

# CALIBRATION SYSTEM CERTIFICATE

With respect to products (measuring instruments and testing instruments) ,we hereby certify that we have established our calibration system traceable to the national (international) standards ,as shown below.

Mitutoyo Corporation qualifies for the registered business operator\*1 of the Japan Calibration Service System (JCSS\*2) and use standards that are traceable to the national standard owned by the National Metrology Institute of Japan / National Institute of Advanced Industrial Science and Technology (NMIJ/AIST\*3) for calibration service.

Being endorsed by the above facts, the calibration results stated in the Mitutoyo-issued calibration certificate stamped with a JCSS mark shall be deemed to be traceable to the national standard.

The Production, Inspection and Calibration Service Departments of Mitutoyo Corporation also use standards which are traceable to the standard calibrated in advance by one of the registered operators of JCSS to perform inspection and calibration services for products (measuring equipment) so that calibration results are traceable to the national standard.

Since the International Accreditation Japan / National Institute of Technology and Evaluation (IAJapan/NITE\*4), which is the accredited organization of JCSS, has signed in the International Laboratory Accreditation Cooperation (ILAC\*5) and the Asia Pacific Laboratory Accreditation Cooperation (APLAC\*6), the calibration certificate issued by Mitutoyo Corporation and stamped with a JCSS mark shall be valid in the countries and commercial areas which also have signed in ILAC and APLAC.

\*1) In Mitutoyo Corporation, we have 6 JCSS registered operations as follows:

- Metrological Standards Calibration Section
- Miyazaki Plant
- Utsunomiya Calibration Center
- Kawasaki Calibration Center
- Hiroshima Calibration Center
- Techno Services Business Division

\*2) The JCSS registered operator conforms to the requirement of ISO/IEC 17025.

\*3) National Metrology Institute of Japan/National Institute of Advanced Industrial Science and Technology

\*4) International Accreditation Japan/National Institute of Technology and Evaluation

\*5) International Laboratory Accreditation Cooperation

\*6) Asia Pacific Laboratory Accreditation Cooperation

Mitutoyo Corporation  
Quality Assurance Department

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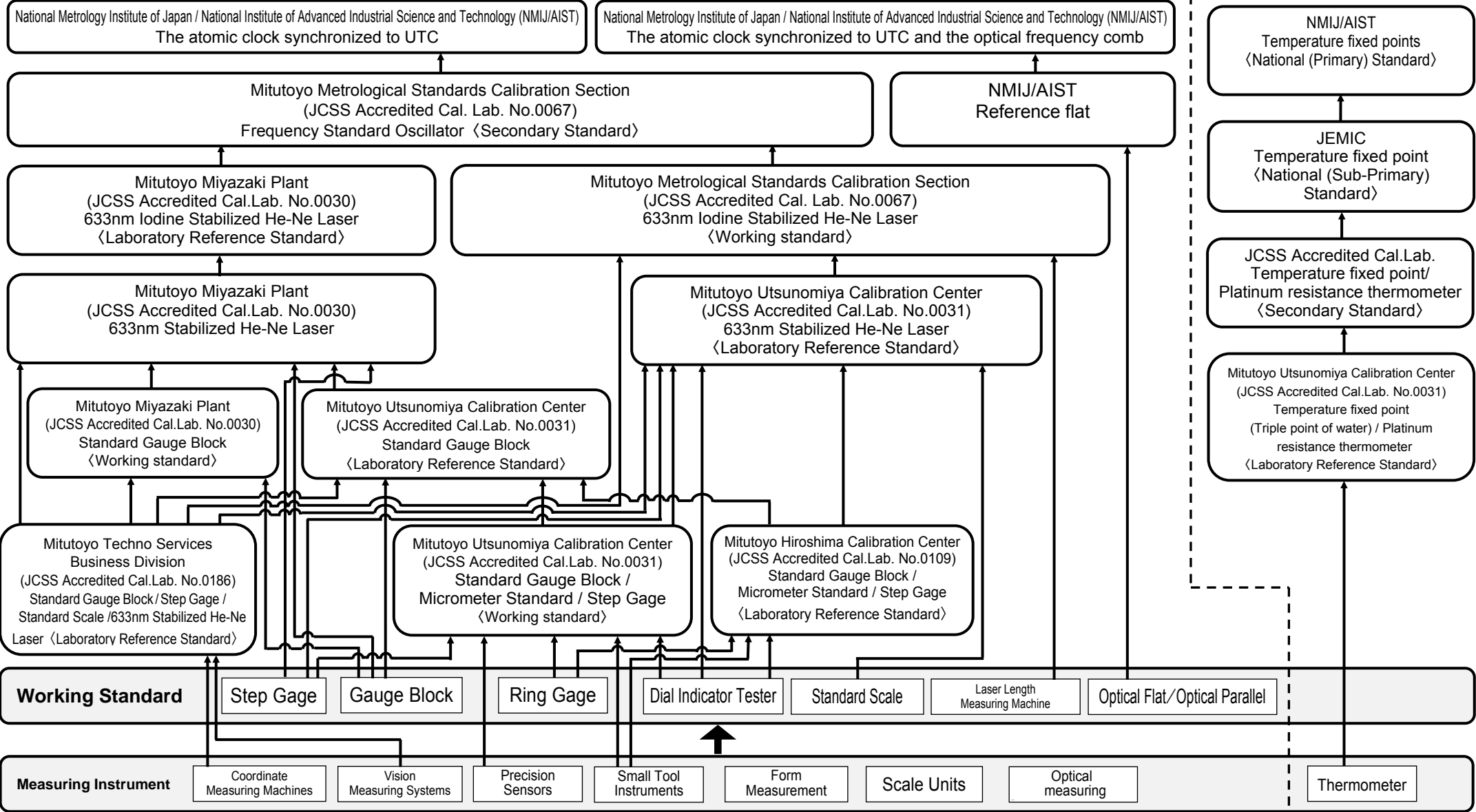
Yasuhiro Takahashi,  
Department Manager

