



Number of Certificate 0000000

**SAMPLE**

## Calibration Certificate

Client name	○○○○
Client address	○○○○○○○○
Calibration site	MURAKAMI KOKI CO., LTD. 10-31 2-chome Akagawa Asahi-ku Osaka, Japan
Calibration object	Weight
Manufacturer	MURAKAMI KOKI CO., LTD.
Type and Quantity	200 g ~ 1 mg 22 pcs.
Article number	A
Calibration item	Conventional mass
Calibration method	Per our calibration manual (Document No.MJW-03)
Top reference	Reference (ID/Certificate number : ◎/000000, ◎3/000000)
Reference used by calibration	Working standard (ID/Certificate number : C/M000000)
Calibration results	As per 2 page
Calibration conditions	As per 2 page
Date of application	6 Jan. 2020
Date of performance of calibration	6 Jan. 2020

This is to certify that the calibration results of the above article.

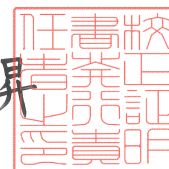
Date of issue : 6 Jan. 2020

MURAKAMI KOKI CO., LTD.

10-31 Akagawa 2-chome Asahi-ku Osaka, Japan

The calibration authority

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This certificate is based on article 144 of the Measurement Act and indicates the result of calibration in accordance with measurement standards traceable to Primary Measurement Standards (National Standards) which realizes the physical units of measurement according to the International System of Units (SI). The accreditation symbol is attestation of which the result of calibration is traceable to Primary Measurement Standards (National Standards).

The certificate shall not be reproduced except in full, without the written approval of the issuing laboratory.

The calibration laboratory who issued this calibration certificate conforms to ISO/IEC 17025:2017.

This calibration certificate was issued by the calibration laboratory accredited by IAJapan who is a signatory to the Mutual Recognition Arrangement (MRA) of International Laboratory Accreditation Cooperation (ILAC) and Asia Pacific Accreditation Cooperation (APAC). This(These) calibration result(s) may be accepted internationally through ILAC/APAC MRA.



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**SAMPLE**Calibration results

Nominal value	Article number	Marking	Conventional mass <sup>1)</sup>		Expanded <sup>2)</sup> uncertainty
200 g	A		200 g	- 0.019 mg	± 0.088 mg
100 g	A		100 g	- 0.010 mg	± 0.045 mg
50 g	A		50 g	+ 0.007 mg	± 0.029 mg
20 g	A	1	20 g	- 0.007 mg	± 0.024 mg
20 g	A	2	20 g	+ 0.010 mg	± 0.024 mg
10 g	A		10 g	+ 0.022 mg	± 0.018 mg
5 g	A		5 g	+ 0.009 mg	± 0.014 mg
2 g	A	1	2 g	+ 0.009 mg	± 0.011 mg
2 g	A	2	2 g	+ 0.009 mg	± 0.011 mg
1 g	A		1 g	+ 0.0059 mg	± 0.0084 mg
500 mg	A		500 mg	+ 0.0003 mg	± 0.0070 mg
200 mg	A	1	200 mg	+ 0.0011 mg	± 0.0056 mg
200 mg	A	2	200 mg	- 0.0016 mg	± 0.0056 mg
100 mg	A		100 mg	- 0.0041 mg	± 0.0045 mg
50 mg	A		50 mg	- 0.0027 mg	± 0.0034 mg
20 mg	A	1	20 mg	- 0.0041 mg	± 0.0029 mg
20 mg	A	2	20 mg	- 0.0025 mg	± 0.0029 mg
10 mg	A		10 mg	- 0.0016 mg	± 0.0022 mg
5 mg	A		5 mg	+ 0.0005 mg	± 0.0017 mg
2 mg	A	1	2 mg	- 0.0014 mg	± 0.0017 mg
2 mg	A	2	2 mg	+ 0.0014 mg	± 0.0017 mg
1 mg	A		1 mg	+ 0.0007 mg	± 0.0017 mg

Note 1) The conventional mass is the mass of a reference weight of a density of 8000 kg/m<sup>3</sup> which balances in air of a reference density of 1.2 kg/m<sup>3</sup> and at a temperature of 20 °C.

