

(English Translation)



Certificate of Accreditation

To: Dr. Hiroyuki Yoshikawa
President
National Institute of Advanced Industrial Science and Technology

IAJapan hereby accredits the following laboratory as calibration laboratory under the ASNITE Accreditation Program. This laboratory meets the requirements of ISO/IEC 17025:2005 (JIS Q 17025:2005).

Accreditation No. and: ASNITE 0001 C
Additional Information
Name of Laboratory: National Metrology Institute of Japan,
National Institute of Advanced Industrial Science and
Technology
Address of Office: 1-1-1 Umezono, Tsukuba, Ibaraki 305-8563 JAPAN
Related Office: AIST Kansai Osaka Ogimachi Site, National
Metrology Institute of Japan, National Institute of
Advanced Industrial Science and Technology
2-6-20 Ogimachi, Kita-ku, Osaka 530-0025, JAPAN
Scope of Accreditation: As attached
Date of Accreditation: 15 August 2002
Date of Latest Issue: 1 February 2008

Katuo Seta, Ph.D.
Chif Executive, IAJapan
National Institute of Technology and Evaluation

This certificate was issued under the accreditation program complying with the rule of MRAs of ILAC(International Laboratory Accreditation Cooperation) and APLAC (Asia-Pacific Laboratory Accreditation Cooperation).

Accreditation Category for Calibration Laboratory : Mass and Related Quantities

Quantity	Calibration and Measurement Capabilities				Date of Accreditation
	Instrument or Artifact	Measurand Level or Range	Measurement Conditions / Independent Variable (Optional)	Expanded Uncertainty ($k=2$)	
Mass standard (True mass)	One by one comparison	100 g		0.012 mg	1 February 2008
		200 g		0.022 mg	
		500 g		0.033 mg	
		1 kg		0.058 mg	
		2 kg		0.23 mg	
		5 kg		0.45 mg	
		10 kg		0.85 mg	
Conventional mass	Mass Standard (One by one comparison or sub-multiple method)	1 mg		0.0006 mg	
		2 mg		0.0006 mg	
		5 mg		0.0006 mg	
		10 mg		0.0008 mg	
		20 mg		0.0010 mg	
		50 mg		0.0012 mg	
		100 mg		0.0015 mg	
		200 mg		0.0020 mg	
		500 mg		0.0025 mg	
		1 g		0.0030 mg	
		2 g		0.0040 mg	
		5 g		0.0050 mg	
		10 g		0.0060 mg	
		20 g		0.0080 mg	
		50 g		0.010 mg	
		100 g		0.015 mg	
		200 g		0.030 mg	
		500 g		0.075 mg	
		1 kg		0.15 mg	
		2 kg		0.30 mg	
		5 kg		0.75 mg	
		10 kg		1.5 mg	
		20 kg		3.0 mg	
		50 kg		0.008 g	
		100 kg		0.20 g	
		200 kg		0.50 g	
		500 kg		1.2 g	
		1000 kg		3.0 g	
2000 kg	7.6 g				
5000 kg	19 g				

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	Instrument or Artifact	Measurand Level or Range	Measurement Conditions / Independent Variable (Optional)	Expanded Uncertainty ($k=2$)	
Force	Force measuring devices	10 N - 500 kN		Compression 0.0020 % Tension 0.0020 %	1 February 2008
		500 kN - 1 MN		Compression 0.010 % Tension 0.010 %	
		1 MN - 20 MN		Compression 0.010 % Tension -	
Torque	Torque measuring devices	5 N·m - 1 kN·m		5.0×10^{-5}	1 February 2008
		1 kN·m - 20 kN·m		7.0×10^{-5}	
	Reference torque wrench	5 N·m - 1 kN·m		7.0×10^{-5}	
Hardness	Rockwell hardness reference machine	20 HRC		0.15 HRC	1 July 2003
		40 HRC		0.15 HRC	
		60 HRC		0.15 HRC	
	Rockwell hardness standard block	From 20 HRC less than 40 HRC		0.34 HRC	
		From 40 HRC up to 65 HRC		0.30 HRC	
	Vickers hardness reference machine	200 HV30		1.6 %	
		600 HV30		1.7 %	
		900 HV30		1.8 %	
	Vickers hardness standard block	200 HV - 950 HV		a) $d < 200 \mu\text{m}$ $1.0 + (200/d) \%$ b) $d \geq 200 \mu\text{m}$ 2 % where: d is the length of a diagonal line of the indentation	

