




Certificate of Calibration	ISO 10360-2:2009	Test Engineer	Work Order	20-2021
Issued by Omni-Tech 1460 Torrey Rd. Suite A Fenton MI 48430		Name: Brian Curtis	Reviewed by:	
Certificate Number: 20-2021		Signature:		
Calibration Date of Issue: 22-Jan-20	(as defined by customer)			
CMM Calibration Due Date				

CMM Calibration Address:
XYZ Company
1460 Torrey Rd Suite A
Fenton MI 48430

Contact: Daryl Barlow
Phone: 810-750-6474

CMM Details:

CMM Make, series, and Model	Coord3 Benchmark 5.4.4	CMM Travels (mm)
CMM Serial Number	12345	X= 500
CMM has Temp Compensation	N	Y= 400
Field Calibration	As Left	Z= 400

CMM Specifications:

Coord3 Benchmark 5.4.4

MPE (PFTU)	=	± 3.0 µm
MPE(0)	=	± 3.0 + L/300µm (L in meters)
MPE (X0)	=	± 3.0 + L/300µm (L in meters)
MPE (Y0)	=	± 3.0 + L/300µm (L in meters)
MPE (Z0)	=	± 3.0 + L/300µm (L in meters)
MPL (R0)	=	2.4 µm

Artifacts (mm):

- 30
- 200
- 300
- 500
- 1000

Mitutoyo Gage Blocks

Serial Number	192039	Certificate Number	T19I04446	CTE	10.8 ± 0.5 x 1e-6/°C
Serial Number	191826	Certificate Number	T19I04436	CTE	10.8 ± 0.5 x 1e-6/°C
Serial Number	190188	Certificate Number	T19H01389	CTE	10.8 ± 0.5 x 1e-6/°C
Serial Number	190069	Certificate Number	T19F05009	CTE	10.8 ± 0.5 x 1e-6/°C
Serial Number	12345	Certificate Number	2468	CTE	10.8 ± 0.5 x 1e-6/°C

Ambient Sensor
Temp Sensor1
Temp Sensor2

Temperature Sensors

Serial Number	12345	Certificate Number	2468
Serial Number	12345	Certificate Number	2468
Serial Number	N/A	Certificate Number	N/A

Probing System:

Calibration Sphere
Head Type and Serial Number
Probe Type and Serial Number
Stylus Diameter and Length

Serial Number	12345	Head Type	PH10
Serial Number	12345	Probe Type	TP2
Serial Number	12345	Length (mm)	20
DIA. (mm)	3.0000		

Controller:

Renishaw UCC
CMM-MANAGER

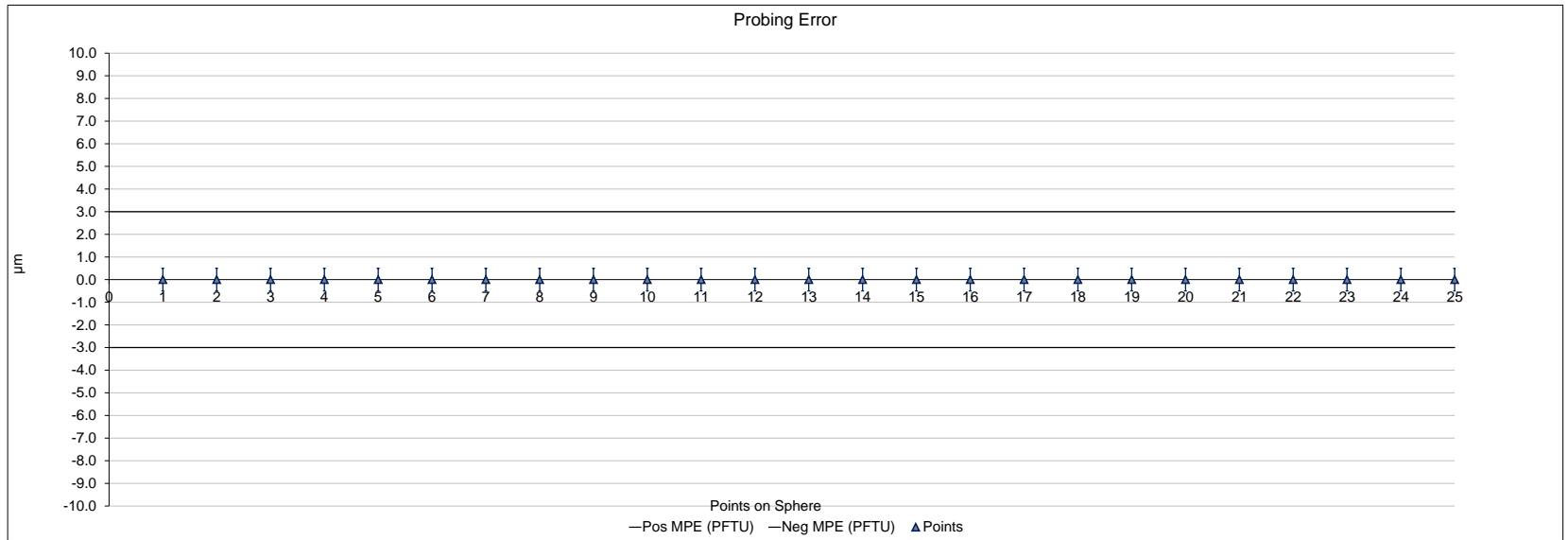
System Software:

