

Mitutoyo

MSC[®]
Industrial Supply Co.



WORLD-CLASS CALIBRATION SERVICES

FROM THE LEADING MANUFACTURER OF
METROLOGY INSTRUMENTS

CALIBRATION LAB



Mitutoyo Fundamentals of Calibration

What is Calibration

Before precision measuring tools are placed in service, and periodically thereafter they need to be calibrated.

"Calibration" is a process to ensure that the measurements obtained by a measuring tool are within allowable specifications/tolerances.

Precision small hand tools (mics, calipers, indicators, etc) are calibrated by measuring a reference standard (such as a gage block). The measurement of the reference standard is recorded and compared to the actual size of the reference standard. Multiple points throughout the tools range are checked for calibration. If the recorded measurements are within the tools allowable deviation from the actual standard size, the tool is within calibration.

Ideally, the size of the reference standard is known to a precision of ten times or more than the smallest graduation of the tool being checked. For example, when calibrating a dial caliper with .001" graduations, a reference standard with a know size to a precision of a least .0001" should be used. Gage block sizes are generally know to within a few "millionth" of an inch, and are ideal for most small hand tool calibration reference standards.

While a precision reference standard is critical to calibration, temperature is also a major consideration when calibrating a precision measuring tool. As temperature increases, the reference standard grows. Gage blocks get longer and holes in ring gages increase in diameter.

Traceability

A cornerstone in the calibration process is traceability.

Traceability allows the reference standard used to calibrate a precision measuring tool to be directly traced back to an accredited lab. In the U.S. this is normally NIST. Traceability assures that all reference standards use the same original reference standard.



Calibration Tester
for Indicators



Caliper Tester



Gage Blocks

Accreditation

A lab's accreditation by an independent outside source provides assurances that the practices used by the lab conform to recognized standard practices. Not only are the actual measuring techniques used by the lab but the all important paper trail are required to conform the accrediting body's specifications. The American Association for Laboratory Accreditation (A2LA) is a well recognized accrediting body in the U.S.

Certificate of Calibration

A Certificate of Calibration (Cert) provides evidence that a tool has been calibrated and is or is not within allowable error specifications. A cert should list:

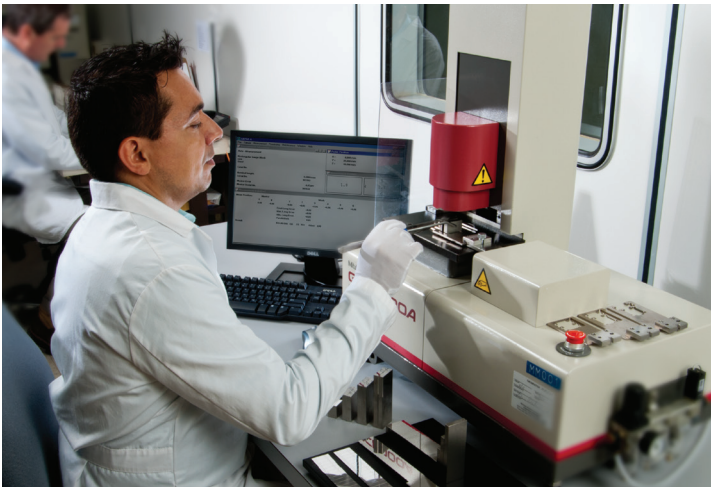
1. Tool manufacture/name/model number, measuring range, tool graduation/resolution, and serial number.
2. Standards used, temperature.
3. Traceability information/specifications used.
4. Calibrating company and person responsible for the calibration.
5. Actual measurements/deviation, permissible error and uncertainty of measurements.
6. Whether the tool passed or failed calibration requirements.

Reference Standards

A reference standard can be a physical object such as a gage block or a ring gage, a caliper checker or a mic checker. A reference standard can also be based on time or light. All reference standards must be traceable back to an accredited lab. In the U.S. this is normally NIST.

Premium uncertainty at an affordable price.

The Mitutoyo America Calibration Lab is accredited to ISO/IEC 17025 by the A2LA (American Association for Laboratory Accreditation). With the broadest scope of any commercial lab in the country, we can calibrate any type of measuring device or dimensional artifact—from small tools to surface finish specimens, gage blocks and step gages, to cylindrical squares and roundness hemispheres.