2) The expanded uncertainty corresponds to a level of confidence of approximately 95 % with a coverage factor  $k$  being equal to 2.

Calibration conditions

Temperature 22.9 °C to 23.7 °C, Atmospheric pressure 1010 hPa to 1020 hPa, Relative humidity 50 % to 53 %

Mass comparators

AT1005, AX106, XP6UV



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Conformity assessment

Accuracy class of conventional mass : class E2

Nominal value	Article number	Marking	Conventional mass deviation	Expanded uncertainty	Maximum permissible errors	Assessment
200 g	A		- 0.019 mg	± 0.088 mg	± 0.3 mg	Conform
100 g	A		- 0.010 mg	± 0.045 mg	± 0.16 mg	Conform
50 g	A		+ 0.007 mg	± 0.029 mg	± 0.10 mg	Conform
20 g	A	1	- 0.007 mg	± 0.024 mg	± 0.08 mg	Conform
20 g	A	2	+ 0.010 mg	± 0.024 mg	± 0.08 mg	Conform
10 g	A		+ 0.022 mg	± 0.018 mg	± 0.06 mg	Conform
5 g	A		+ 0.009 mg	± 0.014 mg	± 0.05 mg	Conform
2 g	A	1	+ 0.009 mg	± 0.011 mg	± 0.04 mg	Conform
2 g	A	2	+ 0.009 mg	± 0.011 mg	± 0.04 mg	Conform
1 g	A		+ 0.0059 mg	± 0.0084 mg	± 0.03 mg	Conform
500 mg	A		+ 0.0003 mg	± 0.0070 mg	± 0.025 mg	Conform
200 mg	A	1	+ 0.0011 mg	± 0.0056 mg	± 0.020 mg	Conform
200 mg	A	2	- 0.0016 mg	± 0.0056 mg	± 0.020 mg	Conform
100 mg	A		- 0.0041 mg	± 0.0045 mg	± 0.016 mg	Conform
50 mg	A		- 0.0027 mg	± 0.0034 mg	± 0.012 mg	Conform
20 mg	A	1	- 0.0041 mg	± 0.0029 mg	± 0.010 mg	Conform
20 mg	A	2	- 0.0025 mg	± 0.0029 mg	± 0.010 mg	Conform
10 mg	A		- 0.0016 mg	± 0.0022 mg	± 0.008 mg	Conform
5 mg	A		+ 0.0005 mg	± 0.0017 mg	± 0.006 mg	Conform
2 mg	A	1	- 0.0014 mg	± 0.0017 mg	± 0.006 mg	Conform
2 mg	A	2	+ 0.0014 mg	± 0.0017 mg	± 0.006 mg	Conform
1 mg	A		+ 0.0007 mg	± 0.0017 mg	± 0.006 mg	Conform

- Remark 1) The assessment criterion is JIS B 7609:2008 6.2 and 6.3 , as follows  
 $| \text{Expanded uncertainty} | \leq | \text{Maximum permissible errors} | / 3 ,$   
 $| \text{Conventional mass deviation} | + | \text{Expanded uncertainty} | \leq | \text{Maximum permissible errors} | .$
- 2) The expanded uncertainty corresponds to a level of confidence of approximately 95 % with a coverage factor  $k$  being equal to 2.

Note If the decimal places of [Conventional mass deviation] and [Expanded uncertainty] is greater than the decimal places of [Maximum permissible errors] , we consider its missing digits as 0 for our conformity assessment.