As of 2017-10-02

# Traceability of Mitutoyo Standard

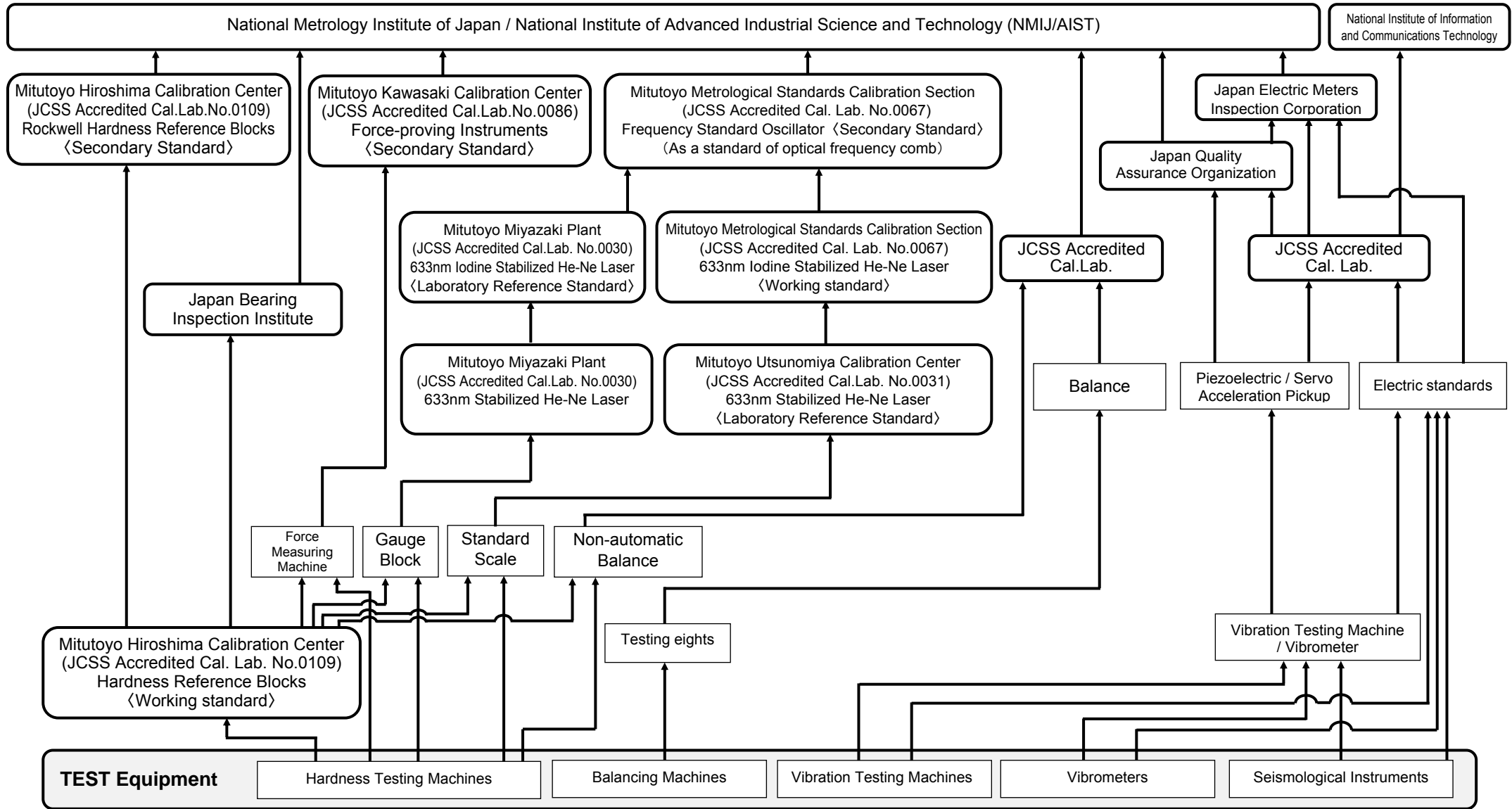
## Traceability of length field

## Traceability of Temperature



◆ This chart shows a simplified traceability system of a part of Mitutoyo products. Detailed traceability charts are published for each product.

## Traceability of Test Equipment





◆ This chart shows a simplified traceability system of a part of Mitutoyo products. Detailed traceability charts are published for each product.

# Certification of Accreditation by JCSS

- (1) Metrological Standards Calibration Section
- (2) Miyazaki Plant
- (3) Utsunomiya Calibration Center
- (4) Kawasaki Calibration Center
- (5) Hiroshima Calibration Center
- (6) Techno Services Business Division

(English Translation) (1)

**Certificate of Accreditation**

To Mitutoyo Corporation



IAJapan hereby accredits the following laboratory as a calibration laboratory based on the Measurement Law as it meets the requirements of relevant international standards. This laboratory also meets the requirements for Mutual Recognition Arrangements (MRA) of ILAC and APLAC.

Accreditation No. JCSS0067  
 Name of Laboratory  
 Metrological Standards Calibration Section,  
 Metrological Standards Office, Mitutoyo Corporation  
 Address of Laboratory  
 430-1, Kamiyokoba, Tsukuba-shi, Ibaraki 305-0854, Japan  
 Accreditation Scope  
 Length (as attached)  
 Accreditation Criterion  
 ISO/IEC 17025:2005  
 Date of Initial Accreditation : 2017-04-28  
 Latest Date of Issue : 2017-04-28

Kyoko Yamasaki  
 Chief Executive, IAJapan  
 National Institute of Technology and Evaluation

\* International Accreditation Japan (IAJapan) is a laboratory accreditation body which has signed MRAs of ILAC (International Laboratory Accreditation Cooperation) and APLAC (Asia Pacific Laboratory Accreditation Cooperation).  