Quantity	Calibration and Measurement Capabilities				Date of Accreditation	
	Instrument or Artifact	Measurand Level or Range	Measurement Conditions / Independent Variable (Optional)	Expanded Uncertainty ($k=2$)		
Flow	Water flow meters	50 m ³ /h - 3000 m ³ /h		0.06%	1 July 2003	
	Water flow calibration facilities	50 m ³ /h - 3000 m ³ /h		0.10%		
	Gas flow calibration facilities & ISO type sonic nozzles	Nitrogen gas & dry Air	0.005 g/min - 0.1 g/min			(0.0006/ Q_m + 0.045)(%) Q_m (g/min): Mass flow
			0.1 g/min - 180 g/min			(0.001 Q_m + 0.05)(%) Q_m (g/min): Mass flow
		Argon gas	0.1 g/min - 0.2 g/min			(0.002/ Q_m + 0.04)(%) Q_m (g/min): Mass flow
			0.2 g/min - 110 g/min			(0.0006 Q_m + 0.05)(%) Q_m (g/min): Mass flow
		Helium gas	0.1 g/min - 0.5 g/min			(0.02/ Q_m + 0.02)(%) Q_m (g/min): Mass flow
			0.5 g/min - 30 g/min			(0.005 Q_m + 0.06)(%) Q_m (g/min): Mass flow
	ISO type sonic nozzles & low gas flow meters	Nitrogen gas & dry air	0.005 g/min - 0.1 g/min			(0.0006/ Q_m + 0.065)(%) Q_m (g/min): Mass flow
			0.1 g/min - 180 g/min			(0.0011 Q_m + 0.07)(%) Q_m (g/min): Mass flow
	ISO type sonic nozzles	At pressure range of 0.1 - 0.5 MPa 5 m ³ /h - 200 m ³ /h		0.17 %		
	Gas flow calibration facilities	At pressure range of 0.1 - 0.5 MPa 5 m ³ /h - 200 m ³ /h		0.24 %		
	Gas flow meters	At pressure range of 0.1 - 0.5 MPa 5 m ³ /h - 1000 m ³ /h		0.28 %		
	Very low air speed wind tunnel	0.05 m/s - 1.5 m/s		6.9 m/s - 8.7 m/s		
	Anemometers	0.05 m/s - 1.5 m/s		6.9 m/s - 8.7 m/s		

Quantity	Calibration and Measurement Capabilities				Date of Accreditation	
	Instrument or Artifact	Measurand Level or Range	Measurement Conditions / Independent Variable (Optional)	Expanded Uncertainty ($k=2$)		
Flow	LDVs	1.3 m/s ~ 1.5 m/s		0.50 %	1 July 2003	
		1.5 m/s ~ 2 m/s		0.31 %		
		2 m/s ~ 3 m/s		0.096 %		
		3 m/s ~ 5 m/s		0.068 %		
		5 m/s ~ 7 m/s		0.063 %		
		7 m/s ~ 10 m/s		0.091 %		
		10 m/s ~ 15 m/s		0.091 %		
		15 m/s ~ 20 m/s		0.063 %		
		20 m/s ~ 25 m/s		0.077 %		
		25 m/s ~ 30 m/s		0.079 %		
		30 m/s ~ 35 m/s		0.19 %		
		35 m/s ~ 40 m/s		0.19 %		
	Anemometers	1.3 m/s ~ 1.5 m/s		0.67 %		
		1.5 m/s ~ 2 m/s		0.52 %		
		2 m/s ~ 3 m/s		0.40 %		
		3 m/s ~ 5 m/s		0.33 %		
		5 m/s ~ 7 m/s		0.30 %		
		7 m/s ~ 10 m/s		0.30 %		
		10 m/s ~ 15 m/s		0.30 %		
		15 m/s ~ 20 m/s		0.29 %		
		20 m/s ~ 25 m/s		0.29 %		
		25 m/s ~ 30 m/s		0.30 %		
		30 m/s ~ 35 m/s		0.35 %		
		35 m/s ~ 40 m/s		0.35 %		
	Optical anemometer calibrators	1.3 m/s ~ 1.5 m/s		0.57 %		
		1.5 m/s ~ 2 m/s		0.41 %		
		2 m/s ~ 3 m/s		0.28 %		
		3 m/s ~ 5 m/s		0.27 %		
		5 m/s ~ 7 m/s		0.27 %		
		7 m/s ~ 10 m/s		0.28 %		
		10 m/s ~ 15 m/s		0.28 %		
		15 m/s ~ 20 m/s		0.27 %		
		20 m/s ~ 25 m/s		0.27 %		
		25 m/s ~ 30 m/s		0.27 %		
		30 m/s ~ 35 m/s		0.32 %		
		35 m/s ~ 40 m/s		0.33 %		
	Volumetric tanks	10 L		0.026 %		
		50 L ~ 100 L		0.013 %		
		100 L ~ 200 L		0.010 %		
	Oil flow meters (Volume flow rate)	15 m ³ /h ~ 300 m ³ /h		0.03 %		11 January 2005
	Oil flow meters (Mass flow rate)	3.3 kg/s ~ 67 kg/s		0.02 %		

