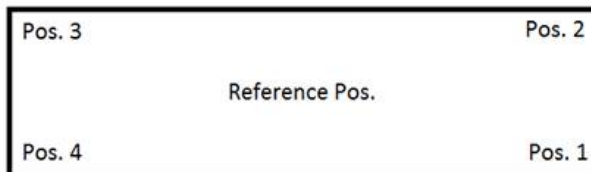
The Length values at each position correspond to how far the actual measurement extends above or below the nominal value in microns. The measurements can be found using this formula:

$$\text{Nominal value} + (\text{position value}/1000)$$

In the example above, the thickness measurements would read in mm:

Nominal	Ref Pos	Pos 1	Pos 2	Pos 3	Pos 4
2.00000	1.99573	2.00214	1.99850	1.99857	1.99499

The positions are taken like this on each gage block:



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The gage blocks are intended for use in the P4336 Evolution 220 Harwell Dosimeter Holder in conjunction with the P4350 MX2 Laser Micrometer. Therefore, the 'Reference Position' measurement value is the most representative of the gage block's thickness.

The Variation in Length (VIL) column on the right is the total range from the highest to the lowest value. In the above example,  $2.143 + 5.007 = 7.150$

The measurement uncertainty for each gage block is provided at  $k=1$  if you choose to establish an acceptance range for instrument performance verification. In the example data on page one, the uncertainty is given as  $\pm 0.089\mu\text{m}$ . This is equal to  $\pm 0.000089\text{mm}$ .

## LIMITATIONS/PRECAUTIONS

The resolution of the gage block calibration ( $\pm 0.000001\text{mm}$ ) far exceeds the resolution of the MX2 laser micrometer ( $\pm 0.001\text{mm}$ ) relegating the measurement uncertainty of the gage block calibration as negligible.

## REFERENCES

### References:

- *ISO/ASTM 52628: Standard Practice for Dosimetry in Radiation Processing*

## REVISION CONTROL HISTORY

DATE	CHANGE DESCRIPTION	REVISION
03/28/17	Initial release.	A

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