 \* MRA requirements are, in addition to relevant international standards and guides, requirements for participation in proficiency testing programs, surveillance and measurement, and the policy for the traceability of measurement for MRA purpose.  
 \* This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system. The management system requirements in ISO/IEC 17025:2005 meet the principles of ISO 9001:2008 and are aligned with its pertinent requirements.

(English Translation) (2)

**Certificate of Accreditation**

To Mitutoyo Corporation



IAJapan hereby accredits the following laboratory as a calibration laboratory based on the Measurement Law as it meets the requirements of relevant international standards. This laboratory also meets the requirements for Mutual Recognition Arrangements (MRA) of ILAC and APLAC.

Accreditation No. JCSS0030  
 Name of Laboratory  
 Miyazaki Plant, Mitutoyo Corporation  
 Address of Laboratory  
 10652-1, Kou, Tano-cho, Miyazaki-shi, Miyazaki  
 889-1701, Japan  
 Accreditation Scope  
 Length (as attached)  
 Accreditation Criterion  
 ISO/IEC 17025:2005  
 Date of Initial Accreditation : 2004-08-13  
 Latest Date of Issue : 2016-11-02

Hideyuki Ota  
 Chief Executive, IAJapan  
 National Institute of Technology and Evaluation

\* International Accreditation Japan (IAJapan) is a laboratory accreditation body which has signed MRAs of ILAC (International Laboratory Accreditation Cooperation) and APLAC (Asia Pacific Laboratory Accreditation Cooperation).  
 \* MRA requirements are, in addition to relevant international standards and guides, requirements for participation in proficiency testing programs, surveillance and measurement, and the policy for the traceability of measurement for MRA purpose.  
 \* This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system. The management system requirements in ISO/IEC 17025:2005 meet the principles of ISO 9001:2008 and are aligned with its pertinent requirements.

