

CERTIFICATE OF INSPECTION

APPLICANT: Name _____
Address _____

INSTRUMENT: (1 set of 81) Gauge Block Material: Ceramics (ZrO₂)
Code No. : 516-304-26 Manufacturer: Mitutoyo
Type: BE3-81-2A/A Basis of Test: ASME B89.1.9-2002
Serial No. : 1300688
Grade: AS-2 (ASME)

DATE OF INSPECTION: 31th Jan. 2013

INSPECTION METHOD: The length of gauge block is determined by comparing it, using a gauge block comparator, with a reference gauge block of the same nominal length. Both gauge blocks were placed in a vertical position on the comparator with their left or unmarked measuring face down. For determining the deviation / variation of length, d_c / d_{max} / d_{min} / v is measured at the center point and the four corner points about 1.5 mm from the face edges.

ENVIRONMENT: Air temperature (68 ± 1.8)F [(20 ± 1.0) °C]

RESULTS: The results apply to the reference temperature of 20°C (ITS-90). For correction of the thermal expansion, an expansion coefficient of the gauge block of $(5.2 \pm 0.3) \times 10^{-6}/F$ [$(9.3 \pm 0.5) \times 10^{-6}/K$] is used. The result of the calibration are presented on the next page.

Expanded Uncertainty: 4" or less 2.4 μ inch (L = Nominal length) L:inch
(For Central Deviation) Up to 20" (1.2 + L / 2.3) μ inch

(k=2)

The uncertainty presented above is based on a standard uncertainty multiplied by a coverage factor of k=2, which provides a confidence level of approximately 95%. The standard uncertainty has been determined in accordance with EAL-R2.

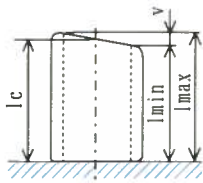
TRACEABILITY: Traceable to NIST No. 821/276375-08
(NIST=National Institute of Standard and Technology)

Date 31th Jan. 2013



A. Matsuura

Result: The following table states for each gauge block the measured deviation from the nominal length at the center point and the measured deviation / variation of length.



Nominal Length	l_n	Maximum Deviation	$d_{max}=l_{max}-l_n$
Central Length	l_c	Minimum Length	l_{min}
Central Deviation	$dc=l_c-l_n$	Minimum Deviation	$d_{min}=l_{min}-l_n$
Maximum Length	l_{max}	Variation	$v=l_{max}-l_{min}$

Unit: μ inch

Nominal Length l_n inch	Ident. No.	Central Dev. dc	Max. Dev. d_{max}	Min. Dev. d_{min}	Var. v
0.05	120011	-2.4	-2.4	-3.1	0.7
0.1	120092	+2.8	+2.8	+1.2	1.6
0.1001	120045	+2.8	+2.8	+1.6	1.2
0.1002	120054	-1.6	-1.6	-3.1	1.5
0.1003	120008	+3.1	+3.1	+0.4	2.7
0.1004	100022	+3.1	+3.1	+2.4	0.7
0.1005	110018	+3.1	+3.1	+1.6	1.5
0.1006	120038	+2.4	+2.8	+2.0	0.8
0.1007	090050	+3.1	+3.1	+1.6	1.5
0.1008	120076	+2.8	+3.1	+1.6	1.5
0.1009	120135	+2.8	+2.8	+1.2	1.6
0.101	120000	-1.6	-1.6	-3.1	1.5
0.102	120051	-1.6	-1.2	-2.8	1.6
0.103	120102	+1.2	+1.2	-0.4	1.6
0.104	090051	-0.8	-0.4	-2.8	2.4
0.105	110013	-1.6	-1.6	-3.1	1.5
0.106	120025	-0.8	-0.4	-3.1	2.7
0.107	120083	+1.2	+1.2	0.0	1.2
0.108	090027	-2.8	-2.8	-3.1	0.3
0.109	130015	+0.8	+0.8	-0.8	1.6
0.11	100023	0.0	0.0	-3.1	3.1
0.111	130004	-0.4	-0.4	-1.2	0.8
0.112	120070	+2.4	+2.8	+1.2	1.6
0.113	070003	-3.5	-3.5	-4.7	1.2
0.114	120044	-1.2	-1.2	-4.3	3.1
0.115	120049	-0.4	-0.4	-2.0	1.6
0.116	110020	+1.6	+2.4	-1.6	4.0
0.117	080034	+2.8	+2.8	0.0	2.8
0.118	120037	+0.4	+0.8	-0.8	1.6
0.119	120061	+2.4	+3.5	+1.6	1.9
0.12	120105	+3.1	+3.1	+2.4	0.7
0.121	120052	-0.8	-0.8	-2.8	2.0
0.122	120041	-0.8	-0.8	-1.6	0.8
0.123	110007	+2.8	+3.1	+0.8	2.3
0.124	120044	+3.1	+3.1	+1.6	1.5
0.125	120179	-1.2	-1.2	-2.8	1.6
0.126	120028	-1.6	-1.2	-2.8	1.6
0.127	120058	0.0	+0.4	-0.8	1.2
0.128	070022	-2.0	-2.0	-3.5	1.5