This certifies that your instrument has been tested in accordance with applicable national, international and Omni-Tech specifications and standards. All referenced equipment used in this test is calibrated and traceable to national and/or international standards. All elements of the calibration procedure performed and stated on this certification are recognized national, international and/or validated test methods by Omni-Tech. The stated expanded uncertainties are given at a coverage factor of k=2, representing a confidence level of approximately 95%. In all cases, the stated uncertainty is that of the calibration method used and not the uncertainty of results obtained when measuring items with the CMM. All actual test data collected during this test are on file and available upon request. These recorded results relate only to this equipment, environmental conditions and instrument condition at the time of calibration. The stated results apply only to the calibrated equipment specified above. Uncertainty results obtained are not used for the pass or fail decision but are presented for completeness. This certificate may be reproduced only in its entirety, with written permission from Omni-Tech.

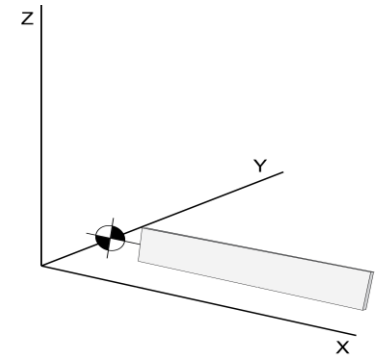
ISO 10360-5:2010 Report of Probing Error WI-061

Time Start	11:00 AM
Time Finished	11:15 PM
Sphere Diameter mm	25.00000
Probe Diameter mm	3.00000
MPE (PFTU) μm	± 3.0
Uncertainty	$U = \pm 0.0005 \text{ mm}$
Start SphereTemp C	20.00
Finished Sphere Temp C	20.00

Point Number	Deviation μm
1	0.0
2	0.0
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0
19	0.0
20	0.0
21	0.0
22	0.0
23	0.0
24	0.0
25	0.0