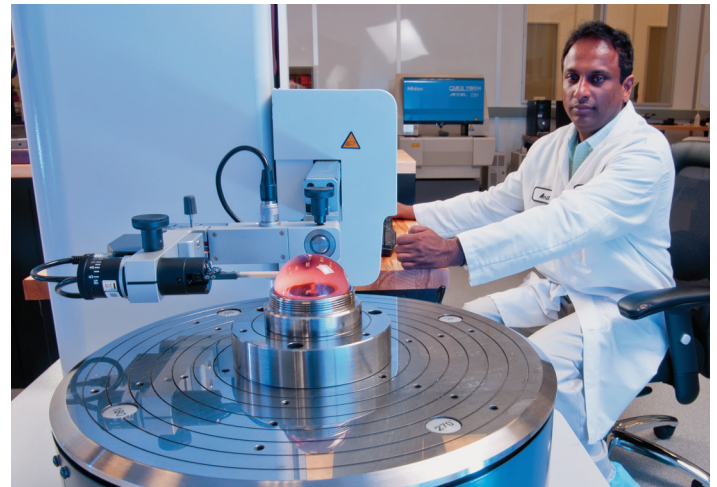
Offering the lowest commercially available measurement uncertainty for gage block calibration

Electromechanical dual-head gage block comparator automatically measures a gage block's center and four corners, eliminating human error for highest accuracy and reproducibility. Measurement uncertainty as low as 1.3 μm (0.033 μm).



Unique capabilities include:

- Lengths up to 40 in. or 1,000 mm
- Materials (steel, ceramic, tungsten and chrome carbide)



Always a step ahead of the competition, we take roundness calibration to the next level: a measurement uncertainty of 5 nm (0.005 μm) or 0.2 μin , depending upon the artifact geometry.

About our calibration lab

To ensure essential performance, all technology used for calibration must be operated in a contamination-free environment. The Mitutoyo Calibration Lab clean rooms are certified Class 10,000. Clean room temperature is maintained at $20^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ with a relative humidity controlled between 40% and 50%. Clean room access is controlled by airlock utilizing positive pressure to prevent the entrance of outside air. Every aspect of the lab is designed to guarantee results that are of the highest possible quality while at the same time ensuring fast delivery and a great price. This is why a number of our industry competitors use our calibration services, and why you should as well.

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MSC Top Selling Mitutoyo Calibrated Tools