Nominal Length In inch	Ident. No.	Central Dev. dc	Max. Dev. dmax	Min. Dev. dmin	Var. v
0.129	120000	-2.0	-1.6	-3.1	1.5
0.13	120091	+0.8	+0.8	-1.2	2.0
0.131	130012	-0.8	-0.8	-2.0	1.2
0.132	080019	-1.2	-1.2	-2.8	1.6
0.133	120103	+2.4	+2.4	-0.4	2.8
0.134	120010	-1.2	-1.2	-2.8	1.6
0.135	100032	+2.8	+2.8	+2.0	0.8
0.136	130012	-1.6	-1.6	-3.5	1.9
0.137	080003	-1.6	-1.6	-2.8	1.2
0.138	080070	-2.4	-2.4	-4.7	2.3
0.139	120026	-2.0	-2.0	-2.8	0.8
0.14	090070	-1.6	-1.6	-3.1	1.5
0.141	110035	+2.0	+2.8	0.0	2.8
0.142	120051	+2.4	+2.8	+1.6	1.2
0.143	070032	-0.8	-0.8	-3.1	2.3
0.144	090030	-1.2	-0.8	-2.8	2.0
0.145	100007	-5.9	-4.7	-5.9	1.2
0.146	100021	-1.6	-1.6	-2.8	1.2
0.147	120020	+0.8	+1.6	-2.4	4.0
0.148	120073	+0.4	+0.4	-0.8	1.2
0.149	120041	-2.4	-2.4	-4.3	1.9
0.15	090028	-1.6	-1.2	-2.8	1.6
0.2	130028	+2.8	+2.8	+1.6	1.2
0.25	120049	-2.4	-2.4	-4.3	1.9
0.3	120119	0.0	+0.4	0.0	0.4
0.35	120009	-0.8	+0.4	-2.8	3.2
0.4	120007	+3.5	+3.5	+2.4	1.1
0.45	120051	+0.8	+0.8	-0.4	1.2
0.5	120239	+1.2	+1.2	-1.6	2.8
0.55	120052	+2.4	+2.4	+0.8	1.6
0.6	120052	+2.0	+2.0	+0.4	1.6
0.65	130015	-2.0	-2.0	-4.7	2.7
0.7	120069	-0.8	-0.8	-2.0	1.2
0.75	120051	+0.8	+0.8	-1.2	2.0
0.8	120044	-2.8	-2.8	-5.1	2.3
0.85	120029	+0.8	+0.8	-0.8	1.6
0.9	120020	+0.8	+0.8	-2.4	3.2
0.95	130027	+3.9	+3.9	+1.6	2.3
1	120201	-1.2	-1.2	-2.4	1.2
2	130014	+3.5	+4.3	+3.5	0.8
3	130019	+2.4	+3.1	0.0	3.1
4	100105	0.0	+1.6	-3.1	4.7