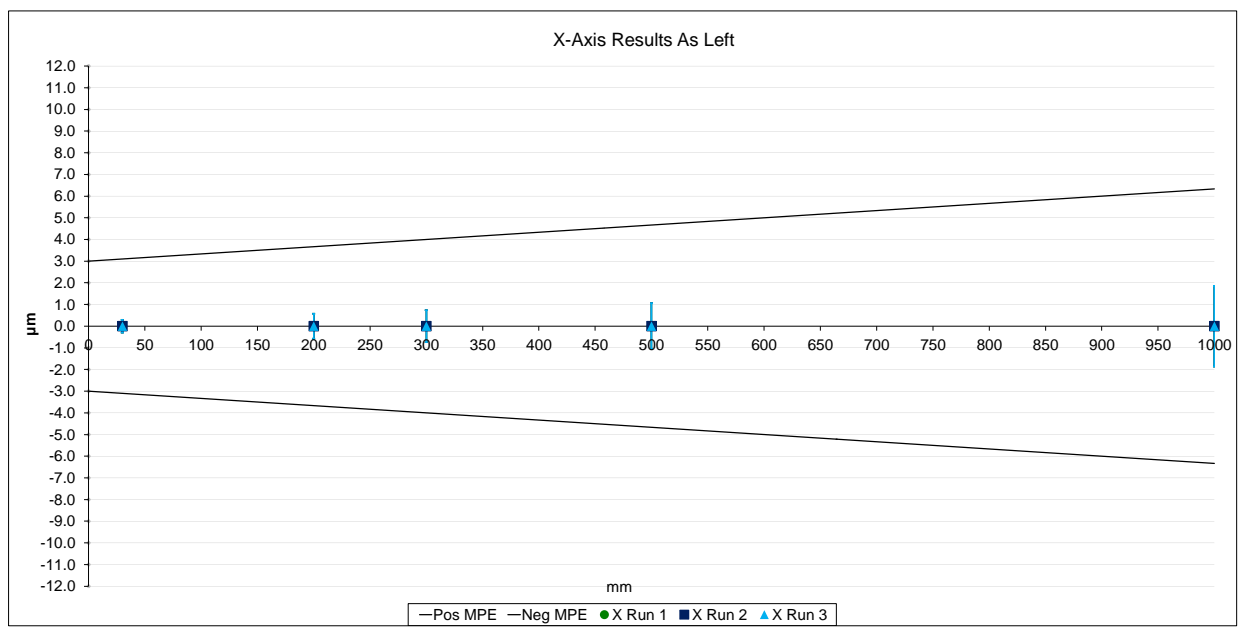


Time Start	11:55 AM				
Time Finished	11:59 AM				
Calibrated Tip (mm)	3.00010				
MPE (EOX)	± 3.0 + L/300µm (L in meters)				
Uncertainty	± U = 0.25 + 1.6L µm (L in meters)				
Ambient Temp C	20.00				
MPL(R0) µm	2.4				
Length (mm)	30	200	300	500	1000
(R0) µm	0.0	0.0	0.0	0.0	0.0
Verification Status	Pass	Pass	Pass	Pass	Pass
(Temp Comp CMM Only)					
CMM Scale Temp C	20.00	20.00	20.00	20.00	20.00
Measured Scale Temp C	20.00	20.00	20.00	20.00	20.00
Difference C	0.00	0.00	0.00	0.00	0.00

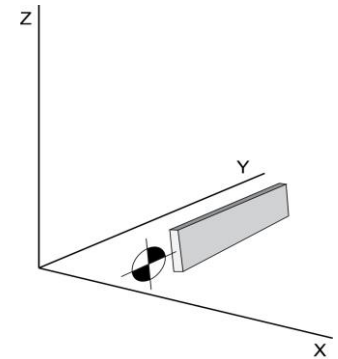


X - Axis As Left

	Measured Length (L1) mm	Measured Gage Temp C	Certified Length at 20 C	Difference µm	Pass
Run 1	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 2	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 3	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass

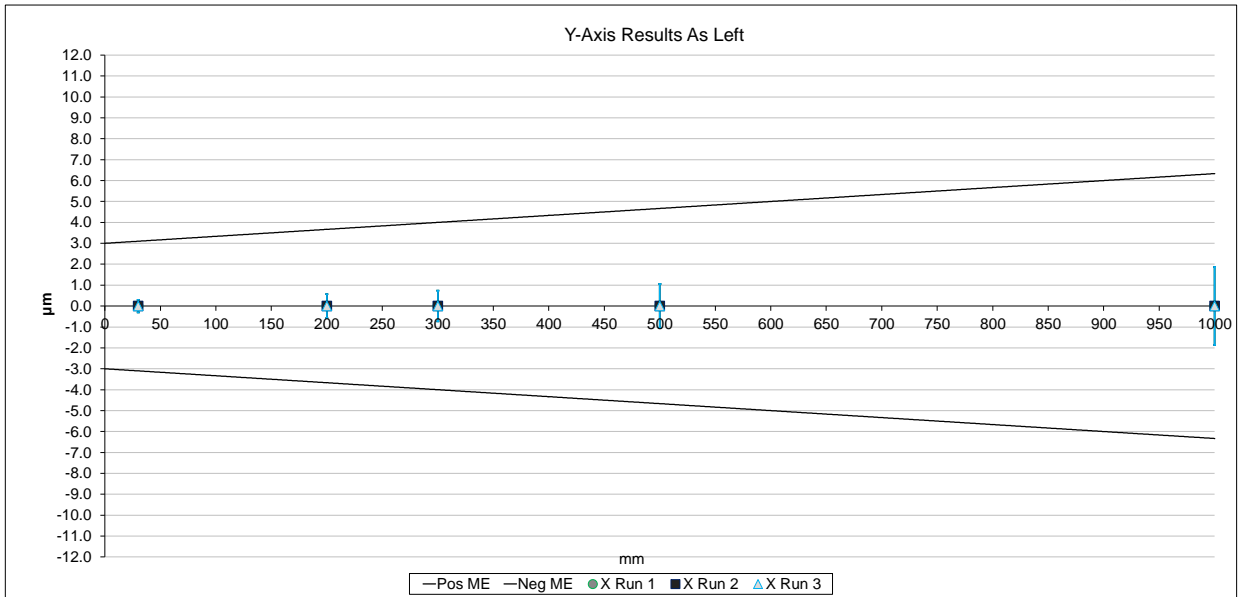


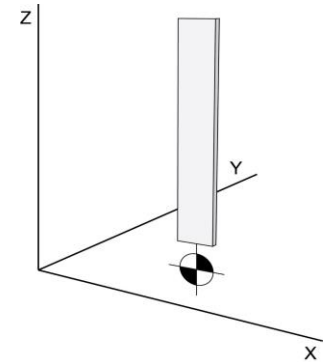
Time Start	11:55 AM				
Time Finished	11:59 AM				
Calibrated Tip (mm)	3.00010				
MPE (E0Y)	± 3.0 + L/300µm (L in meters)				
Uncertainty	± U = 0.25 + 1.6L µm (L in meters)				
Ambient Temp C	20.00				
MPL(R0) µm	2.4				
Length (mm)	30	200	300	500	1000
(R0) µm	0.0	0.0	0.0	0.0	0.0
Verification Status	Pass	Pass	Pass	Pass	Pass
(Temp Comp CMM Only)	X	Y	Z	Part1	Part2
CMM Scale Temp C	20.00	20.00	20.00	20.00	20.00
Measured Scale Temp C	20.00	20.00	20.00	20.00	20.00
Difference C	0.00	0.00	0.00	0.00	0.00



Y - Axis As Left

	Measured Length (L1) mm	Measured Gage Temp C	Certified Length at 20 C	Difference µm	
Run 1	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 2	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 3	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass