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Characteristic evaluation 1

Nominal value	Article number	Marking	Magnetization (Absolute value) [ μT ]		Susceptibility	
			Magnetization	Expanded uncertainty of measurement	Susceptibility	Expanded uncertainty of measurement
200 g	A		< 8.0	0.7	< 0.070	0.004
100 g	A		< 8.0	0.7	< 0.070	0.003
50 g	A		< 8.0	0.7	< 0.070	0.003
20 g	A	1	< 8.0	0.7	< 0.070	0.003
20 g	A	2	< 8.0	0.7	< 0.070	0.003
10 g	A		< 8.0	0.7	< 0.180	0.006
5 g	A		< 8.0	2.1	< 0.180	0.027
2 g	A	1	< 8.0	2.0	< 0.180	0.007
2 g	A	2	< 8.0	2.0	< 0.180	0.007
1 g	A		< 8.0	2.4	< 0.900	0.025
500 mg	A		< 8.0	0.3	----	----
200 mg	A	1	< 8.0	0.3	----	----
200 mg	A	2	< 8.0	0.3	----	----
100 mg	A		< 8.0	0.3	----	----
50 mg	A		< 8.0	0.3	----	----
20 mg	A	1	< 8.0	0.3	----	----
20 mg	A	2	< 8.0	0.3	----	----
10 mg	A		< 8.0	0.3	----	----
5 mg	A		< 8.0	0.3	----	----
2 mg	A	1	< 8.0	0.4	----	----
2 mg	A	2	< 8.0	0.4	----	----
1 mg	A		< 8.0	0.3	----	----

- Remark 1) Characteristic evaluation method;  
 Magnetization      Susceptometer , Gaussmeter (JIS B 7609:2008 B.6.2,B6.4)  
 Susceptibility      Susceptometer (JIS B 7609:2008 B.6.4)
- 2) The expanded uncertainty corresponds to a level of confidence of approximately 95 % with a coverage factor *k* being equal to 2.  
 The value with sign '<' contains the expanded uncertainty.



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## Characteristic evaluation 2

Nominal value	Article number	Marking	Surface roughness (Rz) [ $\mu\text{m}$ ]		Density [ $\text{kg/m}^3$ ]	
			Surface roughness	Expanded uncertainty of measurement	Density	Expanded uncertainty of measurement
200 g	A		< 1.00	0.28	7921	$\pm 11$
100 g	A		< 1.00	0.28	7913	$\pm 21$
50 g	A		< 1.00	0.28	7892	$\pm 27$
20 g	A	1	< 1.00	0.28	7889	$\pm 51$
20 g	A	2	< 1.00	0.28	7883	$\pm 51$
10 g	A		< 1.00	0.28	7830	$\pm 87$
5 g	A		< 1.00	0.28	7860	$\pm 125$
2 g	A	1	< 1.00	0.28	7950	$\pm 140$
2 g	A	2	< 1.00	0.28	7950	$\pm 140$
1 g	A		< 1.00	0.28	7950	$\pm 140$
500 mg	A		< 1.00	0.20	7950	$\pm 140$
200 mg	A	1	< 1.00	0.20	7950	$\pm 140$
200 mg	A	2	< 1.00	0.20	7950	$\pm 140$
100 mg	A		< 1.00	0.20	7950	$\pm 140$
50 mg	A		< 1.00	0.20	7950	$\pm 140$
20 mg	A	1	< 1.00	0.20	7950	$\pm 140$
20 mg	A	2	< 1.00	0.20	7950	$\pm 140$
10 mg	A		< 1.00	0.20	7950	$\pm 140$
5 mg	A		< 1.00	0.20	7950	$\pm 140$
2 mg	A	1	< 1.00	0.20	7950	$\pm 140$
2 mg	A	2	< 1.00	0.20	7950	$\pm 140$
1 mg	A		< 1.00	0.20	7950	$\pm 140$

Remark 1) Characteristic evaluation method;

Surface roughness Comparison specimen (JIS B 7609:2008 B.5.2.1)

Density 200 g ~ 5 g : Acoustic volume meter (JIS B 7609:2008 B.7.10)

2 g ~ 1 mg : Estimation based on known composition (JIS B 7609:2008 B.7.9.3)

- 2) The expanded uncertainty of surface roughness corresponds to a level of confidence of approximately 95 % with a coverage factor  $k$  being equal to 2.26 when the expanded uncertainty is 0.20, and equal to 4.3 when the expanded uncertainty is 0.28.
- The expanded uncertainty of density corresponds to a level of confidence of approximately 95 % with a coverage factor  $k$  being equal to 2.
- The value with sign '<' contains the expanded uncertainty.

End of the certificate.