(English Translation) (3)

**Certificate of Accreditation**

To Mitutoyo Corporation


IAJapan hereby accredits the following laboratory as a calibration laboratory based on the Measurement Law as it meets the requirements of relevant international standards. This laboratory also meets the requirements for Mutual Recognition Arrangements (MRA) of ILAC and APLAC.

Accreditation No. JCSS0031  
 Name of Laboratory  
 Utsunomiya Calibration Center, Techno-Service Business  
 Division, Mitutoyo Corporation  
 Address of Laboratory  
 2200-1, Shimoguri-machi, Utsunomiya-shi, Tochigi 321-0923,  
 Japan  
 Accreditation Scope  
 Length, Temperature (as attached)  
 Accreditation Criterion  
 ISO/IEC 17025:2005  
 Date of Initial Accreditation : 1994-05-02  
 Latest Date of Issue : 2017-07-31

Kyoko Yamasaki  
 Chief Executive, IAJapan  
 National Institute of Technology and Evaluation

\* International Accreditation Japan (IAJapan) is a laboratory accreditation body which has signed MRAs of ILAC (International Laboratory Accreditation Cooperation) and APLAC (Asia Pacific Laboratory Accreditation Cooperation).  
 \* MRA requirements are, in addition to relevant international standards and guides, requirements for participation in proficiency testing programs, surveillance and measurement, and the policy for the traceability of measurement for MRA purpose.  
 \* This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system. The management system requirements in ISO/IEC 17025:2005 meet the principles of ISO 9001:2008 and are aligned with its pertinent requirements.

(English Translation) (4)




**Certificate of Accreditation**

To Mitutoyo Corporation



IAJapan hereby accredits the following laboratory as a calibration laboratory based on the Measurement Law as it meets the requirements of relevant international standards. This laboratory also meets the requirements for Mutual Recognition Arrangements (MRA) of ILAC and APLAC.

Accreditation No. JCSS0086  
 Name of Laboratory  
 Kawasaki Calibration Center,  
 Techno Service Business Division, Mitutoyo Corporation  
 Address of Laboratory  
 1-20-1 Sakado, Takatsu-ku Kawasaki-shi,  
 Kanagawa 213-8533, Japan  
 Accreditation Scope  
 Force (as attached)  
 Accreditation Criterion  
 ISO/IEC 17025:2005  
 Date of Initial Accreditation : 2005-09-01  
 Latest Date of Issue : 2017-07-31

Kyoko Yamasaki  
 Chief Executive, IAJapan  
 National Institute of Technology and Evaluation

\* International Accreditation Japan (IAJapan) is a laboratory accreditation body which has signed MRAs of ILAC (International Laboratory Accreditation Cooperation) and APLAC (Asia Pacific Laboratory Accreditation Cooperation).  
 \* MRA requirements are, in addition to relevant international standards and guides, requirements for participation in proficiency testing programs, surveillance and measurement, and the policy for the traceability of measurement for MRA purpose.  
 \* This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system. The management system requirements in ISO/IEC 17025:2005 meet the principles of ISO 9001:2008 and are aligned with its pertinent requirements.

(English Translation) (5)

**Certificate of Accreditation**

To Mitutoyo Corporation



IAJapan hereby accredits the following laboratory as a calibration laboratory based on the Measurement Law as it meets the requirements of relevant international standards. This laboratory also meets the requirements for Mutual Recognition Arrangements (MRA) of ILAC and APLAC.