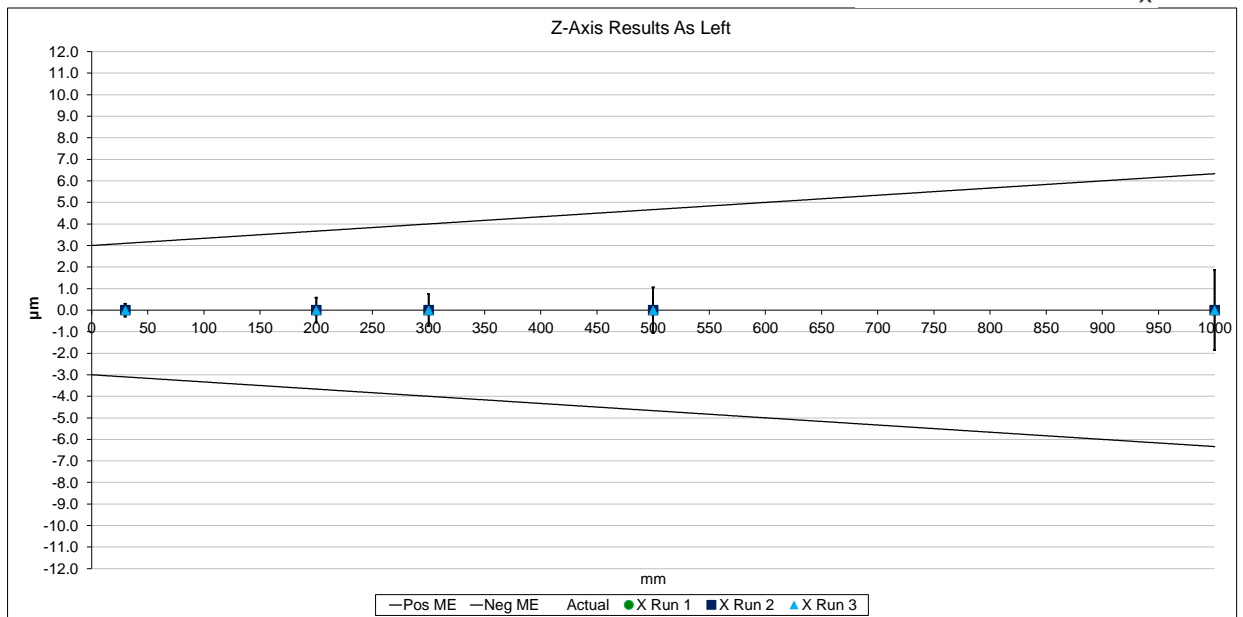




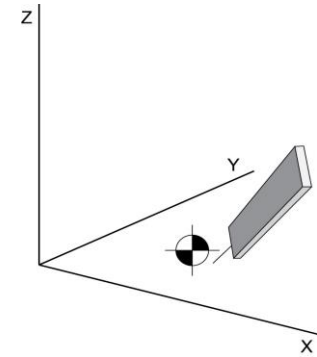
Time Start	11:55 AM				
Time Finished	11:59 AM				
Calibrated Tip (mm)	3.00000				
MPE (E0Z)	± 3.0 + L/300µm (L in meters)				
Uncertainty	± U = 0.25 + 1.6L µm (L in meters)				
Ambient Temp C	20.00				
MPL(R0) µm	2.4				
Length (mm)	30	200	300	500	1000
(R0) µm	0.0	0.0	0.0	0.0	0.0
Verification Status	Pass	Pass	Pass	Pass	Pass
(Temp Comp CMM Only)	X	Y	Z	Part1	Part2
CMM Scale Temp C	20.00	20.00	20.00	20.00	20.00
Measured Scale Temp C	20.00	20.00	20.00	20.00	20.00
Difference C	0.00	0.00	0.00	0.00	0.00

Z - Axis As Left

Run	Measured Length (L1) mm	Measured Gage Temp C	Certified Length at 20 C	Difference µm	Pass
	Run 1	30.00000	20.00	30.00000	
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 2	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 3	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass

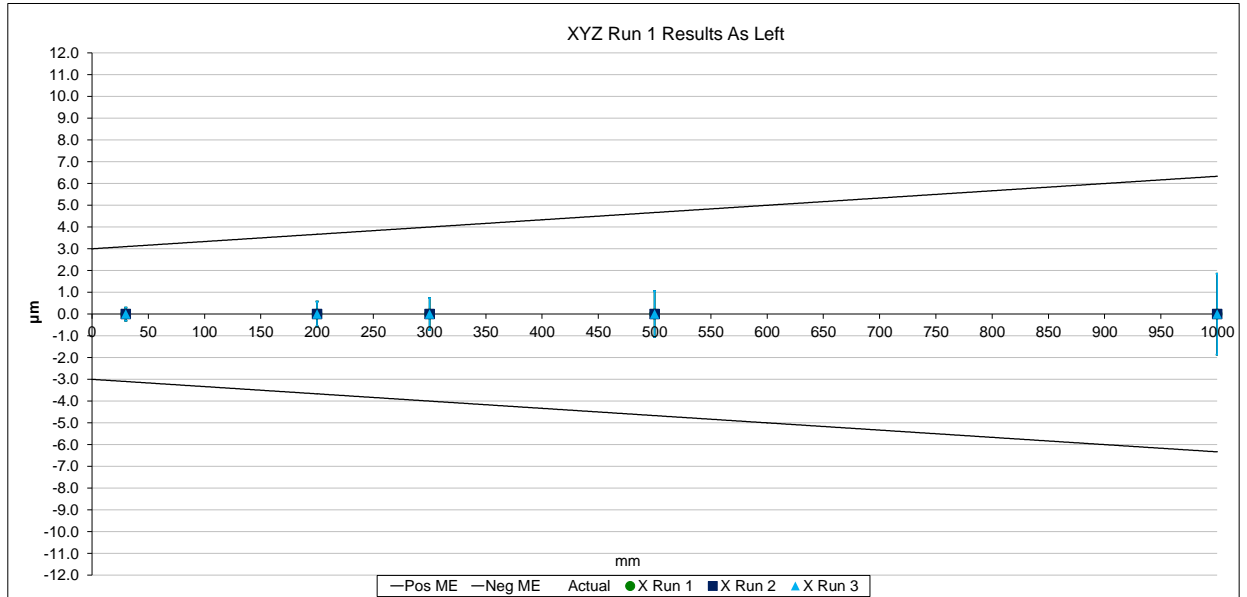


Time Start	11:50 AM				
Time Finished	11:59 AM				
Calibrated Tip (mm)	3.00000				
MPE (E0)	± 3.0 + L/300µm (L in meters)				
Uncertainty	± U = 0.25 + 1.6L µm (L in meters)				
Ambient Temp C	20.00				
MPL(R0) µm	2.4				
Length (mm)	30	200	300	500	1000
(R0) µm	0.0	0.0	0.0	0.0	0.0
Verification Status	Pass	Pass	Pass	Pass	Pass
(Temp Comp CMM Only)	X	Y	Z	Part1	Part2
CMM Scale Temp C	20.00	20.00	20.00	20.00	20.00
Measured Scale Temp C	20.00	20.00	20.00	20.00	20.00
Difference	0.00	0.00	0.00	0.00	0.00

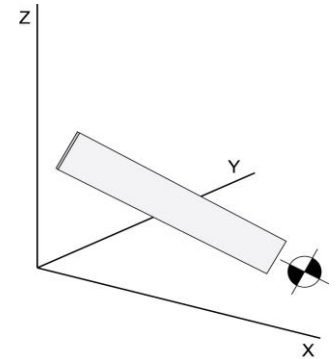


XYZ Run 1 As Left

	Measured Length (L1) mm	Measured Gage Temp C	Certified Length at 20 C	Difference µm	
Run 1	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 2	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 3	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass

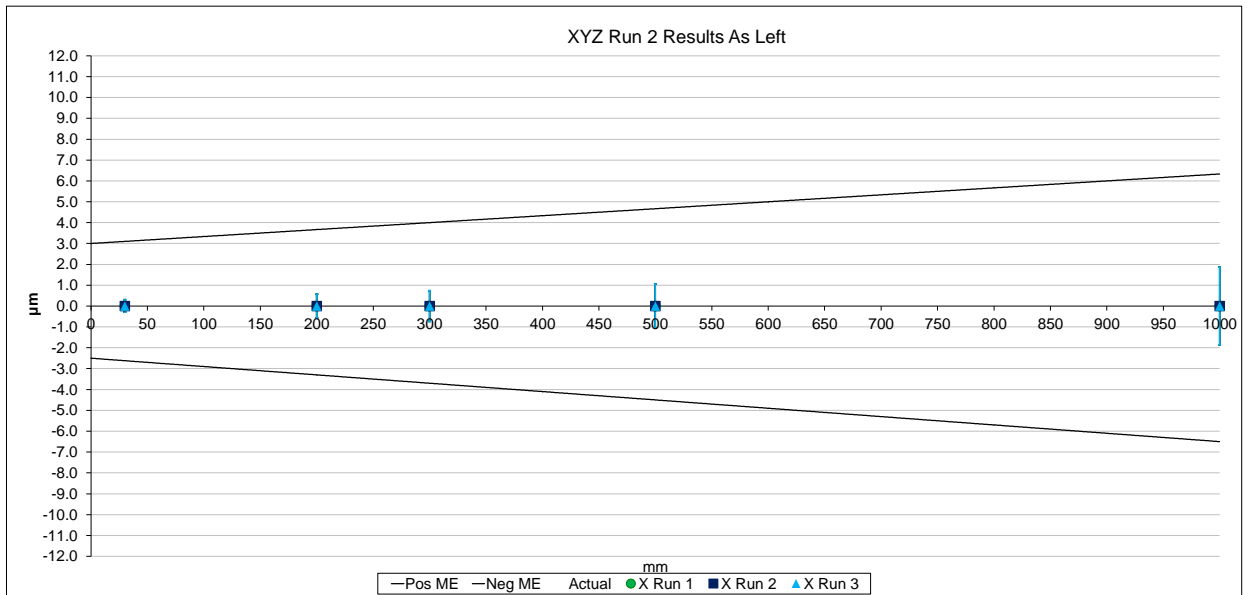


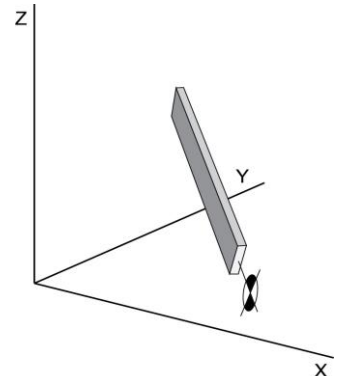
Time Start	11:55 AM				
Time Finished	11:59 AM				
Calibrated Tip (mm)	3.00000				
MPE (E0)	± 3.0 + L/300µm (L in meters)				
Uncertainty	± U = 0.25 + 1.6L µm (L in meters)				
Ambient Temp C	20.00				
MPL(R0) µm	2.4				
Length (mm)	30	200	300	500	1000
(R0) µm	0.0	0.0	0.0	0.0	0.0
Verification Status	Pass	Pass	Pass	Pass	Pass
(Temp Comp CMM Only)	X	Y	Z	Part1	Part2
CMM Scale Temp C	20.00	20.00	20.00	20.00	20.00
Measured Scale Temp C	20.00	20.00	20.00	20.00	20.00
Difference	0.00	0.00	0.00	0.00	0.00



XYZ Run 2 As Left

Run	Measured Length (L1) mm	Measured Gage Temp C	Certified Length at 20 C	Difference µm	
	Run 1	30.00000	20.00	30.00000	0.00000
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 2	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 3	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass

