



# SERTIFIKAT KALIBRASI SURFACE ROUGHNESS TESTER SJ-210



**PT. Mitutoyo Indonesia**



Komite Akreditasi Nasional  
Laboratorium Kalibrasi  
LN - 183 - 124

Certificate Number : IA-2664960

Date of Calibration : 11-Aug-2020

Date of Issue : 11-Aug-2020

Recommend Next Calibration In : August-2021

### CERTIFICATE OF CALIBRATION

Page 1 of 2

<b>Customer Name</b>	: PT. BUMI CAHAYA UNGGUL		
<b>Attention</b>	: Mr. Yanuar	<b>Dept.</b>	: QC Dept
<b>Customer Address</b>	: JL. RAWA KEPITING NO.3 KIP, RAWA TERATE CAKUNG, JAKARTA TIMUR, DKI JAKARTA RAYA 00000		
<b>Equipment Address</b>	: JL. RAWA KEPITING NO.3 PULO GADUNG INDUSTRIAL ESTATE JAKARTA TIMUR 13920		
	: Calibrated at PT Mitutoyo Indonesia Jl. Sriwijaya No.26 Desa Cibatu Kec. Cikarang Selatan Kab. Bekasi 17530		
<b>Equipment Name</b>	: Surface Roughness Tester	<b>Manufacturer</b>	: Mitutoyo
<b>Equipment Model</b>	: SJ-210	<b>Code Number</b>	: 178-561-01E
<b>Serial Number</b>	: 601761906		
<b>Range</b>	: 0.01 µm ~ 360 µm		
<b>Resolution</b>	: 0.010 µm		
<b>Standard Used</b>	: JIS B 0651 (2001) Surface texture - Instruments for the assessment of surface texture - Profile method		
<b>Calibration Procedure</b>	: MAP-12 (Revision 3, 15 August 2014)		
<b>Remarks</b>	: Annual Calibration		
	: Pre-Adjustment Data refer to Annex A - Page 1 of 1		

This certifies that the equipment model has been calibrated in accordance with the required Japanese Industrial Standards ( JIS ) or Manufacturer's Specification or other applicable standards .

The Ambient Temperature at the time of calibration is 20.8 °C and the Relative Humidity is 58.0 %rh

Calibration Equipment Used

Code No.	Description	Manufacturer	Serial No.	Report No.	Due date
178-604	Roughness Specimen	Mitutoyo	900150	16003	20-Feb-2023
50-0569	Straight plate	Mitutoyo	DM005448	LL001978	16-Apr-2021
SH-101	Thermo-Hygro Meter	ISO LAB	TH - 0017 - MI	S-18-0494	18-Jan-2021
RAYMT4U	Infrared Thermometer	RAYTEK	102949	C253396	28-Feb-2022
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

The calibration reference used have been calibrated by National Metrology Centre (Singapore) or accredited laboratory.

The results of calibration are referred to a temperature of 20° C .

Jalan Sriwijaya No.26 Desa cibatu, Kec. Cikarang Selatan Kab. Bekasi 17530    MI-WS-5.10.1-FMM.SV.0-001  
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PT. Mitutoyo Indonesia

Certificate Number : IA-2664960

## CERTIFICATE OF CALIBRATION

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<b>1. Straightness of the drive unit</b>	Specification = 0,5 $\mu\text{m}$ / 17,5 mm
Measured value is 0.13 $\mu\text{m}$	Expanded uncertainty of measurements is 0.06 $\mu\text{m}$ with coverage factor, k = 2.25
<b>2. Radius of Stylus</b>	Specification = 0.343 $\pm$ 0.1 $\mu\text{m}$
Measured value is 0.38 $\mu\text{m}$	Expanded uncertainty of measurements is 0.20 $\mu\text{m}$ with coverage factor, k = 2.04
<b>3. Repeatability of Ra Measurement</b>	Specification = 2.89 $\pm$ 0.2 $\mu\text{m}$
Measured value is 2.89 $\mu\text{m}$	Expanded uncertainty of measurements is 0.20 $\mu\text{m}$ with coverage factor, k = 2.04

All the expanded uncertainties of measurements for the measured values are estimated at a level of confidence of approximately 95 %.