Accreditation No. JCSS0109  
 Name of Laboratory  
 Hiroshima Calibration Center,  
 Techno-Service Business Division, Mitutoyo Corporation  
 Address of Laboratory  
 626-62 Ichinomakkoyama, Gohara-cho, Kure-shi,  
 Hiroshima 737-0161, Japan  
 Accreditation Scope  
 Length, Hardness (as attached)  
 Accreditation Criterion  
 ISO/IEC 17025:2005  
 Date of Initial Accreditation : 2002-04-11  
 Latest Date of Issue : 2017-08-03

Kyoko Yamasaki  
 Chief Executive, IAJapan  
 National Institute of Technology and Evaluation

\* International Accreditation Japan (IAJapan) is a laboratory accreditation body which has signed MRAs of ILAC (International Laboratory Accreditation Cooperation) and APLAC (Asia Pacific Laboratory Accreditation Cooperation).  
 \* MRA requirements are, in addition to relevant international standards and guides, requirements for participation in proficiency testing programs, surveillance and measurement, and the policy for the traceability of measurement for MRA purpose.  
 \* This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system. The management system requirements in ISO/IEC 17025:2005 meet the principles of ISO 9001:2008 and are aligned with its pertinent requirements.

(English Translation) (6)

**Certificate of Accreditation**

To Mitutoyo Corporation

IAJapan hereby accredits the following laboratory as a calibration laboratory based on the Measurement Law as it meets the requirements of relevant international standards. This laboratory also meets the requirements for Mutual Recognition Arrangements (MRA) of ILAC and APLAC.

Accreditation No. JCSS0186  
 Name of Laboratory  
 Techno Services Business Division, Mitutoyo Corporation  
 Address of Laboratory  
 796-1, Hiramatsumoncho, Utsunomiya-shi, Tochigi  
 321-0932, Japan  
 Accreditation Scope  
 Length (as attached)  
 Accreditation Criterion  
 ISO/IEC 17025:2005  
 Date of Initial Accreditation : 2006-12-27  
 Latest Date of Issue : 2015-10-26

Hideyuki Ota  
 Chief Executive, IAJapan  
 National Institute of Technology and Evaluation

\* International Accreditation Japan (IAJapan) is a laboratory accreditation body which has signed MRAs of ILAC (International Laboratory Accreditation Cooperation) and APLAC (Asia Pacific Laboratory Accreditation Cooperation).  
 \* MRA requirements are, in addition to relevant international standards and guides, requirements for participation in proficiency testing programs, surveillance and measurement, and the policy for the traceability of measurement for MRA purpose.  
 \* This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system. The management system requirements in ISO/IEC 17025:2005 meet the principles of ISO 9001:2008 and are aligned with its pertinent requirements.

# Scope of Service and Calibration Uncertainty

◆General Field of Calibration : Length

L is measured length (mm)

Type of Service		Item	Calibration Scope	CMC <sup>Note 1</sup> (Level of Confidence Approximately 95%)
1	Laser Wave Length	Frequency stabilized laser in the 633nm/532nm region		$1.1 \times 10^{-13}$
2	Length Measuring Instrument	Block Gauge (Interferometry method)	Gauge Block	From 0.1mm up to 100mm 0.020μm
				More than 100mm up to 250mm $(0.010+0.00010 \cdot L) \mu\text{m}$
				More than 250mm up to 1000mm $(0.020+0.00020 \cdot L) \mu\text{m}$
3	Block Gauge (Comparison method)	Gauge Block	From 0.1mm up to 100mm 0.06μm	0.04+0.00043·L μm
4	End gages with Flat ends (Interferometry method)	Check Master	Up to 2100mm (0.18+0.38·L/1000) μm	
5		Caliper Checker		
6		Inside Micro Checker		
7	End gages with Flat ends (Comparison method)	Depth Micro Checker	From 0.5mm up to 300mm	(0.5+L/1000) μm
8		Height Master	Up to 1000mm	
9		Cylindrical Gages	From 25mm up to 500mm	
10		Micrometer standards	From 25mm up to 1000mm (0.4+L/1000) μm	
11	Standard Scale	Standard scale	Up to 350mm (0.10+0.12·L/1000) μm	0.11μm
			More than 350mm up to 1000mm (0.06+0.25·L/1000) μm	
			Reference scale Pattern size: From 0.2mm up to 4mm	
14	Ring Gages	Setting Rings	From 6mm up to 80mm 0.7μm	0.8μm
			More than 80mm up to 120mm	
15	Dial Indicator Tester	Calibration Tester	Up to 5mm 0.10μm	(0.1+4.8·L/1000) μm
			More than 5mm up to 25mm 0.21μm	
			More than 25mm up to 100mm	
16	Micrometers (including micrometer heads)		Up to 25mm 0.3μm	(1.2+L/175) μm
			More than 25mm up to 500mm	
17	Indicating Micrometers		Micrometer: Up to 100mm (0.9+L/250) μm	(0.3+L/125) μm
18	Calipers		Up to 600mm 0.02mm	0.03mm
			More than 600mm up to 1000mm	
19	Height Gages		Up to 600mm 0.015mm	0.020mm
			More than 600mm up to 1000mm	
20	Depth Gages		Up to 600mm 0.02mm	0.03mm
			More than 600mm up to 1000mm	
21	Dial Indicators		Up to 5mm 0.5μm	1.7μm
			More than 5mm up to 50.8mm 1.1μm	
			More than 50.8mm up to 100mm	
22	Lever-type Dial Indicators	Dial Test Indicators	Up to 0.6mm 0.5μm	1.2μm
23	Bore Gages		From 6mm up to 400mm 0.7μm	1.0μm
24	Electrical Comparator	Mu-Checker	±5μm 0.15μm	1.0μm
			±200μm 0.2μm	
			±2000μm	
25	Dimensional Measuring Instrument	Sphere (Average diameter)	Master Ball From 2mm less than 10mm 0.06μm	(0.024+2.6·L/1000) μm
			From 10mm up to 40mm	