MSC Part No.	MAC Part No.	Description
Digital Calipers		
53766077	530-312CAL	N6P IN
53766275	552-314-10CAL	CFC-40"G
53766267	552-315-10CAL	CARBON FIBER DIGI CALIPER -60"G
53766259	552-316-10CAL	CARBON FIBER CALIPER -80"G
53766242	573-721CAL	NTD12-6"PMX IP-67
53766234	500-166CAL	CD-12"CPWW
69242980	500-170-30CAL	DIGI CAL, 4", 100MM, ABS, SPC
53766366	500-171-30CAL	DIGI CAL, 6", 150MM, ABS, SPC
53766358	500-172-30CAL	DIGI CAL, 8", 200MM, ABS, SPC
53766341	500-173CAL	DIGIMATIC CALIPER 12" W/OUTPUT
53766333	500-193CAL	DIGIMATIC CALIPER 12"
53766325	500-195-30CAL	DIGI MYCAL, 0-4", 0.75 D BAR, ABS
53766549	500-196-30CAL	DIGI MYCAL, 0-6", 0-150MM, W/ ABS
53766531	500-197-30CAL	DIGI MYCAL, 8", 0-200MM, ABS
53766523	500-463CAL	DIGIMATIC SOLAR CALIPER 4" (ABS TYP
53766515	500-464CAL	DIGI SOLAR CALIPER 6" ABS TYP
53766507	500-465CAL	DIGIMATIC SOLAR CALIPER 8" (ABS TYP
53766499	500-473CAL	DIGIMATIC SOLAR CALIPER 4" (ABS TYP
53766481	500-474CAL	DIGI SOLAR CALIPER 6" ABS TYP
53766473	500-475CAL	DIGI SOLAR CALIPER 8" ABS TYP
53766465	500-505-10CAL	DIGIMATIC CALIPER 18"
53766457	500-506-10CAL	DIGIMATIC CALIPER 24"
53766440	500-507-10CAL	DIGIMATIC CALIPER 40"
53766432	500-733-10CAL	CD-6"PSXWW
53766556	500-734-10CAL	CD-8"PSXWW
53766564	500-737-10CAL	CD-6"PMXWW
53766424	500-738-10CAL	CD-8"PMXWW
53766416	500-752-10CAL	CD-6"PSX
53766408	500-753-10CAL	DIGIMATIC CALIPER, IP67, 8" NO-SPC
53766382	500-754-10CAL	DIGIMATIC CALIPER, IP67, 12"
53766374	500-762-10CAL	DIGIMATIC CALIPER,IP67, 6" W/OUTPUT
53766317	500-763-10CAL	CD-8"PMX
53766309	500-764-10CAL	CD-12"PMX
53766291	500-784CAL	SOLAR CD IP-67 6"/150MM WO/OUTPUT
53766283	500-785CAL	SOLAR CD IP-67 8"/200MM WO/OUTPUT
Dial Calipers		
53766028	505-673CAL	DIAL CALIPER 300MM/0.02MM
53766010	505-674CAL	DIAL CALIPER 4"T
53766002	505-675CAL	DIAL CALIPER 6"
53765996	505-676CAL	DIAL CALIPER 8"
53765988	505-677CAL	DIAL CALIPER 12"
53766044	505-709CAL	CALIPER, DIAL, 8", OD CARBIDE JAW
53766036	505-712CAL	CALIPER, DIAL, 6" OD/ID CARBIDE JAW
Depth Micrometers		
53862991	527-313-50CAL	DEPTH GAGE, DIAL, 12", .001", F/ADJ
53765798	547-258SCAL	DIGIMATIC DEPTH GAGE/IDC112
Calibration Kits		
53765772	516-931-26CAL	9 PC SET, IN, RECT, AS-1
Height Gages		
57582280	192-152CAL	HEIGHT GAGE, DIGITAL COUNT, 0-24"
53765608	570-312CAL	DIGIMATIC HEIGHT GAGE 12"/300MM
Bore Gages		
53765459	511-752CAL	CG-2.5"AX/2923SB-10
53765467	511-932CAL	CG-1.4,2.5,6"AX/2923SB-10
Dial Indicators		
53854857	1410S-10CAL	DIAL GAGE, 0.001", 0.25", 0-100
53854774	1923CAL	DIAL GAGE, 0.0005", 0.05", 0-10-0
53854840	2358S-10CAL	DIAL INDICATOR, FB, .0001-5
53854832	2416S-10CAL	DIAL INDICATOR, .001-1" C2
53854824	2416SCAL	DIAL INDICATOR, .001-1" C2
53854808	2424S-19CAL	DIAL INDICATOR, .001-2"
53854816	2776SCAL	DIAL INDICATOR, .0005-1"