This certificate does not imply that PTMI warrants the equipment performance after calibration and the certificate may not be reproduced except in full, without written approval by the Head of Laboratory.

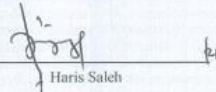
The user should determine the suitability of the measuring instrument for its intended use.

Calibrated by :



Encep Hidayat  
Calibration Officer

Approved by :



Haris Saleh  
Head of Laboratory

**Annex A**

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## Pre-Adjustment Data

Items of Inspection	Permissible error	Error ( $\mu\text{m}$ )	Pass/Fail
Straightness of the drive unit	0,5 $\mu\text{m}$ / 17,5 mm	0,1	Pass
Radius of Stylus	0,343 $\pm$ 0,1 $\mu\text{m}$	0,35	Pass
Repeatability of Ra measurement	2,89 $\pm$ 0,2 $\mu\text{m}$	2,98	Pass

Please refer to the following for Adjustment made to Machine

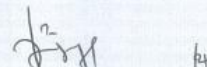
ITEM	Adjustment Y / N or NA
Straightness of the drive unit	NA
Radius of Stylus	NA
Repeatability of Ra measurement	Y

Calibrated by :




Enecep Hidayat  
Calibration Officer

Approved by :




Harris Saleh  
Head of Laboratory

# SERTIFIKAT KALIBRASI CMM QM-353



**PT. Mitutoyo Indonesia**



**KAN**  
Komite Akreditasi Nasional  
Laboratorium Kalibrasi  
LK - 183 - IDN

Certificate Number : IA-2654201

Date of Calibration : 1-Jul-2020

Date of Issue : 6-Jul-2020

## CERTIFICATE OF CALIBRATION

Page 1 of 3

**Customer Name** : PT BUMI CAHAYA UNGGUL

**Attention** : Mr. Yanuar Dept. QC Dept Tel. 0811 155 8270

**Customer Address** : JL. RAYA KEPITING NO. 3 KIP  
RAWA TERATE, CAKUNG, JAKARTA TIMUR, DKI JAKARTA RAYA

**Equipment Address** : JL. RAYA KEPITING NO. 3  
PULO GADUNG INDUSTRIAL ESTATE, JAKARTA TIMUR, 13920

**Equipment Room** : Measuring Room

**Equipment Name** : Coordinate Measuring Machine **Manufacturer** : MITUTOYO

**Equipment Model** : QM Measure 353 **Code Number** : 198-313

**Serial Number** : 0028007C

**Range** : X : 300 mm Y : 500 mm Z : 300 mm

**Resolution** : 0.1 μm

**Standard Used** : CMM Inspection Standard ISO 10360-2:2009 10360-5 : 2010 as a guide

**Calibration Procedure** : MAP-13e (Revision 1, 28 May 2013)

**Remarks** : Annual Calibration  
Pre-Adjustment Data refer to Annex A - Page 1 of 1

This certifies that the equipment model has been calibrated in accordance with the required International Organization for Standardization ( ISO ).

The Ambient Temperature at the time of calibration is 25.0 °C and the Relative Humidity is 40.0 %rh

The coefficient of thermal expansion of the checkmaster is 10,8 x 10<sup>-6</sup> /°C

**Calibration Reference Used And Traceability**

Code No.	Description	Manufacturer	Serial No.	Report No.	Due Date
515-742	Check Master	Mitutoyo	210128	48370	25-Feb-2023
99CMM001	Master Ball	Mitutoyo	20-98-217	LL003009	29-Sep-2022
EM913R	Thermo-Hygrometer	Oregon Scientific	TH0009	S-18-0495	18-Jan-2021
515-741	Check Master	Mitutoyo	310101	48365	24-Feb-2023
1523	Platinum Resistance Thermometer	Fluke - Hart Scientific	2017240	03/09/200-500/137	27-Oct-2021
1523	Indicator	Fluke - Hart Scientific	2017240	03/09/200-500/137	27-Oct-2021

The calibration reference used have been calibrated by National Metrology Centre (Singapore) or accredited laboratory.