◆General Field of Calibration : Length

L is measured length (mm)

Type of Service		Item	Calibration Scope	CMC <sup>Note 1</sup> (Level of Confidence Approximately 95%)
26	Dimensional Measuring Instrument	Coordinate Measuring Machines	CNC Coordinate Measuring Machines	Up to 61mm (0.1+0.6·L/1000) μm
			Vision Measuring System	Up to 650mm (0.13+0.11·L/1000) μm
				Up to 1000mm (0.2+0.2·L/1000) μm
				Up to 10000mm <sup>Note 2</sup> (0.1+0.6·L/1000) μm
27	Surface Texture	Surface Roughness Measuring Machines	Depth: From 0.3μm up to 20μm	$2 \times \sqrt{6.70^2 + (2.74 \times d)^2}$ nm d(μm) : Depth
			Arithmetical mean deviation of the roughness profile: From 0.1μm up to 5μm	$2 \times \sqrt{6.82^2 + (2.74 \times Ra)^2}$ nm Ra (μm) : Arithmetical mean deviation of the roughness profile
			Maximum height of the roughness profile From 0.3μm up to 20μm	$2 \times \sqrt{35.8^2 + (2.74 \times Rz)^2}$ nm Rz (μm) : Maximum height of the roughness profile

◆General Field of Calibration : Temperature

Type of Service		Calibration Scope	CMC <sup>Note 1</sup> (Level of Confidence Approximately 95%)
1	Contact type thermometer	Resistance thermometer (Comparison calibration)	Platinum Resistance Thermometer (4 wires system, 100Ω) From 0°C up to 40°C 6mK <sup>Note 3</sup>
			Platinum Resistance Thermometer (3 wires system, 100Ω) From 0°C up to 40°C 50mK <sup>Note 3</sup>
		Temperature sensors with display unit (Comparison method)	From 0°C up to 40°C 8mK

◆General Field of Calibration : Force

Type of Service		Calibration Scope	CMC <sup>Note 1</sup> (Level of Confidence Approximately 95%)
1	Force-proving Instruments	JIS B 7728	Compression From 10N up to 200N 0.042%
			From 30N up to 2kN 0.049%

◆General Field of Calibration : Hardness

Type of Service		Calibration Scope	CMC <sup>Note 1</sup> (Level of Confidence Approximately 95%)	
1	Rockwell hardness testing machines, etc.	Rockwell Hardness Reference Blocks	From 20HRC up to 25HRC 0.43HRC	
			More than 25HRC less than 35HRC 0.44HRC	
			From 35HRC up to 45HRC 0.42HRC	
			More than 45HRC less than 55HRC 0.39HRC	
			From 55HRC up to 65HRC 0.35HRC	
	Rockwell Hardness Testing Machines	From 20HRC up to 25HRC	—	0.41HRC
		More than 25HRC less than 35HRC	—	0.41HRC
		From 35HRC up to 45HRC	—	0.39HRC
		More than 45HRC less than 55HRC	—	0.37HRC
		From 55HRC up to 65HRC	—	0.34HRC

NOTE 1) Calibration and Measurement Capabilities: These values are the smallest uncertainties. Therefore, they sometimes differ from the uncertainties written in the Calibration Certificates.

NOTE 2) Exclude Vision Measuring System.

NOTE 3) These values are the temperature converted into resistance.