Quantity	Calibration and Measurement Capabilities				Date of Accreditation		
	Instrument or Artifact	Measurand Level or Range		Measurement Conditions / Independent Variable (Optional)		Expanded Uncertainty ($k=2$)	
Density	Silicon single crystal (hydrostatic weighing)	2320 kg/m ³ - 2340 kg/m ³	20 °C From 30 g less than 1000 g		0.29 mm ³ - 0.36 mm ³ (Uncertainty in density depends on the mass of silicon single crystal)	11 May 2007	
			20 °C From 1000 g up to 1010 g		0.00071 kg/m ³		
	Solid materials (hydrostatic weighing)	800 kg/m ³ - 20000 kg/m ³	20 °C 1 g - 1010 g		0.29 mm ³ - 0.39 mm ³ (Uncertainty in density depends on the mass of silicon single crystal)		
	Liquid density (magnetic suspension densimeter)	600 kg/m ³ - 700 kg/m ³				0.016 kg/m ³	9 October 2003
		700 kg/m ³ - 1100 kg/m ³				0.015 kg/m ³	
		1100 kg/m ³ - 1300 kg/m ³				0.018 kg/m ³	
		1300 kg/m ³ - 1600 kg/m ³				0.020 kg/m ³	
		1600 kg/m ³ - 1700 kg/m ³				0.021 kg/m ³	
	Density hydrometer*	0.600 g/cm ³ - 0.940 g/cm ³				0.00015 g/cm ³	24 February 2005
		0.940 g/cm ³ - 1.380 g/cm ³				0.00020 g/cm ³	
1.380 g/cm ³ - 1.800 g/cm ³		0.00025 g/cm ³					
1.800 g/cm ³ - 2.000 g/cm ³		0.00030 g/cm ³					

*This calibration is done at Kansai Ogimachi Site.

Quantity	Calibration and Measurement Capabilities				Date of Accreditation
	Instrument or Artifact	Measurand Level or Range	Measurement Conditions / Independent Variable (Optional)	Expanded Uncertainty ($k=2$)	
Pressure and vacuum	Gas gauge pressure	5 kPa - 175 kPa		$200+15 P$ mPa P : measurement pressure [kPa]	5 January 2004
		175 kPa - 7000 kPa		$20 P$ mPa P : measurement pressure [kPa]	
	Gas absolute pressure	5 kPa - 175 kPa		$1000+15 P$ mPa P : measurement pressure [kPa]	
		175 kPa - 7000 kPa		$1000+20 P$ mPa P : measurement pressure [kPa]	
	Gas differential pressure	1 Pa - 10 kPa [Line pressure 100 kPa \pm 10 kPa (absolute pressure)]		$11+14 P$ mPa P : measurement pressure [kPa]	2 May 2006
	Hydraulic pressure	1 MPa - 500 Mpa		$100+20 P +0.2 P^2$ Pa P : measurement pressure [MPa]	5 January 2004
	Spinning rotor vacuum meter	0.0001 Pa - 0.001 Pa		0.91 %	
		0.001 Pa - 0.01 Pa		0.38 %	
		0.01 Pa - 0.1 Pa		0.35 %	
		0.1 Pa - 1.0 Pa		0.35 %	
1.0 Pa - 10.0 Pa			0.32 %		
Diaphragm vacuum meter	0.1 Pa - 1.0 Pa		2.84 %		
	1.0 Pa - 10.0 Pa		0.36 %		
	10.0 Pa - 150.0 Pa		0.18 %		