The results of calibration are referred to a temperature of 20° C.

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MI-WS-5.10.1-CMM e-001

Certificate Number : IA-2654201

## CERTIFICATE OF CALIBRATION

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### 1. Length measurement error and its repeatability range

$$E_{0,MPE} = \pm (3 + 4L/1000) \mu\text{m} \quad R_{0,MPE} = \pm 3 \mu\text{m}$$

<b>E<sub>0-1</sub>, parallel to x-axis</b>	Length ( mm )	30	90	150	210	270
	Mean Error ( $\mu\text{m}$ )	-0.7	-1.0	-1.0	-1.3	-1.6
<b>R<sub>0-1</sub></b>	Repeatability ( $\mu\text{m}$ )	0.3	0.3	0.2	0.1	0.2

Expanded uncertainty of E<sub>0,1</sub> measurement is 2.1  $\mu\text{m}$  with coverage factor, k = 2.00

<b>E<sub>0-2</sub>, parallel to y-axis</b>	Length ( mm )	30	150	250	370	470
	Mean Error ( $\mu\text{m}$ )	-0.6	-0.9	-0.9	-1.2	-1.4
<b>R<sub>0-2</sub></b>	Repeatability ( $\mu\text{m}$ )	0.2	0.1	0.3	0.2	0.1

Expanded uncertainty of E<sub>0,2</sub> measurement is 3.6  $\mu\text{m}$  with coverage factor, k = 2.00

<b>E<sub>0-3</sub>, parallel to z-axis</b>	Length ( mm )	30	90	150	210	270
	Mean Error ( $\mu\text{m}$ )	-0.6	-0.8	-1.0	-1.3	-1.5
<b>R<sub>0-3</sub></b>	Repeatability ( $\mu\text{m}$ )	0.2	0.1	0.2	0.1	0.1

Expanded uncertainty of E<sub>0,3</sub> measurement is 2.1  $\mu\text{m}$  with coverage factor, k = 2.00

<b>E<sub>0-4</sub>, XYZ plane diagonal</b>	Length ( mm )	30	90	210	310	410
	Mean Error ( $\mu\text{m}$ )	-0.4	-0.9	-0.9	-1.4	-1.7
<b>R<sub>0-4</sub></b>	Repeatability ( $\mu\text{m}$ )	0.8	0.1	0.1	0.2	0.1

Expanded uncertainty of E<sub>0,4</sub> measurement is 3.2  $\mu\text{m}$  with coverage factor, k = 2.00

<b>E<sub>0-5</sub>, XYZ plane diagonal</b>	Length ( mm )	30	90	210	310	410
	Mean Error ( $\mu\text{m}$ )	-0.6	-0.8	-1.0	-1.4	-1.6
<b>R<sub>0-5</sub></b>	Repeatability ( $\mu\text{m}$ )	0.2	0.2	0.2	0.2	0.1

Expanded uncertainty of E<sub>0,5</sub> measurement is 3.2  $\mu\text{m}$  with coverage factor, k = 2.00

<b>E<sub>0-6</sub>, XYZ plane diagonal</b>	Length ( mm )	30	90	210	310	410
	Mean Error ( $\mu\text{m}$ )	-0.7	-0.9	-1.0	-1.6	-1.7
<b>R<sub>0-6</sub></b>	Repeatability ( $\mu\text{m}$ )	0.2	0.1	0.1	0.2	0.2

Expanded uncertainty of E<sub>0,6</sub> measurement is 3.2  $\mu\text{m}$  with coverage factor, k = 2.00

<b>E<sub>0-7</sub>, XYZ plane diagonal</b>	Length ( mm )	30	90	210	310	410
	Mean Error ( $\mu\text{m}$ )	-0.8	-0.9	-1.0	-1.7	-1.8
<b>R<sub>0-7</sub></b>	Repeatability ( $\mu\text{m}$ )	0.1	0.0	0.1	0.1	0.1

Expanded uncertainty of E<sub>0,7</sub> measurement is 3.2  $\mu\text{m}$  with coverage factor, k = 2.00

L : Measured Length in mm