53854782	2803S-10CAL	DIAL INDICATOR, .0001-.025" B
53854766	513-402TCAL	TI .0005-.03 IN
Digital Indicators		
53848420	543-282BCAL	SIGNAL DIGIMATIC INDICATOR(.00005"-
53848347	543-392BCAL	DIGIMATIC INDICATOR, ID-C112EXB
53848412	543-392CAL	DIGIMATIC INDICATOR, ID-C112EX
53848404	543-396CAL	DIGIMATIC INDICATOR, ID-C112CEX
53848388	543-402BCAL	DIGIMATIC INDICATOR, ID-C1012EXB
53848396	543-402CAL	DIGIMATIC INDICATOR, ID-C1012EX
53848370	543-472BCAL	DIGIMATIC INDICATOR, ID-C125EXB
53848362	543-474BCAL	DIGIMATIC INDICATOR, ID-C1025XB
53848354	543-552ACAL	ID-F (IN/MM), 0-1", 120V AC
53848552	543-558ACAL	ID-F (IN/MM), 0-2", 120V AC
53848560	543-562ACAL	DIGIMATIC INDICATOR, 1.2" / 30.4MM, AC-CURACY 0.0015MM
53848545	543-564ACAL	DIGIMATIC IND .00002" / .0005MM
53848537	543-571CAL	ID-N1012E .5"/12.7mm, .0005"
53848529	543-576CAL	ID-N112E (12.7mm/.5")
53848503	543-581CAL	ID-B1005E .2"/5.08mm, .0005"
53848511	543-586CAL	ID-B105E .2"/5.08mm, .00005"
53848487	543-783BCAL	DIGIMATIC INDICATOR,IDS (.0005"-.5"
53848495	543-783CAL	DIGIMATIC INDICATOR,IDS (.0005"-.5"
53848479	543-793BCAL	DIGIMATIC INDICATOR IDS .0001"/.5"
53848461	543-793CAL	DIGIMATIC INDICATOR IDS .0001"/.5"
53848446	543-796BCAL	DIGIMATIC INDICATOR, ID-S112PEXB
53848453	543-796CAL	DIGIMATIC INDICATOR IDS .00005"/.5"
53848438	575-123CAL	ID-U (INCH/MM), AGD TYPE
Calibrated Tool Kits		
53863189	64PKA076BCAL	TOOL PKG, DIGIMATIC, INCH, W/ 1" MIC (RATCHET STOP TYPE), 6" CALIPER, CASE
53863171	64PKA077BCAL	TOOL PKG, DIGIMATIC, INCH, W/ 1" MIC (FRIC-TION THIMBLE TYPE), 6" CALIPER, CASE
Mechanical Micrometers		
53765301	193-211CAL	DIGIT MICROMETER
53765111	101-113CAL	MIC, OUTSIDE, 0-1", 0.0001", RS
53765103	101-119CAL	MIC, OUTSIDE, 2-3", 0.0001", RS
53766788	112-237CAL	MIC, POINT, 0-1", 0.001", 30°/.430"
53765095	118-129CAL	MIC, DEEP THROAT, 0-1", 0.0001"
53765145	129-127CAL	MIC, DEPTH, 0-4", 0.001", 2.5" BASE
53765293	293-240-30CAL	DIGIMATIC MIC 0-25MM NO-OUTPUT
53765285	293-330-30CAL	MIC, DIGI, 0-1", W/SPC OUTPUT, IP65
53765277	293-335-30CAL	MIC, DIGI, 0-1", W/SPC OUTPUT, IP65
53765269	293-340-30CAL	DIGIMATIC MIC 1" NO-SPC OUTPUT
53765251	293-344-30CAL	MIC, DIGIMATIC, 0-1", IP65
53765244	293-345-30CAL	MIC, DIGIMATIC, 1-2", IP65
53765236	293-346-30CAL	MIC, DIGIMATIC, 2-3", IP65
53765210	293-348-30CAL	MIC, DIGIMATIC, 0-1", IP65
53765202	293-831-30CAL	MIC, DIGI, MDC-LITE, 0-1", R
53765319	293-832-30CAL	MIC, DIGI, MDC-LITE, 0-1", F
53766689	323-350CAL	DIGIMATIC DISC MIC 0-1" IP-65
53753711	329-350-10CAL	DMC4-6"MB
53765129	340-351-10CAL	OMC-6"MB
53766796	342-351CAL	DIGIMATIC POINT MIC. 0-1" IP-65
53766614	350-357-10CAL	MHN3-1"MTB
53858288	395-371CAL	DIGI SPHERICAL MIKE 0-1" IP-65
Thickness Gages		
53863106	547-500SCAL	DIGIMATIC THICKNESS GAGE, IDS TYPE
53863080	547-561SCAL	DIGIMATIC THICKNESS GAGE, IDS TYPE
53863122	700-118-20CAL	QUICK MINI, 0-5" / 0-12.7mm
53765707	7300SCAL	DIAL THICKNESS GAGE (2414SB)
53765699	7304SCAL	DIAL THICKNESS GAGE/2416SB
53765673	7322SCAL	DIAL THICKNESS GAGE (2416SB)
53765681	7326SCAL	DIAL THICKNESS GAGE (2804S-10)



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