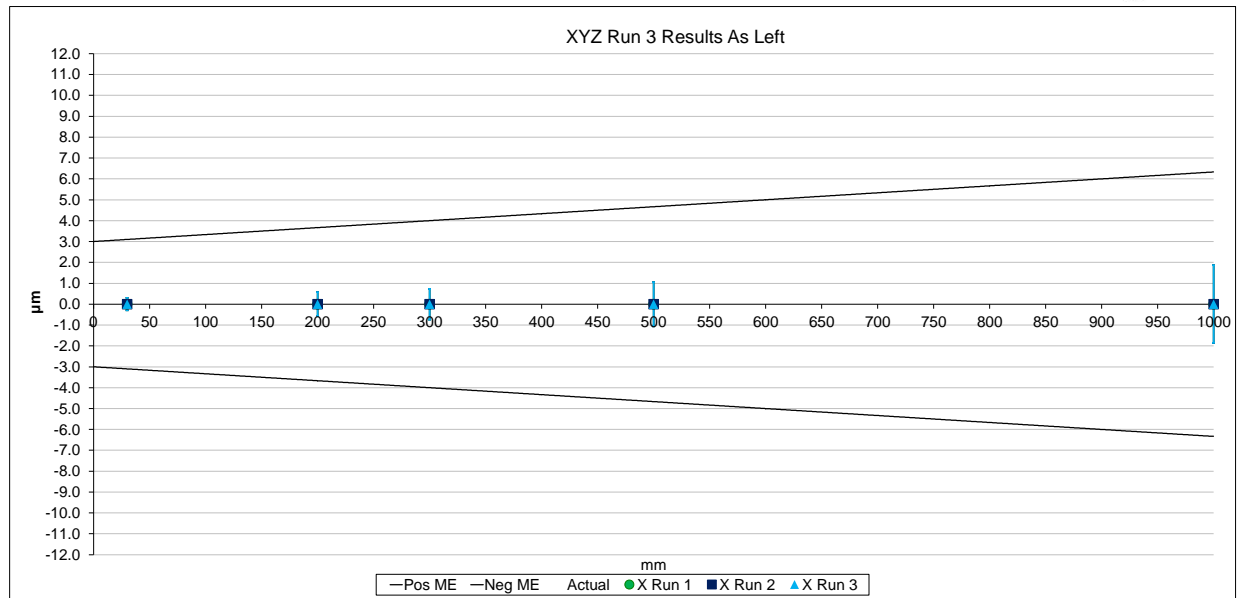




Time Start	11:55 AM				
Time Finished	11:59 AM				
Calibrated Tip (mm)	3.00000				
MPE (E0)	± 3.0 + L/300µm (L in meters)				
Uncertainty	± U = 0.25 + 1.6L µm (L in meters)				
Ambient Temp C	20.00				
MPL(R0) µm	2.4				
Length (mm)	30	200	300	500	1000
(R0) µm	0.0	0.0	0.0	0.0	0.0
Verification Status	Pass	Pass	Pass	Pass	Pass
(Temp Comp CMM Only)	X	Y	Z	Part1	Part2
CMM Scale Temp C	20.00	20.00	20.00	20.00	20.00
Measured Scale Temp C	20.00	20.00	20.00	20.00	20.00
Difference C	0.00	0.00	0.00	0.00	0.00

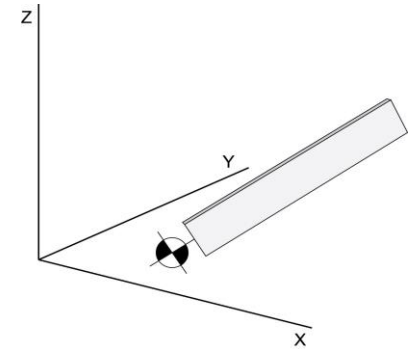
XYZ Run 3 As Left

	Measured		Certified Length at 20 C	Difference µm	
	Length (L1) mm	Gage Temp C			
Run 1	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 2	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
Run 3	30.00000	20.00	30.00000	0.00000	Pass
	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass



Time Start
 Time Finished
 Calibrated Tip (mm)
 MPE (E0)
 Uncertainty
 Ambient Temp C
 MPL(R0) μm
 Length (mm)
 (R0) μm
 Verification Status
 (Temp Comp CMM Only)
 CMM Scale Temp C
 Measured Scale Temp C
 Difference C

11:55 AM				
11:59 AM				
3.00000				
± 3.0 + L/300μm (L in meters)				
± U = 0.25 + 1.6L um (L in meters)				
20.00				
2.4				
30	200	300	500	1000
0.0	0.0	0.0	0.0	0.0
Pass	Pass	Pass	Pass	Pass
X	Y	Z	Part1	Part2
20.00	20.00	20.00	20.00	20.00
20.00	20.00	20.00	20.00	20.00
0.00	0.00	0.00	0.00	0.00



XYZ Run 4 As Left

Run	Measured Length (L1) mm	Measured Gage Temp C	Certified Length at 20 C	Difference μm	Pass
	Run 1	30.00000	20.00	30.00000	
Run 2	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass
	Run 3	30.00000	20.00	30.00000	0.00000
Run 3	200.00000	20.00	200.00000	0.00000	Pass
	300.00000	20.00	300.00000	0.00000	Pass
	500.00000	20.00	500.00000	0.00000	Pass
	1000.00000	20.00	1000.00000	0.00000	Pass