Quantity	Calibration and Measurement Capabilities				Date of Accreditation	
	Instrument or Artifact	Measurand Level or Range		Measurement Conditions / Independent Variable (Optional)		Expanded Uncertainty ($k=2$)
Kinematic viscosity	Standard liquids for calibrating viscometers	0.5 mm ² /s - 1.8 mm ² /s	20 °C - 40 °C		0.04%	11 January 2005
		1.8 mm ² /s - 5.0 mm ² /s	20 °C - 40 °C		0.05%	
		5.0 mm ² /s - 20 mm ² /s	20 °C - 40 °C		0.06%	
		20 mm ² /s - 150 mm ² /s	20 °C - 40 °C		0.07%	
		150 mm ² /s - 940 mm ² /s	20 °C - 40 °C		0.09%	
		940 mm ² /s - 2000 mm ² /s	20 °C - 40 °C		0.10%	
		2000 mm ² /s - 14 000 mm ² /s	20 °C - 40 °C		0.12%	
		14 000 mm ² /s - 52 000 mm ² /s	20 °C - 40 °C		0.14%	
		52 000 mm ² /s - 500 000 mm ² /s	20 °C - 40 °C		0.17%	
		0.5 mm ² /s - 1.2 mm ² /s	100 °C		0.05%	
		1.2 mm ² /s - 4.0 mm ² /s	100 °C		0.05%	
		4.0 mm ² /s - 20 mm ² /s	100 °C		0.06%	
		20 mm ² /s - 40 mm ² /s	100 °C		0.07%	
		0.5 mm ² /s - 80 mm ² /s	-40 °C		0.07%	

Quantity	Calibration and Measurement Capabilities				Date of Accreditation	
	Instrument or Artifact	Measurand Level or Range		Measurement Conditions / Independent Variable (Optional)		Expanded Uncertainty ($k=2$)
Dynamic viscosity	Standard liquids for calibrating viscometers	0.4 mPa·s - 1.4 mPa·s	20 °C - 40 °C		0.07 %	11 January 2005
		1.4 mPa·s - 4.1 mPa·s	20 °C - 40 °C		0.07 %	
		4.1 mPa·s - 17 mPa·s	20 °C - 40 °C		0.08 %	
		17 mPa·s - 130 mPa·s	20 °C - 40 °C		0.09 %	
		130 mPa·s - 820 mPa·s	20 °C - 40 °C		0.10 %	
		820 mPa·s - 1800 mPa·s	20 °C - 40 °C		0.11 %	
		1800 mPa·s - 12 000 mPa·s	20 °C - 40 °C		0.13 %	
		12 000 mPa·s - 46 000 mPa·s	20 °C - 40 °C		0.15 %	
		46 000 mPa·s - 450 000 mPa·s	20 °C - 40 °C		0.18 %	
		0.4 mPa·s - 1.0 mPa·s	100 °C		0.07 %	
		1.0 mPa·s - 3.2 mPa·s	100 °C		0.08 %	
		3.2 mPa·s - 16 mPa·s	100 °C		0.08 %	
		16 mPa·s - 32 mPa·s	100 °C		0.09 %	
		0.4 mPa·s - 72 mPa·s	-40 °C		0.09%	
Volume	One mark volumetric flasks*	1 L			0.4 mL	24 February 2005
		2 L			0.5 mL	
		5 L			1.1 mL	
		10 L			1.5 mL	
	Burettes*	≤ 2 L			0.05 %	

*This calibration is done at Kansai Ogimachi Site.